Northland Dairy Development Trust

Annual Field Day

17th June 2026

Northland Agricultural Research Farm

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Northland Dairy Development Trust

"Leading Research in Northland's Pastoral Sector"

Northland Agricultural Research Farm Society Inc.

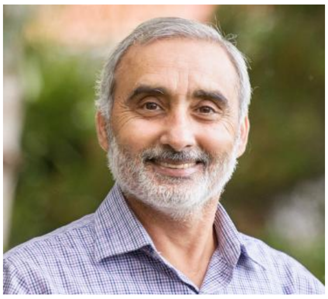
Health and Safety

- Please ensure you have registered
- Clean your footwear before entering farm
- Remain with the group at all times
- Treat all fences as live
- Dial 111 for emergency, or 0212425719 for first aid

Programme

10.15 – Welcome and introductions
10:30 - ASB
10.35 - BSI – Climate Smart Forages – Kim Richardson and Wajid Hussain
11:10 – Future Dairy Farm Systems Project Summary – Chris Boom
11:40 – Extended Lactation Project – Paul Edwards & Kim Robinson
12:10 – Farm Walk

The Bioeconomy Science Institute Maiangi Taiao: Alternative species for climate-resilient forages.



Wajid Hussain: World-first cocksfoot and ryegrass hybrid

The breakthrough: We have successfully created a cocksfoot and ryegrass hybrid. This is a notoriously difficult pairing which has struggled to produce viable seed, despite decades of international effort.

How the team achieved it: The turning point was the use of embryo rescue, a specialist technique that allows a developing hybrid embryo to survive when the seed cannot support it naturally.

What is embryo rescue? When cocksfoot and ryegrass are crossed, an embryo may form, but the seed's endosperm – the natural food source – does not. Without that nourishment, the embryo cannot survive. Before that could happen, we delicately removed the tiny embryo and transferred it onto an artificial nutrient medium, effectively placing it into a controlled, plant scale equivalent of neonatal intensive care. With this support, the embryo developed into a viable plant and later produced fertile seed.

Why this matters for farmers: Cocksfoot offers drought tolerance and persistence, ryegrass provides high feed quality and ease of establishment. Combining their strengths could eventually open new pathways to grasses that are more resilient, more nutritious, and better suited to a changing climate. However, it will take time. These plants are a proof of concept, not a commercial product. The hybrid's traits are not yet optimised for paddock conditions, and further study is needed to understand how best to harness the advantages of combining two species that have never successfully hybridised in nature.

Caption: Cocksfoot on left, hybrid in centre and ryegrass on right.

What happens next: Work will now shift to stabilising fertility, assessing agronomic traits, and developing later generation hybrids, including a planned three-species grass hybrid. If successful, the research could produce pre-breeding material for commercial seed companies in the future. Future development will explore commercial pathways, supported by Grasslanz Technology Limited, to help ensure the science ultimately delivers benefits on farm.

Kim Richardson: Biotech enhanced tropical grasses

Early-stage research: We are using biotechnology to genetically enhance the forage quality of warm season C_4 grasses for New Zealand pastures, with a particular focus on kikuyu and ruzigrass. The goal is to build more climate-resilient forage options for warmer northern regions where ryegrass-white clover pastures are under pressure.

Key traits being targeted: Gene editing is being explored to reduce lignin in kikuyu, which could improve fibre digestibility, metabolisable energy and animal intake. High Metabolisable Energy (HME) technology uses genetic modification to increase leaf lipid levels, providing more usable energy for livestock. This technology is well advanced in perennial ryegrass and has been shown in animal feeding studies to lower methane emissions by around about 10 percent and increase gross energy by around 1 MJ/kg of dry matter.

Why this matters for farmers: If successful, this research could provide more climate-resilient forage options for warmer northern regions. In addition, it could help improve feed quality, animal productivity and pasture resilience and help reduce emissions intensity from pastoral systems over time.

Where the work is up to: This research is still at an early laboratory stage. This work is conducted under sterile conditions to establish a toolbox of tissue culture and gene transfer systems for both species. Progress has been made in ruzigrass, while the kikuyu tissue culture system is proving more complex and is still being developed.

What happens next: If successful, the next steps are greenhouse testing, selection and introgression of the traits into elite kikuyu types, followed by agronomic and animal feeding trials. From developing plants through to a commercial cultivar is expected to take many years, including around six years of selection work and approximately a further four years with breeding companies before possible release. Commercialisation will also depend on regulatory approval, as well as market and community acceptance of gene technologies in New Zealand.

Caption: Development of shoots from cell cultures of kikuyu.

For more information on the Plants and Microbiomes of the Future programme, visit:
https://www.agresearch.co.nz/plants-and-microbiomes-of-the-future/

Future Dairy Farm Systems for Northland Project

Chris Boom and Kim Robinson
June 2026

Summary

This study compares three Northland dairy farm systems:

1. **Baseline Farm** – kikuyu/Italian ryegrass pastures, 3.0 cows/ha, up to 190 kg N/ha applied
2. **Alternative Pastures Farm** - over 70% of land in tall fescue/cocksfoot/chicory-based pastures, 3.0 cows/ha, up to 190 kg N/ha
3. **Low Emissions Farm -** designed to reduce greenhouse gas (GHG) emissions, kikuyu/Italian ryegrass pastures, 2.1 – 2.3 cows/ha, no N applied.

