



DIVERSE PASTURES AND RELEVANCE TO NEW ZEALAND DAIRY FARMING

Open Day 2024
at Waimate West Farm



Dairy Trust
TARANAKI

AGENDA

11.00 am Introduction and H&S

11.15 am Trial overview

11.25 am information sessions – split into groups

12.40 pm summary and questions

Lunch

HEALTH AND SAFETY



- Slippery races when wet
- Vehicles and machinery may be operating
- Electric fences are on
- **No go areas:** effluent sump, chemical storage
- Any accidents or near misses to be reported to DTT or DairyNZ staff
- Meeting point: middle of tanker loop
- First Aid kit located in the cow shed office
- First Aid lead: Katie Starsmore (DairyNZ)

TRIAL OBJECTIVE

Dairy Trust Taranaki are conducting a two farmlet study over a 7-year period to assess the economic and environmental impact of diverse pastures as part of the *Regenerating Aotearoa* program. This program investigates the impacts of regenerative farming practices funded by MPI through the *sustainable food and fibre futures* (SFFF) fund.



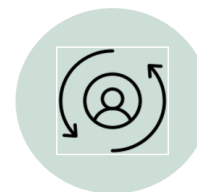
PROFITABILITY AND PRODUCTION

determine how well diverse pastures perform relative to profit and production from conventional ryegrass-based pastures.



ENVIRONMENTAL

determine whether diverse pastures lead to reduced N leaching and retain or increase soil carbon compared with ryegrass-based pastures.

