Ministry for Primary Industries
Manatū Ahu Matua

ON FARM SUPPORT TEAM

Resilient future pasture-based dairy farming systems

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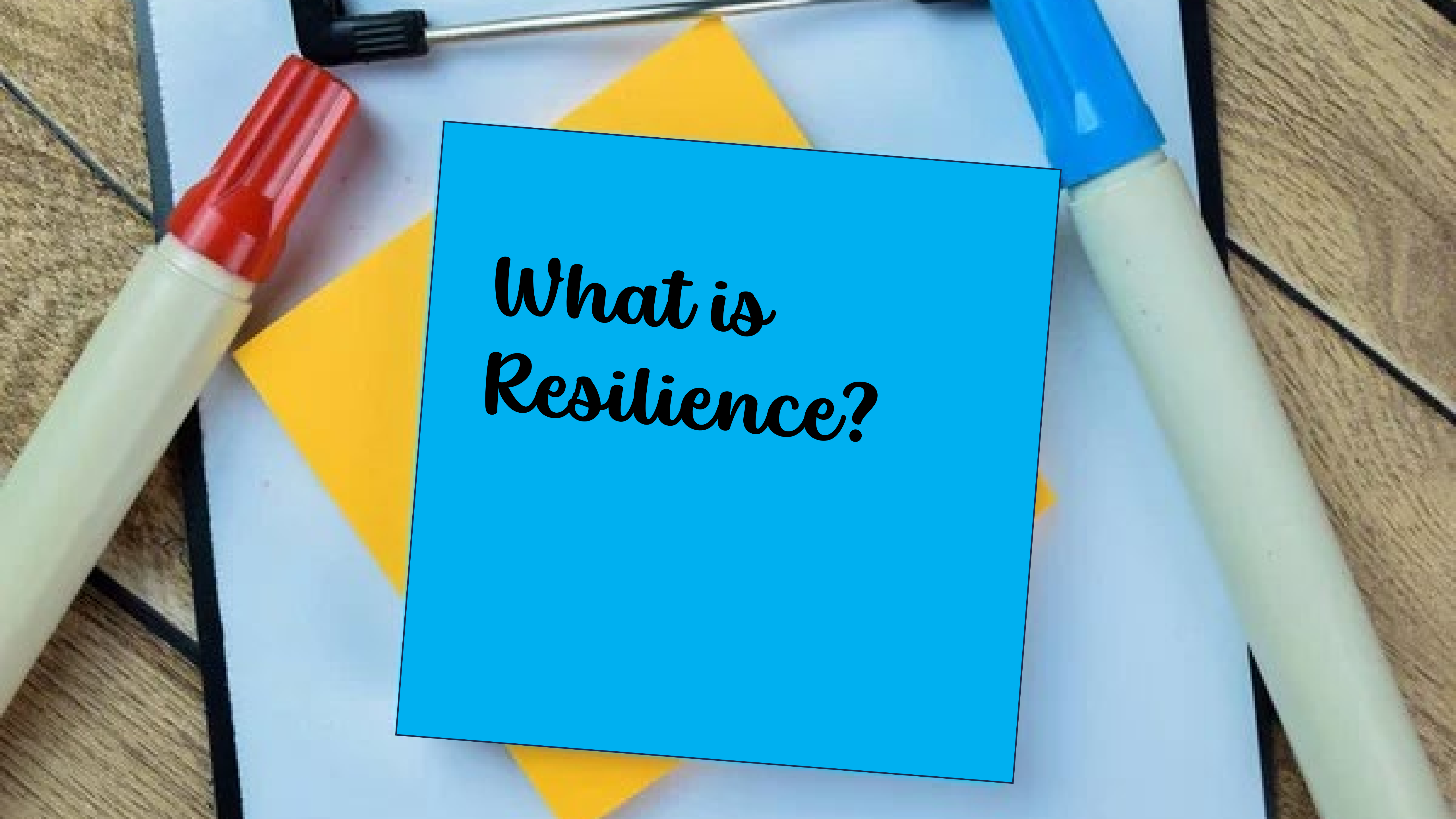
The 75th European Association of Animal Production Annual Meeting , Florence, Italy.