This study is now completed. Results have varied over the five years of this study. Milk production was highest on the Baseline Farm in three of those seasons while the Alternative Pastures Farm had the highest milk production in the other two seasons. Drier summers favoured the Baseline Farm which has a higher kikuyu presence in the pastures.

Milk production on the lower stocked Low Emissions Farm where no nitrogen fertiliser was applied has been between 20% and 39% lower than the Baseline Farm. The variation in milk production on the Low Emissions Farm appears to be related to variance in clover presence. Over the five seasons, clover content of the pasture on the Baseline Farm has averaged 9% while the Low Emissions Farm has averaged 24%.

Financial analysis of each farm (using actual milk prices) across the five years of the study shows that on average the Baseline and Alternative Pastures Farms have had relativity similar farm operating profit. The Low Emissions Farm operating profit has averaged $698/ha lower than the Baseline Farm, although it was not the least profitable farm in two of the five years.

	Milk Solids kg/ha	Milk Solids kg/cow	Farm Operating Profit $/ha
Baseline Farm	1,245	413	$ 3,373
Alternative Pastures Farm	1,228	405	$ 3,269
Low Emissions Farm	917	408	$ 2,675

Emissions reduction targets for the Low Emissions Farm were set in line with government messaging at the start of the trial, being 25-30% reduction in methane and 50% reduction in nitrous oxide, relative to the Baseline Farm. Averaged across the five seasons, the Low Emissions Farm achieved close to these targets when calculated using the Overseer model.

Low Emissions Farm vs Baseline Farm	Methane	Nitrous Oxide	GHG/kg MS
Targeted Reduction	25%	50%	-
Actual Reduction (5 yr average)	26%	46%	13%

Emissions intensity (GHG/kg MS) on the Low Emissions Farm was reduced, primarily through a reduction in the embedded emissions associated with lower PKE and nitrogen fertiliser while maintaining relatively high milk production per cow.

This study has provided results under contrasting climatic conditions. Extended dry summers appear to favour kikuyu/Italian ryegrass-based pastures, whereas the Alternative Pastures Farm performed well in the normal to wetter summer rainfall seasons. Removing nitrogen fertiliser on the Low Emissions Farm quickly resulted in a large increase in clover presence. Between season variation in performance of this farm has shown how dependent no-nitrogen systems are on clover presence. Reducing stocking rate and withholding nitrogen fertiliser to reduce GHG emissions on the Low Emissions Farm has reduced farm profit. Without clear pricing signals the drop in profit is significant when achieving these reductions through farm system change alone.

Background

Northland farm systems are at the forefront of the effects of a warming climate and demonstrate the challenges that other areas of New Zealand will experience over time. Ryegrass persistence is relatively poor, rust and pest damage is significant and regression to kikuyu often occurs within two to three years after sowing new ryegrass pastures. Kikuyu is productive during summer/autumn, however it has poorer nutritive value, is difficult to manage and has low winter/spring growth. Farmers are looking for alternative pasture species which may be more persistent and resilient in the face of climate change.

Farmers are also being encouraged to lower GHG emissions. Despite an abundance of modelled information farmers are uncertain as to whether the strategies to reduce emissions are physically or financially sustainable, particularly the lowering of stocking rate on kikuyu pastures.

This farm systems trial, conducted at Northland Agricultural Research Farm near Dargaville, compared farm systems which may be used in the future to mitigate and adapt to the effects of a warming climate.

Trial Design

This project ran from 2021/22 through to 2025/26 seasons and compared three farm systems:

1. **Baseline Farm** – existing Italian ryegrass/kikuyu pastures. Stocking rate 3.0 cows/ha and up to 190 kg applied N/ha
2. **Alternative Pastures Farm** – 75% of pastures in tall fescue and/or cocksfoot-based pastures, with legumes & herbs. Stocking rate 3.0 cows/ha and up to 190 kg applied N/ha
3. **Low Emissions Farm** – existing Italian ryegrass/kikuyu pastures. Targeting a 25-30% reduction in methane emissions and 50% reduction in nitrous oxide emissions (compared to the Baseline Farm). Stocking rate 2.1 – 2.3 cows/ha, no nitrogen fertiliser applied

All farms used imported feed to fill feed deficits (mainly PKE). Trial measures captured pasture and milk production and composition, profit, labour input and management difficulty and environmental impact.

Introduction of New Pastures

The Alternative Pastures Farm was set up by sowing 74% of the farm area during 2020 and 2021, into tall fescue, cocksfoot, white and red clovers and chicory. Plantain and Persian clover were also added in some paddocks. Between 15 - 20% of these alternative pastures were resown each autumn. Pasture introduction was grass to grass in the first two years, however following farmer feedback regrassing in the last 3 years was via annual ryegrass (previous autumn) and then a summer crop (either chicory or turnips) prior to sowing the tall fescue/cocksfoot based pastures.