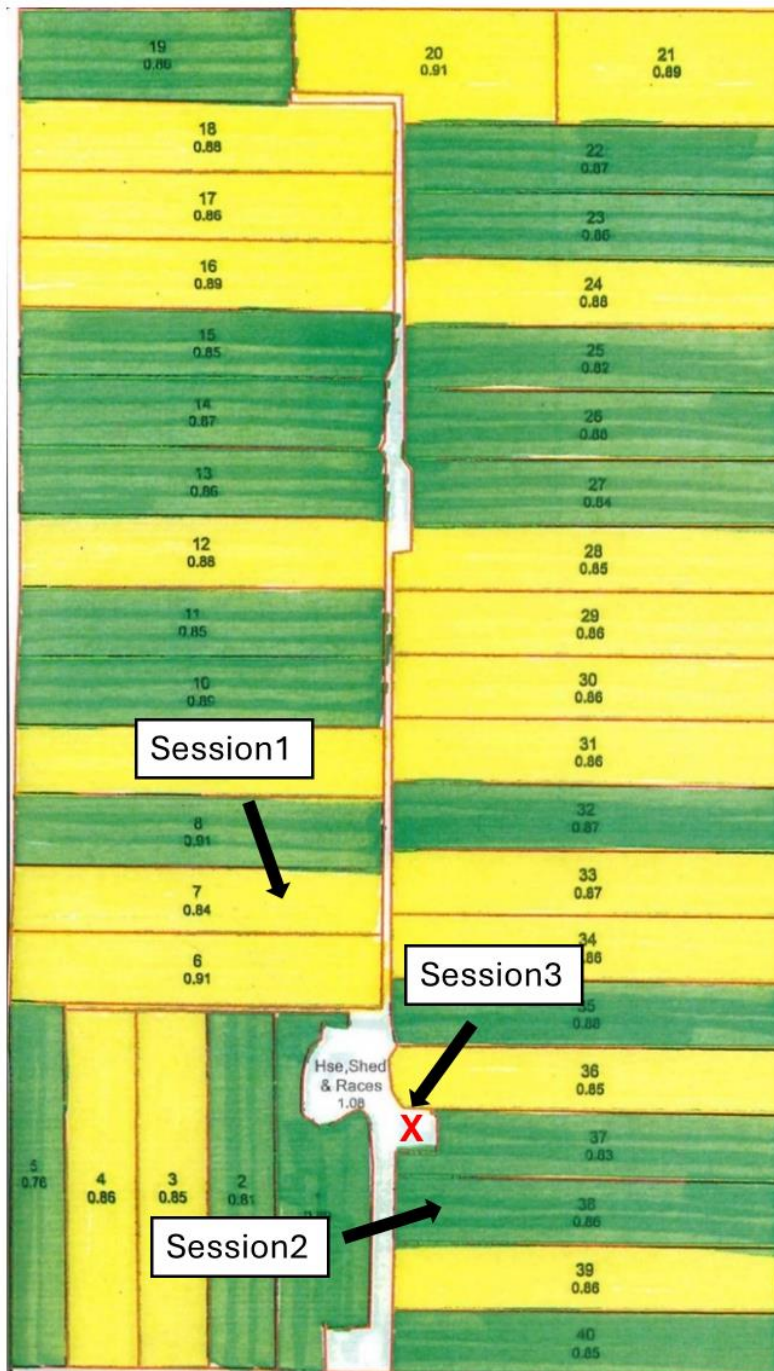


WELLBEING AND VALUES

determine whether diverse pastures provide farmers and their communities with better outcomes with regards to how the production system is perceived by themselves, consumers and other stakeholders.

TRIAL OVERVIEW

Two farmlets were established in spring 2021. The farmlets were balanced for location, Olsen P, Soil K, effluent use, new grass, previous cropping history and randomised on soil fertility. Initial randomization of cows took place in January 2022. 120 Jersey & Jersey X cows were randomised on age, BW, PW, calving date, liveweight, condition score and previous milk solids production. Both herds are full autumn calving as the area is traditionally summer dry. At the start of the trial both farmlets were stocked at 3.5 cows/ha. Stocking rate was reduced to 3.0 cow/ha in the second year.



Session 1: Diverse pastures – pdk 7
Bruce Patterson - Barenbrug

Session 2: N leaching and soil biology results – pdk 38
Mags Bremer – DTT

Session 3: Financials and production figures – classroom
Jason Rolfe - DTT

Farmlets:

Conventional – current system with ‘conventional’ rye/clover-based pastures.

Diverse – Initially 20% of the farmlet was planted in a diverse multi species pasture mix. The whole farmlet will be gradually re-sown in diverse pastures over the length of the trial. An equal area of the conventional farmlet will be resown with a standard ryegrass/clover mix each year. Currently 40% of the diverse farmlet is sown into a Barenbrug diverse pasture mix.

Seed Mix		
Cultivar	Rate/bag	
Maxsyn NEA4 perennial ryegrass	5	
Safin fine leaved cocksfoot	3	
Rohan NEA2 SPR perennial ryegrass	2	
Timothy	1	
Bareno grazing brome	3	
Tabu+ Italian ryegrass	2	
Kotuku white clover	1	
Weka white clover	1	
Morrow MS red clover	3	
Laser Persian clover	1	
Coolamon sub clover	1	
501 chicory	1	
Captain CSP plantain	1	
Total	25kg Bag	

Following the crop of maize, paddocks were resown at the end of March 2023 with a ryegrass/clover mix on the conventional farmlet. Paddocks on the diverse farmlet were resown with a mix of brome and perennial and annual ryegrass at the same time. The legumes and herbs were oversown into the diverse paddocks in October 2023. This allowed for spraying of the newly established pastures and controlling of the weeds before the herbs and legumes were sown.

For the second season of the trial the stocking rate was reduced from 3.5 to 3.0 cows/ha to make the herds less dependent on bought in feed while milking during the winter months.