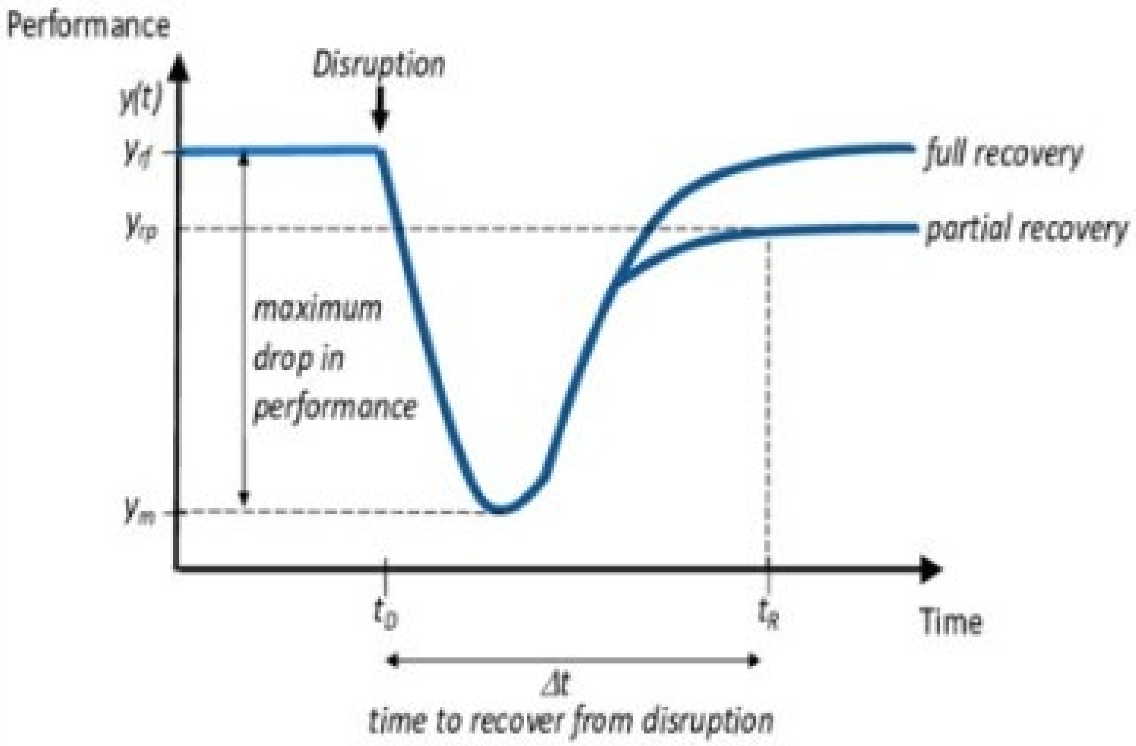
"No civilization can survive the time when its agricultural economy is destroyed"

- Lloyd Noble


What is
Resilience?

Resilience

- The ability of a substance or object to spring back into shape
- The capacity to recover quickly from difficulties;