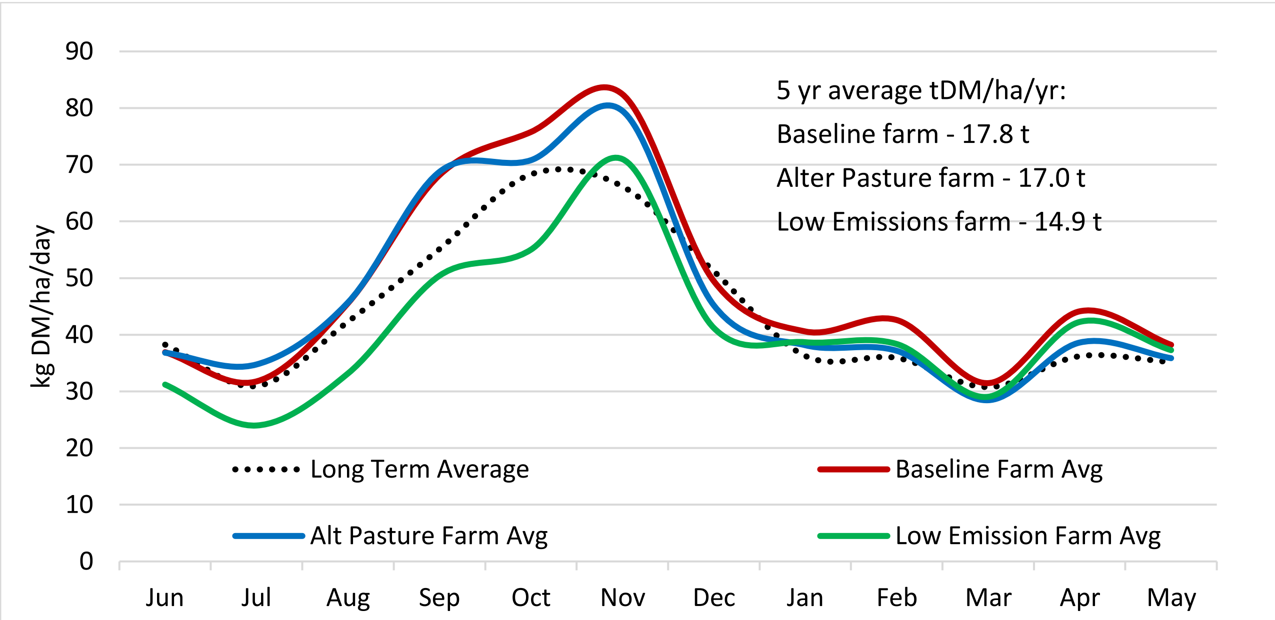
The other two farms (Baseline Farm and Low Emissions Farm), and the 26% portion of the Alternative Pastures Farm that was not sown in new pasture species, had older pastures with approximately 80% kikuyu presence. Kikuyu-based paddocks on all three farms were mulched every autumn and under-sown with Italian ryegrass to provide control of kikuyu stolon and boost winter/spring pasture growth and quality to complement the summer/autumn active kikuyu.

Pasture Growth & Pasture Covers

Figure 1 shows the pasture growth differences between these pastures as calculated by weekly rising platemeter assessments. Pasture growth on the Baseline farm has generally been higher during summer and autumn than the Alternative Pasture Farm. This is due to kikuyu being present during autumn on 80% of the Baseline Farm compared to 47% of the Alternative Pastures Farm.

Across the five seasons the Baseline and Alternative Pastures Farms averaged 177 kg nitrogen applied/ha. With no nitrogen applied, the Low Emissions Farm had lower pasture growth during winter and spring than the other farms, averaging 2.9 t/ha lower than the Baseline Farm. This indicates nitrogen response on the Baseline Farm of 16.4 kg DM/kg N applied. This relatively good nitrogen response is despite the high clover presence on the Low Emissions Farm (see Figure 2).