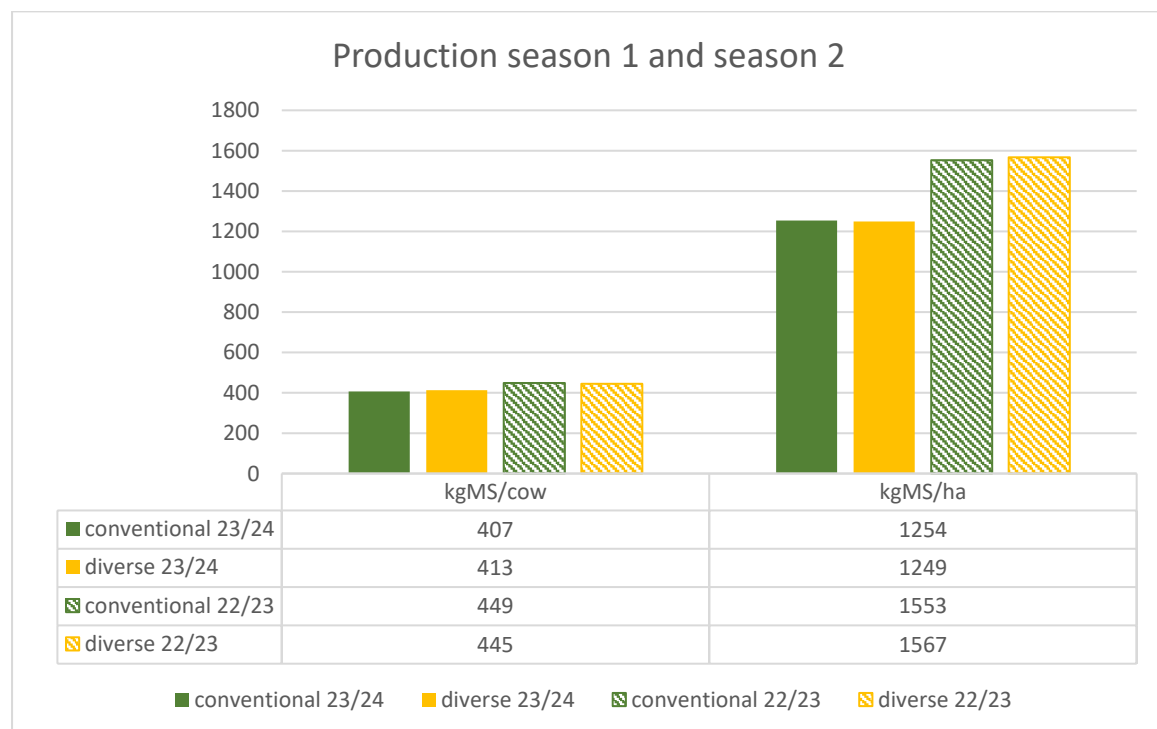
	Season 1 (22/23 season)		Season 2 (23/24 season)	
	Conventional	Diverse	Conventional	Diverse
effective ha	17.2	17.2	17.2	17.2
cows	60	60	53	52
stocking rate cows/ha	3.5	3.5	3.1	3.0
nitrogen kgN/ha	78	88	114	112
capital fert	synthetic	Osflo	synthetic	Osflo
Maize (ha)	1.7	1.7	1.7	1.7
pasture species	rye/clover	13 species mix	rye/clover	13 species mix
Area regrassed	30%	30%	40%	40%

MEASUREMENTS

The following parameters will be measured throughout the trial:

- Milk production
- Liveweight, BCS and animal health
- Mating and calving information
- Supplements – all supplements harvested and fed
- Soil biology – earthworms, pasture pests and nematodes
- Soil physics – macroporosity and water holding capacity, soil carbon and nitrogen
- N leaching – suction cups and lysimeters
- Pasture botanicals and pasture quality
- Milk senses and human health benefits testing