https://redshoemovement.com/what-is-resilience-its-role-in-your-career/

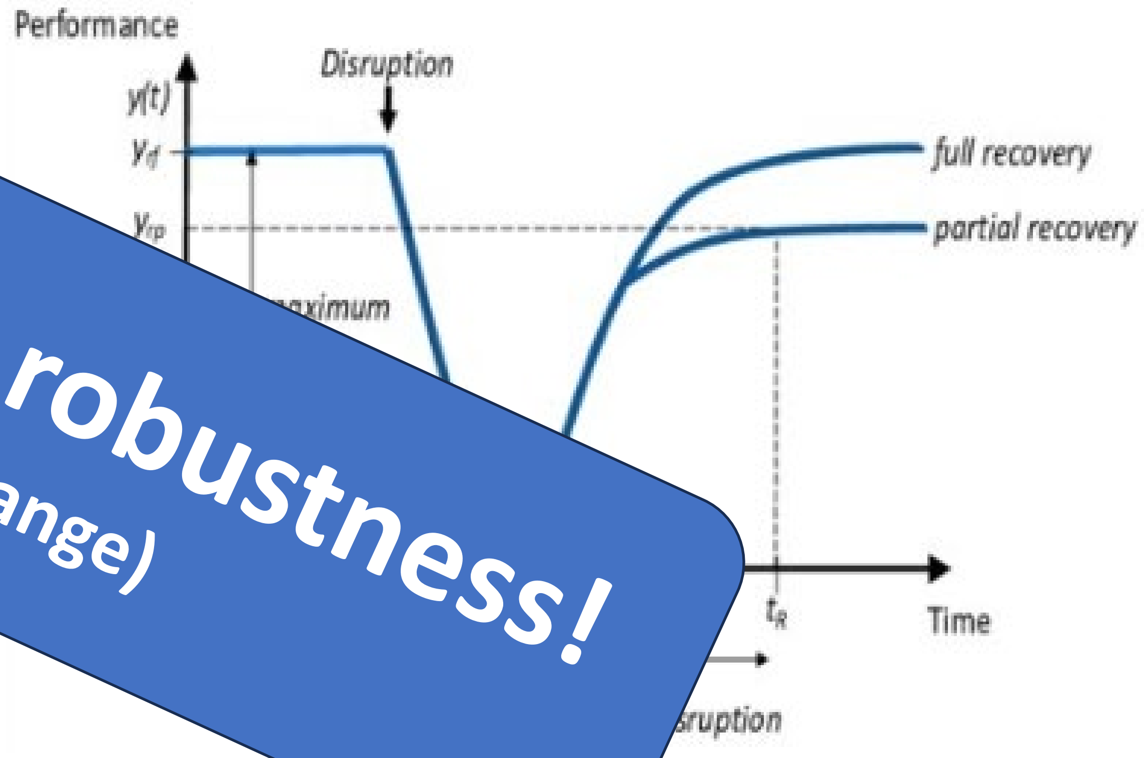
Re... ce

su...

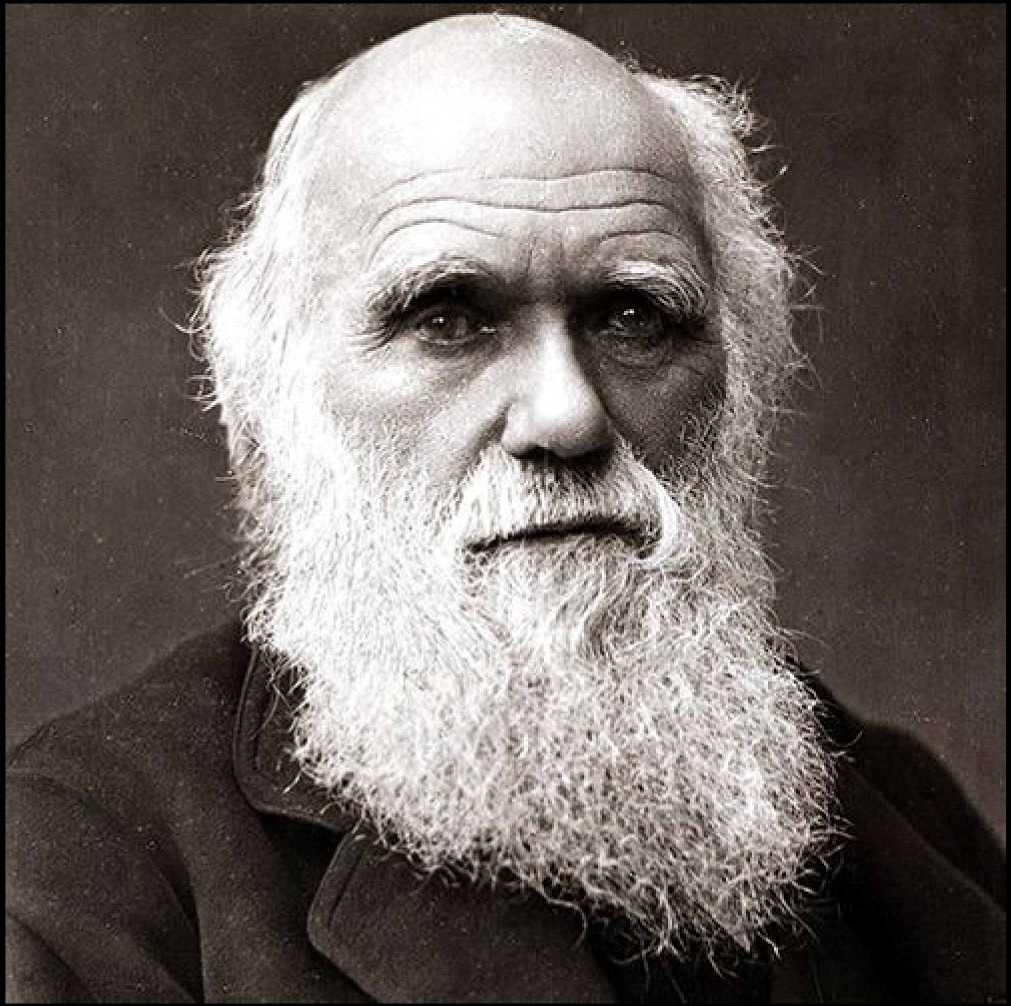
spring b...