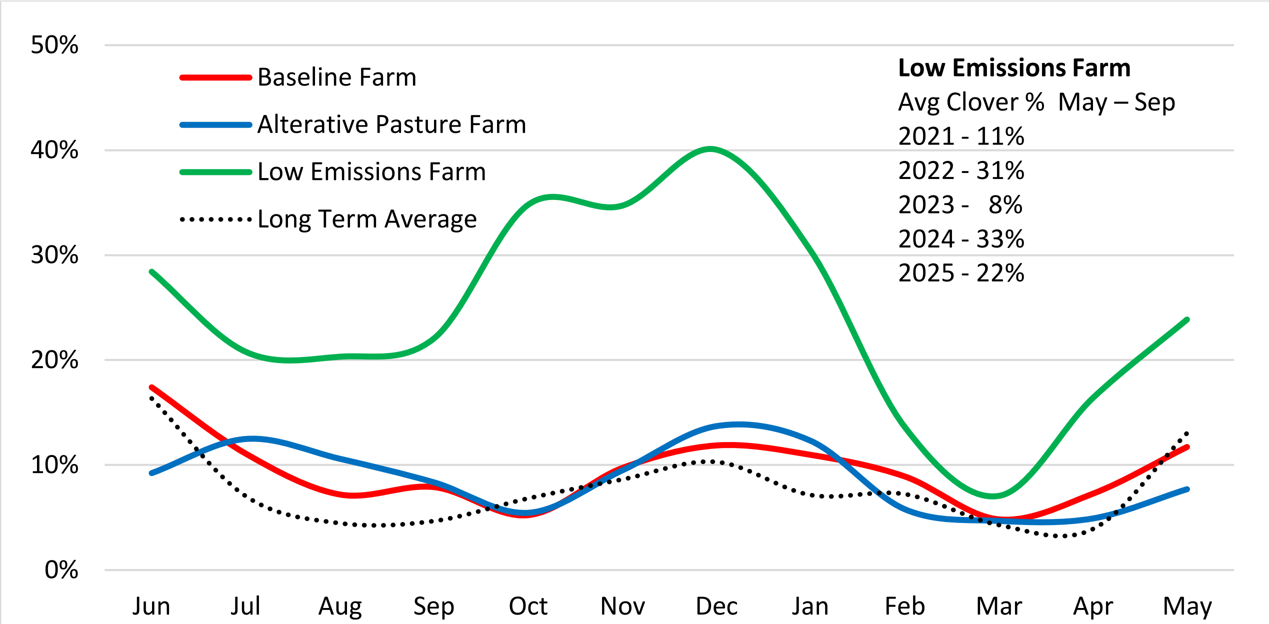
Figure 1. *Pasture growth rates, average of 5 years (calculated by pre – post grazing platemeter assessments).*



Pasture Composition

Pasture samples were collected monthly from the next three paddocks to be grazed on each farm and analysed for feed quality and species present. Figure 2 shows the presence of clover averaged over the five years. The clover was entirely white clover on the Baseline and Low Emissions Farms with a small amount of red clover on the Alternative Pastures Farm.

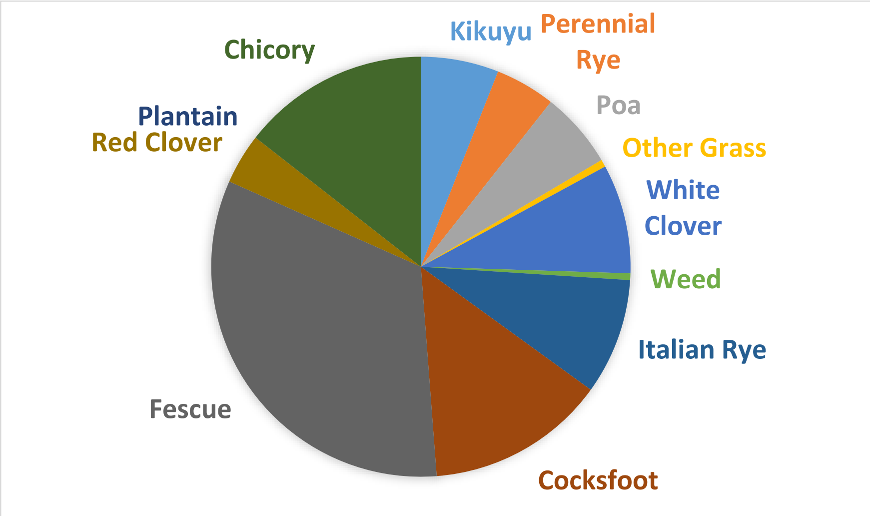
Figure 2. *Clover presence in pasture sampling to grazing height (% clover), average of five years.*



The Low Emissions Farm paddocks had a long history of regular nitrogen applications during winter/spring prior to the start of this study. The proportion of clover within the pasture increased steadily over the first 5 months of the study until it was 40% of the pasture. Flooding in February 2023 killed all clover on 90% of all three farms. Clover recovery took 10 months until it was fully recovered to pre flood levels. In the seasons when clover content has been high during winter and early spring, milk production on the Low Emissions Farm has also been high, relative to the poor clover seasons.

Figure 3 shows the average pasture composition of the tall fescue/cocksfoot based pastures on the Alternative Pastures Farm. Tall fescue was the most dominant component. Cocksfoot was only sown in some drier paddocks, some of which were cocksfoot dominant for the first two years of the study, however cocksfoot became very scarce in the latter three seasons likely due to the wetter winters. Kikuyu presence was generally very low in paddocks until three years after sowing and widespread by the fifth season after sowing.

__Figure 3.__ Pasture composition of Tall Fescue/Cocksfoot based pastures, average of five years.



Supplement Fed & Pasture Eaten

Farms were managed so that home grown or purchased supplement was only fed when pasture residuals fell below target levels (1500-1600 kg DM/ha). There was a limit of 800 kg DM/cow/yr (around 15% of total requirements) of purchased feed so that pasture system differences were not masked by high supplement use.

Table 1 shows the average amount of supplement fed/annum over the five seasons, the cost of those supplements and the calculated feed eaten for each of the farms. The Baseline Farm tended to feed more purchased supplement during winter/spring and the Alternative Pastures Farm fed more during summer/autumn.