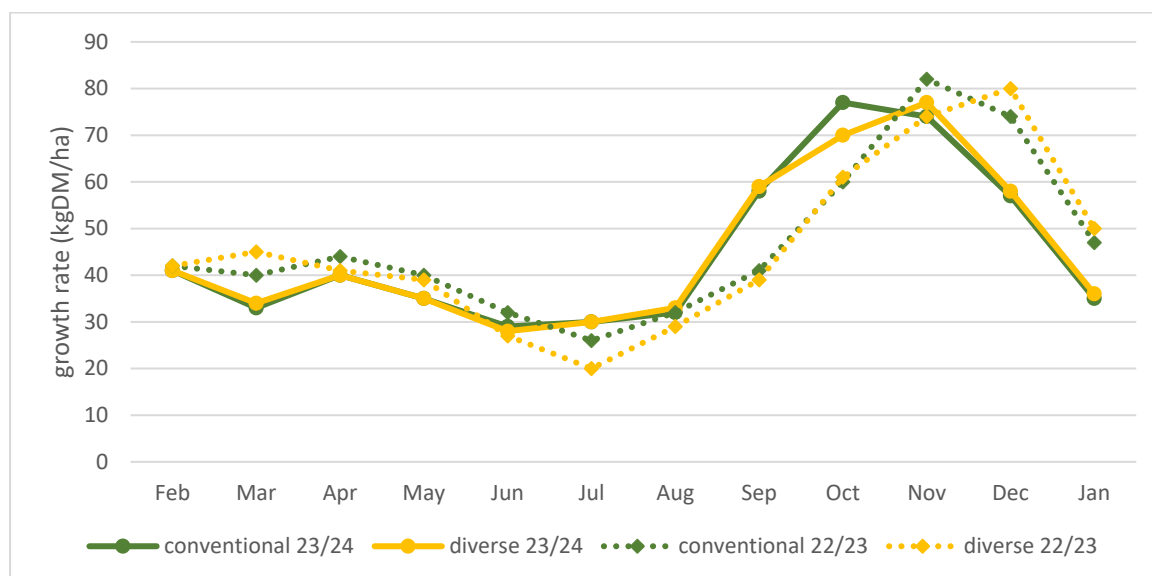
MILK PRODUCTION



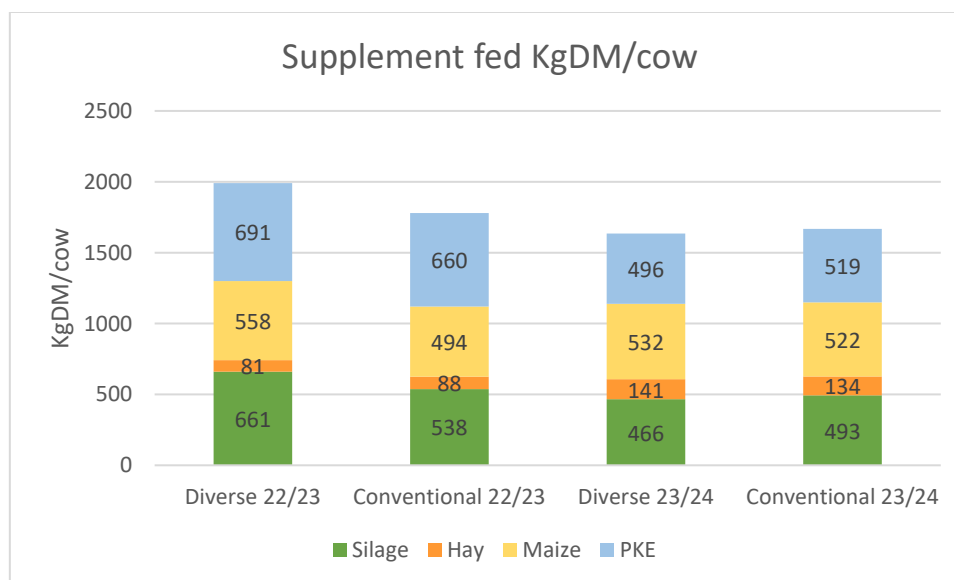
The milk production is very similar so far for the two herds. Milk production per cow and per hectare was lower in the second season. The lower milk production per hectare is partly related to the reduction in stocking rate.

PASTURE PRODUCTION

Pasture growth on the two farmlets was quite similar throughout the second season of the trial (23/24 season). Pasture growth was higher during spring in the second season than in the first season of the trial (22/23 season). However, December and January in the second season was quite warm and dry so the pasture growth in these months have been lower than in the first season of the trial.