- The capacity to ... quickly from difficulties;

https://redshoemovement.com/what-is-resilience-its-role-in-your-career/



Often confused with robustness!
(The ability to resist change)



"It is not the strongest of the species that survives, nor the most intelligent that survives.

It is the one that is the most adaptable to change"

- Charles Darwin

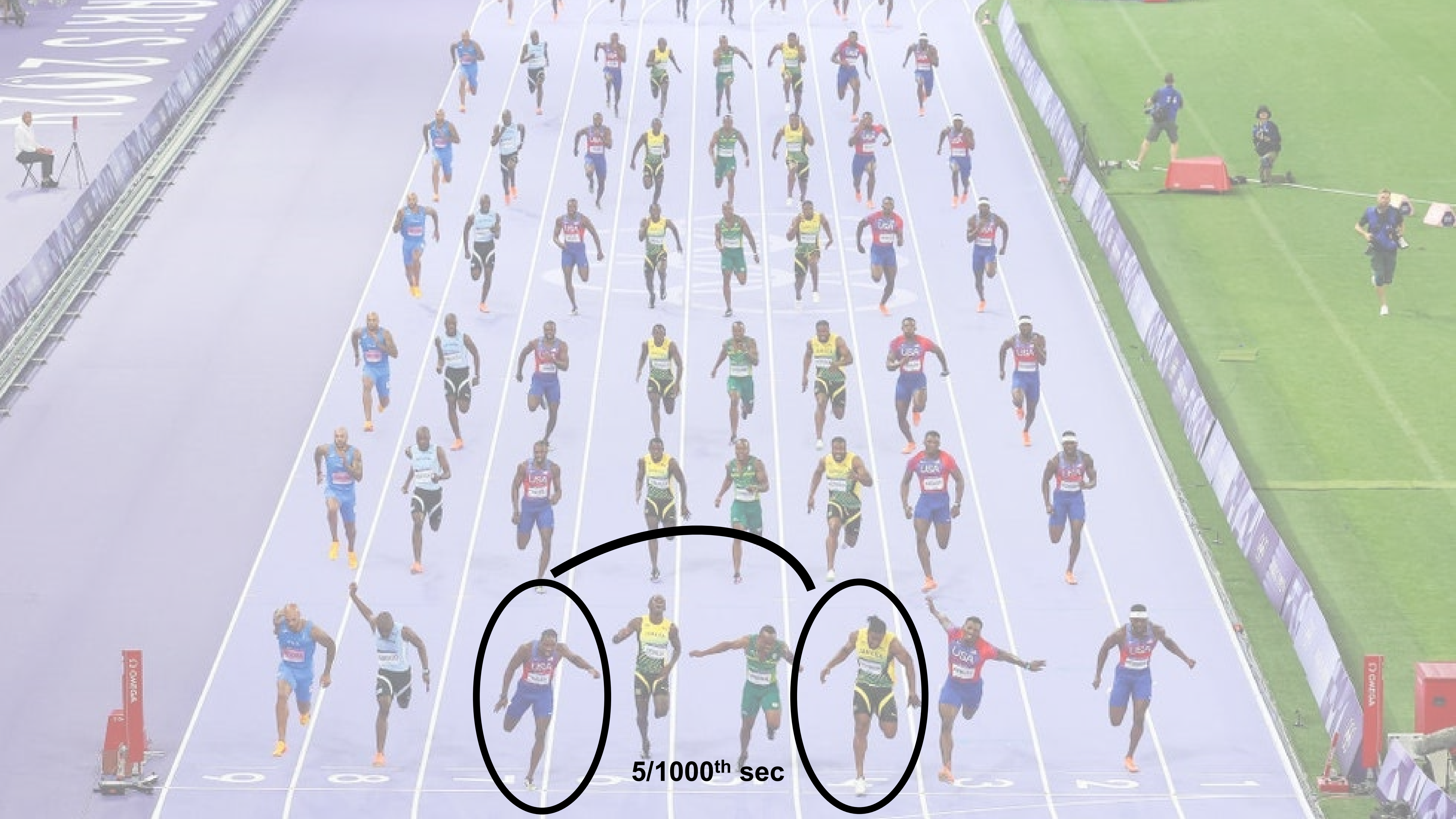
Change does not mean throwing the baby out with the bathwater!