__Table 1.__ Supplement made and purchased, cost of supplement and calculated pasture eaten – average of five seasons.

Farm	Supplement	Kg DM/cow fed	Cost of Supplement (incl Freight)	Total Cost of Supplement c/kg DM	Calculated Pasture Eaten tDM/ha
Baseline Farm	Home-made Silage	251	$52.50/bale	19	13.3
	PKE	663	$394/t	43	
	Purchased Silage	129	$93/bale	35	
	Total	**1,043**			
Alternative Pastures Farm	Home-made Silage	253	$52/bale	19	13.4
	PKE	608	$401/t	43	
	Purchased Silage	148	$93/bale	35	
	Total	**1,009**			
Low Emissions Farm	Home-made Silage	391	$52/bale	19	10.8
	PKE	289	$401/t	43	
	Purchased Silage	14	$93/bale	35	
	Total	**694**			

With a lower stocking rate, the Low Emissions Farm had lower demand for purchased supplement. Most of the supplement fed was during winter/early spring due to the impact of no nitrogen applications leading to low pasture growth rates.

Milk Production

Milk production is shown in tables 2 and 3. The Baseline Farm had the highest average milk production over the 5 years, though the Alternative Pastures Farm had the highest milk production for two of those years. Climatic conditions drove this variance through lower pasture growth and covers on the Alternative Pastures Farm during dry summer/autumn periods resulting in cows drying off earlier, whereas kikuyu growth during autumn supported longer lactations on the Baseline Farm.

On average, milk production on the Low Emissions Farm was 328 kg MS/ha lower than the Baseline Farm. Milk production was especially low during the 2021/22 and 2023/24 seasons when clover levels in the pasture were low during winter/spring. The other three seasons had significantly higher clover levels, at times >50% of pasture, which appears to have supported milk production.

Table 2. *Seasonal Milk Production (kg MS/ha).*

Farm	2021/22	2022/23	2023/24	2024/25	2025/26	5 Year Average
Baseline Farm	1,284	1,204	1,112	1,289	1,356	**1,245**
Alternative Pastures Farm	1,213	1,269	1,178	1,188	1,307	**1,228**
Low Emissions Farm	794	910	790	1,002	1,083	**917**

Averaged over the 5 seasons, milk production per cow was fairly similar across all farms.

Table 3. *Seasonal Milk Production (kg MS/cow).*

Farm	2021/22	2022/23	2023/24	2024/25	2025/26	5 Year Average
Baseline Farm	409	392	375	430	458	**413**
Alternative Pastures Farm	397	406	386	393	443	**405**
Low Emissions Farm	370	399	355	450	464	**408**

Figures 4 and 5 show the seasonality of milk production. These show the lower average production of the Alternative Pastures Farm during autumn due to lower pasture supply and earlier dry-off in some seasons.

The Low Emissions Farm showed lower milk production per cow during spring than the other farms, though this only occurred in the two seasons where clover levels were low in the pasture during this period.