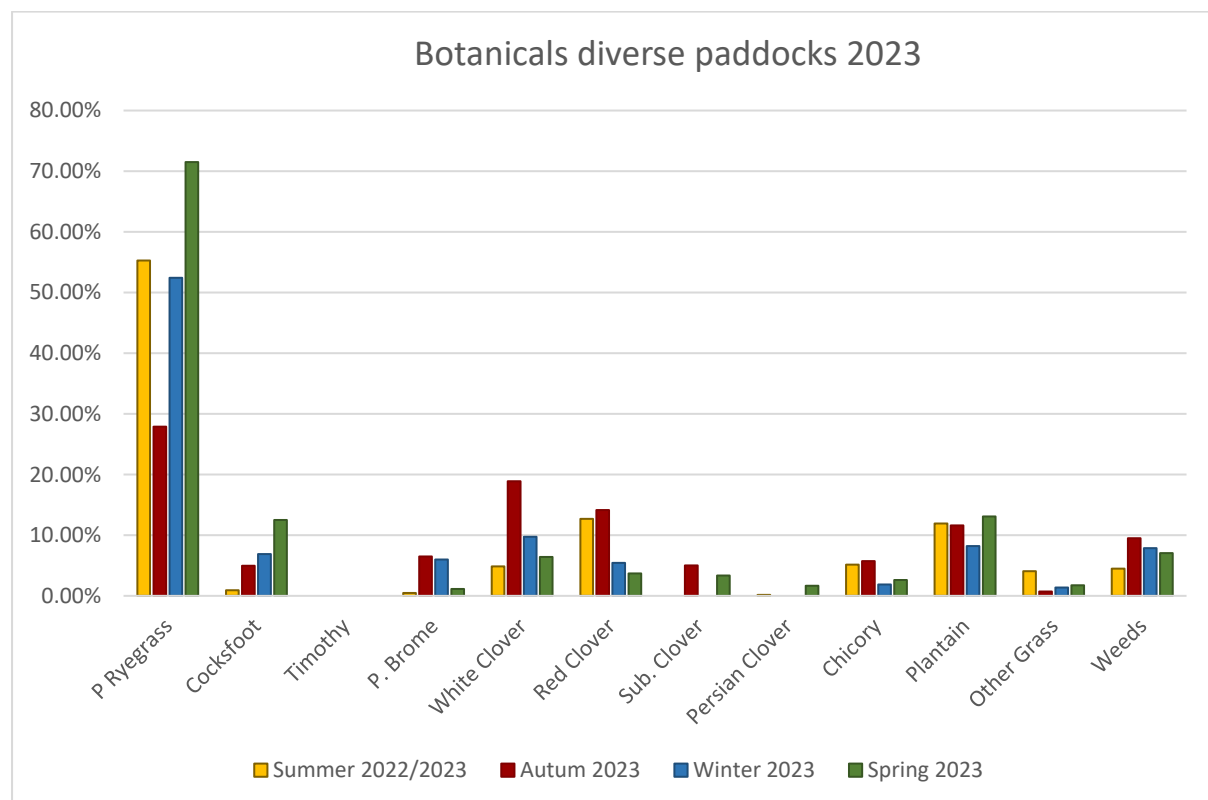


SUPPLEMENTS



Like any autumn calving system both herds required considerable amounts of supplements. Less supplements were fed in the second season of the trial. Similar amounts of supplements were fed on the diverse and conventional farmlet in the second season of the trial.

DIVERSE PASTURES BOTANICALS



Pasture samples are taken from each paddock four times per year in spring, summer, autumn and winter, pre grazing for analysis of the botanical composition. After dissection into the different pasture species and drying, pasture composition is determined on dry weight.