Gilbert Enoka

Elite athletes

- Preserve the Core;
- Disrupt the edges;


USA
OMEGA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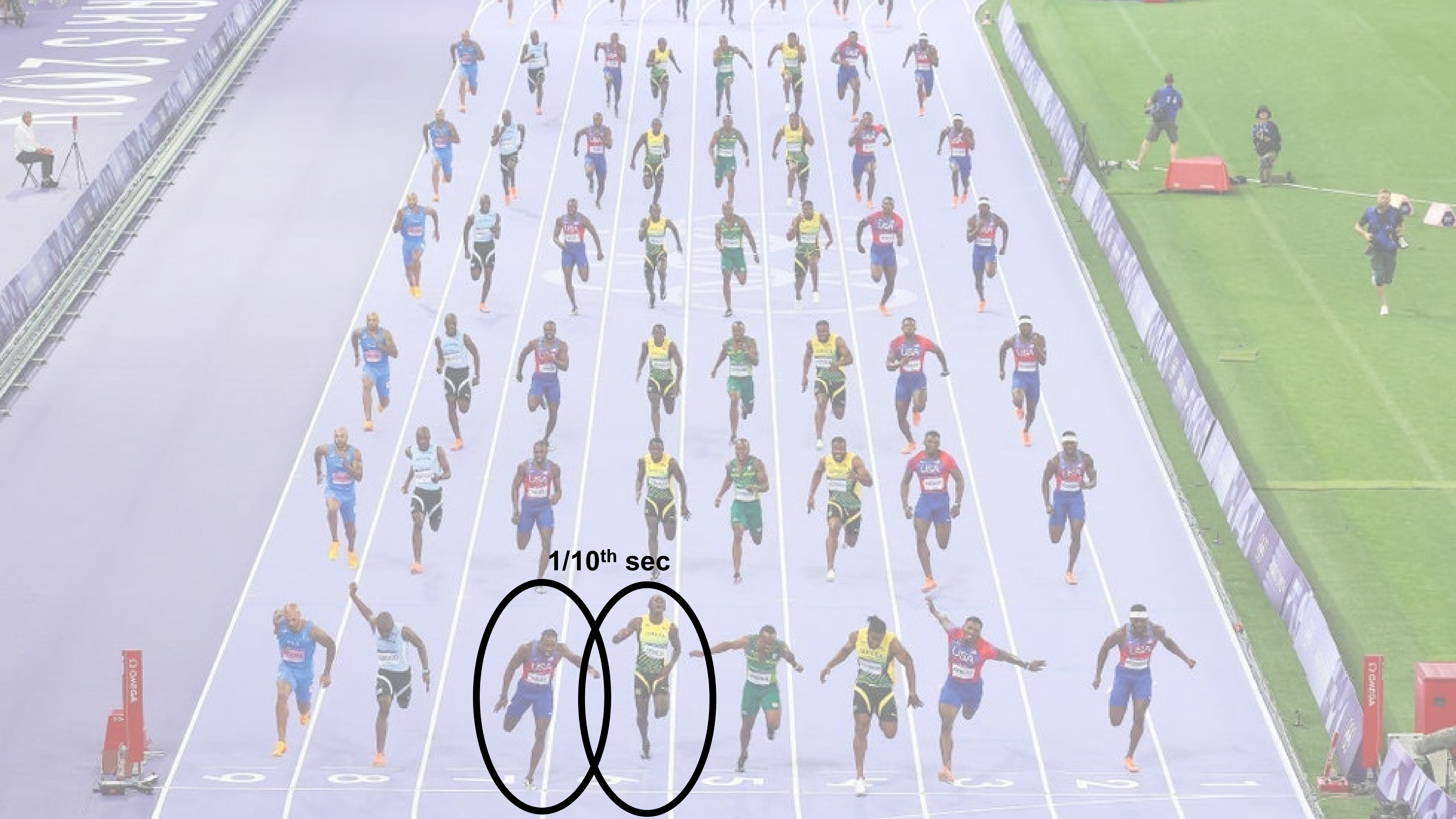