__Figure 4.__ Milk Production – kg MS/ha/day, average of 5 years.

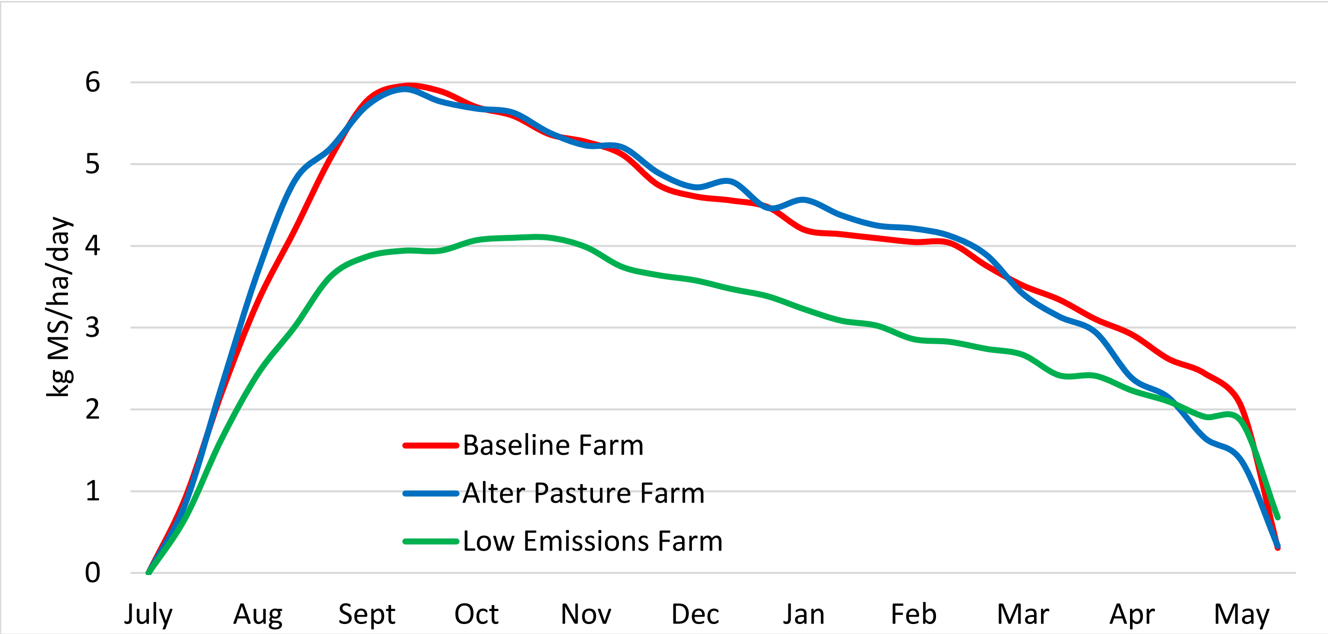
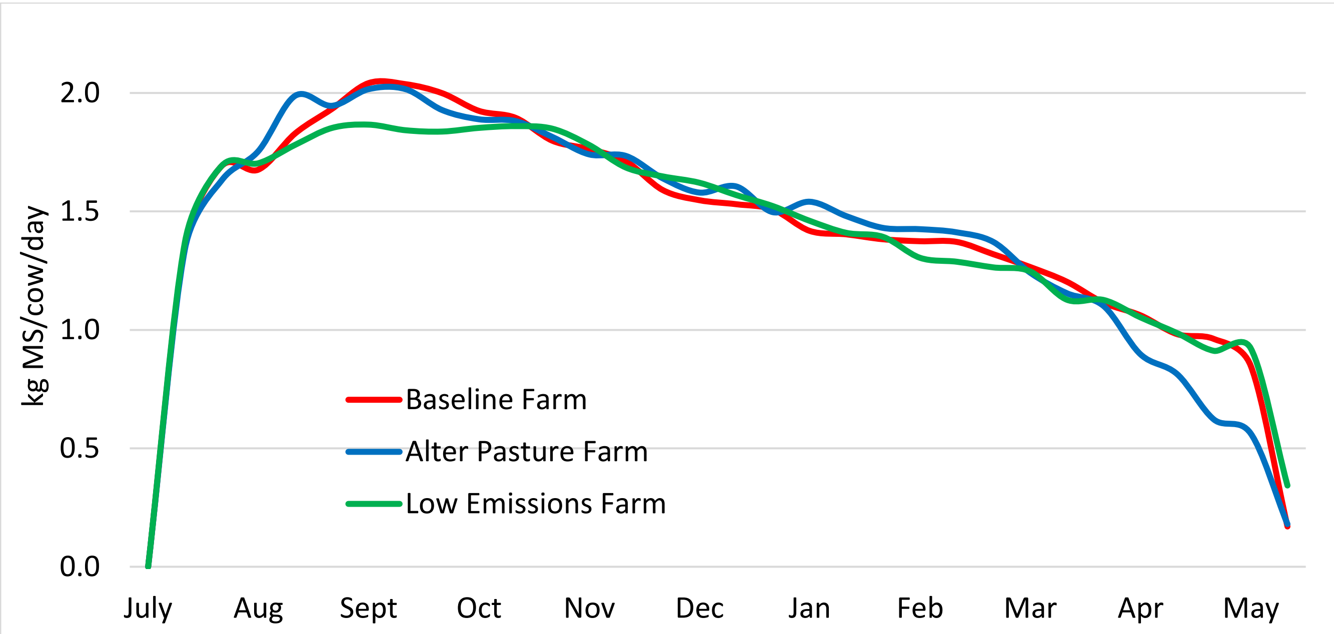


__Figure 5.__ Milk Production – kg MS/cow/day, average of 5 years.



Mating Results

Table 4 shows the mating results averaged over the first four seasons. There was no consistent difference between farms.

__Table 4.__ Six week in-calf and empty rates, average of 4 years.

Farm	6 week in-calf rate	Empty rate
Baseline Farm	78%	12%
Alternative Pastures Farm	79%	8%
Low Emissions Farm	77%	7%

Greenhouse Gas Emissions

Greenhouse gas emissions were calculated using the Overseer model and are shown in Table 5.

Emissions have been relatively similar between the Baseline and Alternative Pastures Farms, due to similar stocking rate, milk production, PKE and N inputs. The Low Emissions Farm averaged 26% less methane and 46% less nitrous oxide for the five years of the trial. The higher milk production on the Low Emissions Farm during the 2025/26 season led to lower reductions in methane and N_2O compared to the previous four years. The methane levels fluctuate somewhat in line with milk production and stocking rate, as methane is closely related to feed eaten.

Table 5. *Calculated GHG Emissions using Overseer Model, average of five seasons and 2025/26.*

Farm	5 yr avg Methane (CO_2 eq) t/ha	2025/26 Methane (CO_2 eq) t/ha	5 yr avg Nitrous Oxide (CO_2 eq) t/ha	2025/26 Nitrous Oxide (CO_2 eq) t/ha
Baseline Farm	8.5	8.8	2.0	2.0
Alternative Pastures Farm	8.7	9.0	2.0	2.1
Low Emissions Farm Compared to Baseline Farm	6.3 26% reduction	7.1 20% reduction	1.1 46% reduction	1.2 41% reduction

The Low Emissions farm has consistently produced milk with lower emissions intensity, primarily due to three key factors – low emissions associated with less PKE, no N fertiliser and good milk production per kg liveweight which dilutes maintenance feed methane across more kg MS.