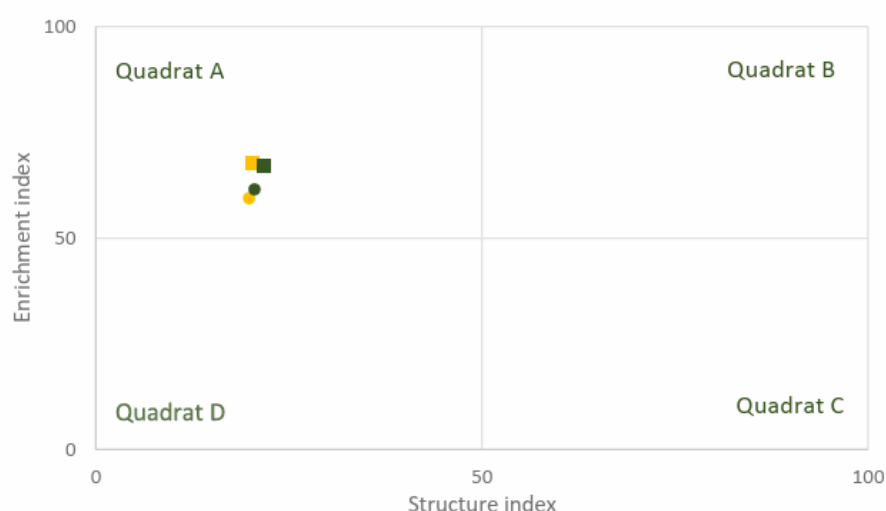


SOIL BIOLOGY



Soil biology is assessed through a combination of measurements, including microbial biomass, microbial respiration, microbial diversity, nematodes, earthworms, and insect pasture pests. The results from samples taken between Spring 2021 and Autumn 2023, showed variability in abundance and activity in soil biology between sampling times but no significant differences in the soil biology between the two farmlets. The difference between the two farmlets may be limited so far due to the short time since the establishment of the diverse paddocks.

The distribution of the composition of the nematode community as an indicator for soil health, has been found to be similar for the diverse and conventional farmlets so far. Nematodes are microscopic invertebrates that span the entire soil food web and can have both beneficial and detrimental effects within the soil-plant system. Nematodes have been found to be responsive to management and may therefore be useful indicators of soil health.



Distribution of the nematode community composition for the diverse (yellow) and the conventional (green) farmlets in spring 2021 (circles) and spring 2022 (squares). The nematode community of both farmlets are placed in Quadrat A which is N-enriched, and the decomposition is bacterial dominated. Quadrat B represents a “maturing” food web which is N-enriched, and the decomposition pathways are balanced. Quadrat C represents a “structured” food web which has moderate enrichment, and the decomposition is fungal dominated. Quadrat D represents a “degraded” food web which is stressed with depleted food resources and the decomposition is fungal dominated.

NITROGEN LEACHING

Nitrogen (N) leaching losses are determined by measuring the nitrate and ammonium concentrations in soil water below plant rooting depth by sampling leachate from ceramic suction cups.



The analysis of the first year of leachate collections show no statistically significant differences in nitrate-N or ammonium-N concentrations between the two farmlets. There were also no statistically significant differences in the total amount of nitrogen leaching on the farmlets. Generally, large differences are not expected to be seen in the first year of leaching studies as this a start-up period where differences between treatments are only starting to occur.

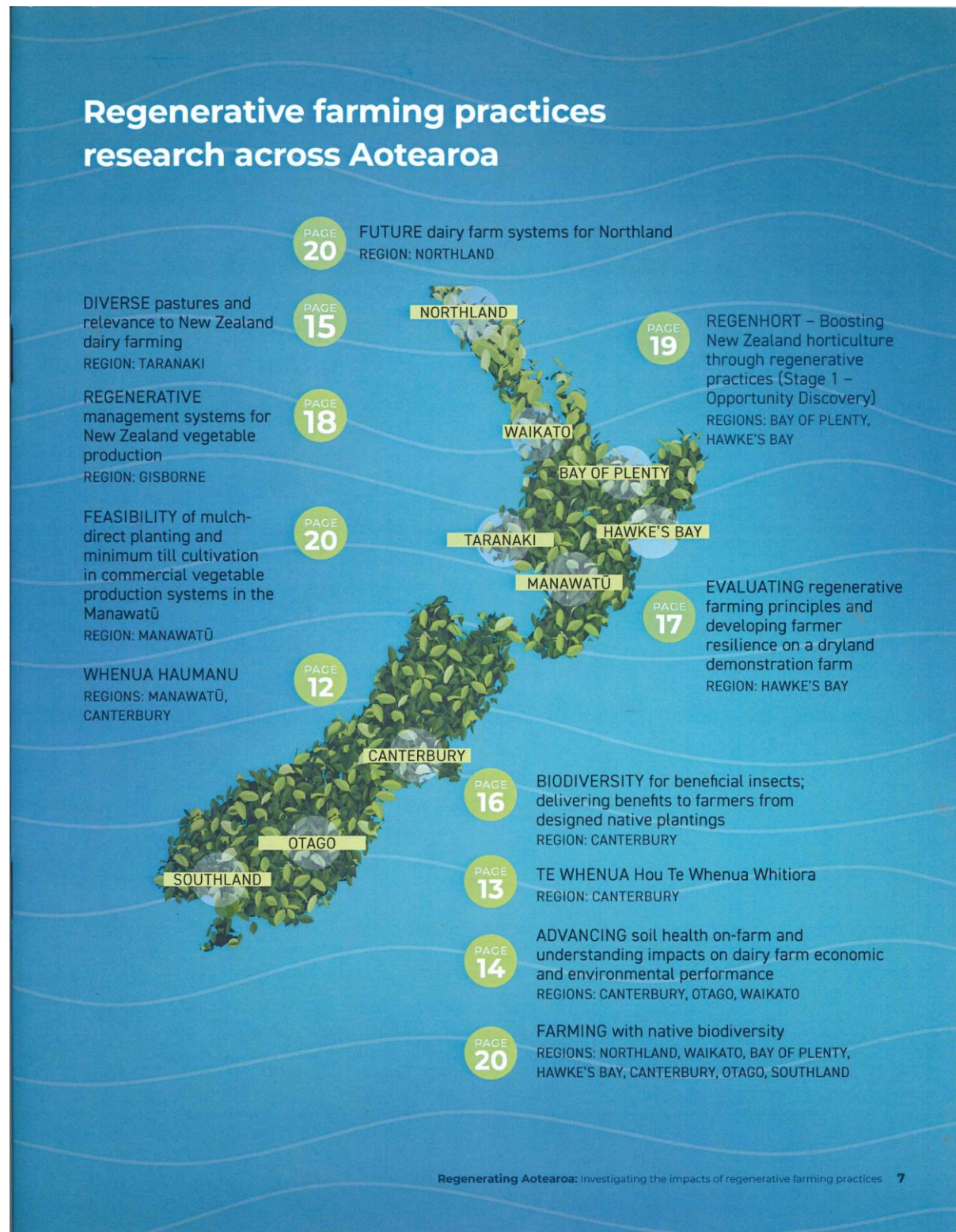
CONCLUSION

40% of the diverse farmlet have now been sown into diverse pastures. Diversity in the latest 10% is only coming through since the herbs and legumes were sown in spring 2023. So far, no significant differences have been found between the two farmlets with regards to milk production, pasture growth, soil biology or nitrogen leaching. However, large differences cannot be expected to be detected this early in the project due to the short amount of time since the establishment of the diverse pastures as well as the majority of the diverse farmlet still being conventional pastures.

DISCLAIMER

Please note that the majority of the results presented in this handout are preliminary results that have not yet been statistically analysed.

MPI - Regenerating Aotearoa: Investigating the impacts of regenerative farming practices (Aug 2022).



For more information on diverse pastures and on the trials that Dairy Trust Taranaki is running on its other three farms sign up to the weekly farm walk notes and follow us across our social media channels.

Gibson

- **Step change:**

Carbon footprint down, profit up.

2020-2024

Stratford

- **Spikey:**

Spikey treatment of urine patches to reduce nitrate leaching.

2020-2024

Waimate West

- **Regenerative Trial:**

An investigation of diverse pastures

2021-2028

Kavanagh

- **Net Zero Carbon:**

A practical demonstration of a journey towards net zero carbon dairy farming on a commercially viable and representative NZ dairy farm

2022-2032



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THANKS TO OUR PARTNERS INVOLVED IN THIS PROJECT

Ministry for Primary Industries
Manatū Ahu Matua



*Dairy***NZ** 

 **BARENBRUG**

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