Table 6. *Calculated GHG Emissions Intensity (Overseer Model), average of five seasons and 2025/26.*

Farm	5 yr avg (CO_2 eq) Kg/kg MS	2025/26 (CO_2 eq) Kg/kg MS
Baseline Farm	10.4	9.8
Low Emissions Farm Compared to Baseline Farm	9.0 13% reduction	8.5 13% reduction

Financial Analysis

Five-year average income, expenses and operating profit for the three farms is summarised in Table 7. Fonterra dividend income is excluded from this financial analysis. Milk price over the 5 years of the study averaged $9.04/kg MS. Expenses are based on actual farm expenses with some adjustments for labour and administration to compensate for extraordinary expenses involved in running the research trial. Records of additional labour and tractor time for each farm have been used to allocate the vehicle, R&M, and depreciation expenses.

The Baseline and Alternative Pastures Farms have shown similar farm operating profit when averaged across the five years. The individual year operating profit shows the variation between seasons, mainly due to climatic conditions or milk price suiting one farm over another.

Averaged over the 5 years, the Low Emissions Farm operating profit was $698/ha lower than the Baseline Farm. However, in two years this farm was not the least profitable which shows that this system can be somewhat competitive under certain conditions.

Table 7. *Financial Results - income, expenses, and operating profit for the three farms ($/ha).*

Financial Summary 5 Year Average	**Baseline Farm**	**Alternative Pastures Farm**	**Low Emissions Farm**
Income	**$/ha**	**$/ha**	**$/ha**
Income from milk ($9.04/kg MS)	$11,325	$11,116	$8,357
Other income (excl Fonterra Dividend)	$808	$804	$652
Total Income/ha	**$12,132**	**$11,920**	**$9,009**
Expenses			
Farm Working Expenses	$8,179	$8,117	$5,837
Depreciation	$580	$534	$498
Total Operating Expenses/ha	**$8,759**	**$8,651**	**$6,334**
Farm Working Expenses $/kg MS	**$6.61**	**$6.61**	**$6.32**
Operating Profit (at $9.04/kg MS)	**$3,373**	**$3,269**	**$2,675**
Individual Seasons Operating Profit/ha			
2021/22 Operating Profit @ $9.30/kg MS	**$4,952**	$4,699	$2,974
2022/23 Operating Profit @ $8.22/kg MS	$1,906	**$2,669**	$2,234
2023/24 Operating Profit @ $7.83/kg MS	$204	**$494**	-$439
2024/25 Operating Profit @ $10.16/kg MS	**$5,183**	$4,261	$4,515
2025/26 Operating Profit @ $9.70/kg MS	**$4,618**	$4,223	$4,091

Discussion

Over the five seasons of this trial there have been two relatively dry summers and three relatively wet summers. The wet summers have generally benefited the tall fescue and cocksfoot pastures on the Alternative Pastures Farm, whereas the dry summers have favoured the Baseline Farm with kikuyu pastures. It should be noted that all kikuyu pastures are intensively managed with mulching and under-sowing of Italian ryegrass each autumn, making the Baseline Farm a relatively high performing system.

The removal of nitrogen fertiliser from the Low Emissions Farm has resulted in a consistent overall reduction in pasture growth during winter and spring compared with the Baseline Farm, averaging 2.9 t DM/ha/annum less pasture grown.

All paddocks on all farms had a long history of nitrogen applications prior to this study. Clover levels on the Low Emissions Farm increased rapidly when nitrogen applications ceased at the start of this study. However, this did not fully compensate for the lack of nitrogen applied. Calculations indicate an average total farm system response of 16.4 kg DM/kg N applied on the Baseline Farm over the five years.

Averaging data over the five years of this project, the Low Emissions Farm showed 328 kg MS/ha lower milk production and $698/ha lower operating profit than the Baseline Farm. Variation between seasons shows how dependent the Low Emissions Farm is on clover presence to reduce the impacts of removing nitrogen applications. The average milk price over the five years of the study was $9.04/kg MS. The milk price would need to be < $7.00/kg MS with current input costs for the Low Emissions Farm to be as profitable as the Baseline Farm.

This project expected to reduce methane emissions by 25-30% and nitrous oxide emissions by 50% on the Low Emissions Farm compared to the Baseline Farm. The actual (modelled) reduction has generally been in line with these targets, reflecting the reduction in stocking rate and milk production. The consistent improvement in emissions intensity indicates the potential for lower input systems like the Low Emissions Farm to be more efficient from a GHG emissions perspective, as long as milk production per cow is maintained.

Extended Lactation for Northland

Background

Maintaining labour requirements on New Zealand dairy farms is a constant challenge. Labour demand varies over the farming season with the calving period having the highest demand and the highest level of stress.

Recent trial work on small farmlets in the Waikato has shown that extending lactation, from 10 months to 22 months (calving every 24 months), can have similar or improved productivity and profitability compared to a standard 12 month calving regime, while potentially smoothing labour demand across the season. Combining this with once-a-day milking could further reduce labour demand and make dairy farming more attractive to staff. Extended lactation combined with sexed semen and selective beef semen could also reduce the number of surplus dairy calves.

Computer modelling has indicated that extended lactation would suit Northland better than other regions with an increase in farm profitability of >$400/ha compared to the normal 12-month calving system. In addition, a relatively high proportion of Northland farms already milk once-a-day for the full season. Combining extended lactation with once-a-day milking is a novel and untested system. NDDT and NARF are prepared to take on the risk of implementing this technique. If it is proven to work in a Northland commercial farming context then it will likely have applicability to other regions, especially as the climate warms.

Questions that this project will address:

- Can extended lactation be productive and profitable under two different milking frequencies within a commercial farming context?
- Are additional supplements required to maintain production in the second season of lactation?
- Are certain cows more suited to extended lactation?
- What are the environmental impacts of extended lactation compared to a 12-month calving regime?
- How does extended lactation impact people and labour demand?

Trial Structure & Activities

The trial began on 1st June 2026 and will run for up to three years. Each farm is approximately 27.1 ha and has 80 cows (3.0 cows/ha). The project will quantify the physical and financial performance, and impact on labour of three farm systems:

1. **Baseline Farm** - A standard 12 month calving regime being milked twice-a-day
2. **Extended Lactation TAD** - A 24 month calving regime being milked twice-a-day
3. **Extended Lactation OAD** - A 24 month calving regime being milked once-a-day

Preparation for the trial began in spring 2025 when one third of all cows were intentionally not mated. These cows were selected randomly to reflect the age and BW structure of the herd. All cows were then reallocated across the new trial herds to ensure any herd differences from the previous trial do not carry over into the EL trial. The mating planning guide shows how half of the herd is mated each year on the two EL farms.

All farms 27.5ha	2025/26	2026/27	2027/28	2028/29
Baseline Herd 80 cows 18 replacements /yr 22%	100% mated spring	100% mated spring	100% mated spring	100% mated spring
EL TAD 80 cows 14 replacements / yr 17%	41 cows AB mated 8 wks	40 cows AB mated 8 wks	40 cows AB mated 8 wks	100% cows mated spring
EL OAD 80 cows 14 replacements/yr 17%	41 cows AB mated 8 wks	40 cows AB mated 8 wks	40 cows AB mated 8 wks	100% cows mated spring

Imported supplements will be used when pasture grazing residuals are below predetermined levels depending on the season. Supplement use will be restricted to PKE, PKE blends and silage.

Nitrogen use will be consistent across all farmlets, up to 190 kg N/ha/annum. All kikuyu-based pastures will be mulched and under-sown with Italian ryegrass in autumn. Paddocks sown in alternative species (tall fescue & cocksfoot) will be balanced across farmlets.

Current Farm Metrics are as follows

Update 11 June 2026	**Baseline Farm**	**EL TAD Farm**	**EL OAD Farm**
Average Pasture Cover	2,251	2,204	2,254
Pasture Growth (kg DM/ha/d, last 2 weeks)*	23	29	27
Rotation Length (days)	66	49	52
Cows in milk/Total Cows	0/81	40/81	40/81
BCS	4.7 Dries	4.8 Dries 4.35 Milkers	4.95 Dries 4.35 Milkers
Kg MS/cow/day	-	1.55	1.30
Litres/cow/day		13.0	11.3
Kg MS/cow, season to date		15	13
Kg MS/ha, season to date	-	22	19
Supplement offered (kg DM/cow/day)	Dries 4.4 PKE	Dries 4.5 PKE Milkers 4.5 PKE Milkers 3.3 bale	Dries 0 Milkers 4.5 PKE Milkers 3.3 bale
Purch Supp Fed, season to date (kg DM/cow)	PKE 32 Baleage 7	PKE 32 Baleage 20	PKE 32 Baleage 20
Managers Worry Score (1 = Low, 10 = High)	3	4	4
Rainfall (last two weeks)	80mm		

Subsurface Drainage Trial

Northland Agricultural RESEARCH FARM (INC)

NARF 1948

Purpose

- To quantify the benefits of tile and mole drainage on the marine clay soils at NARF

Background

There was a lot of interest in subsurface drainage in the 1940s through to 1970s. The practice was relatively expensive so the Northern Wairoa Demonstration Farm (now NARF) set up a Drainage Demonstration area in a 2.4ha paddock in 1948. Pasture production was measured through weekly cuts over 8 years. The figures below are the average of the 8 years.

Results

	Pasture Growth kgDM/ha		
	Drained	**Undrained**	**Difference**
Winter	2260	1980	+ 14%
Spring	4790	4470	+ 7%
Summer	5440	5120	+ 6%
Autumn	3840	3530	+ 9%
Total	16330	15100	**+ 8%**

Notes