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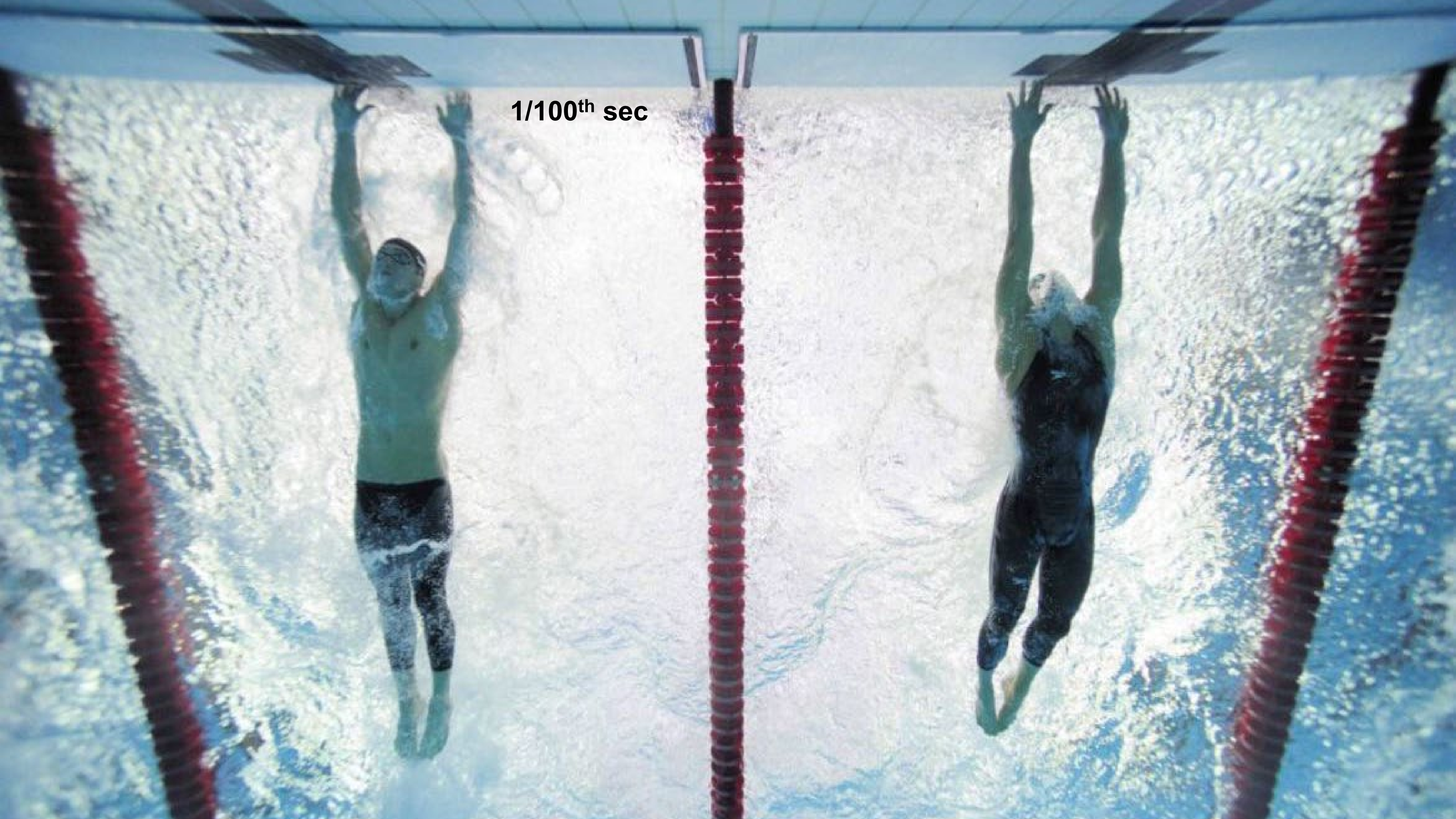
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Gilbert Enoka

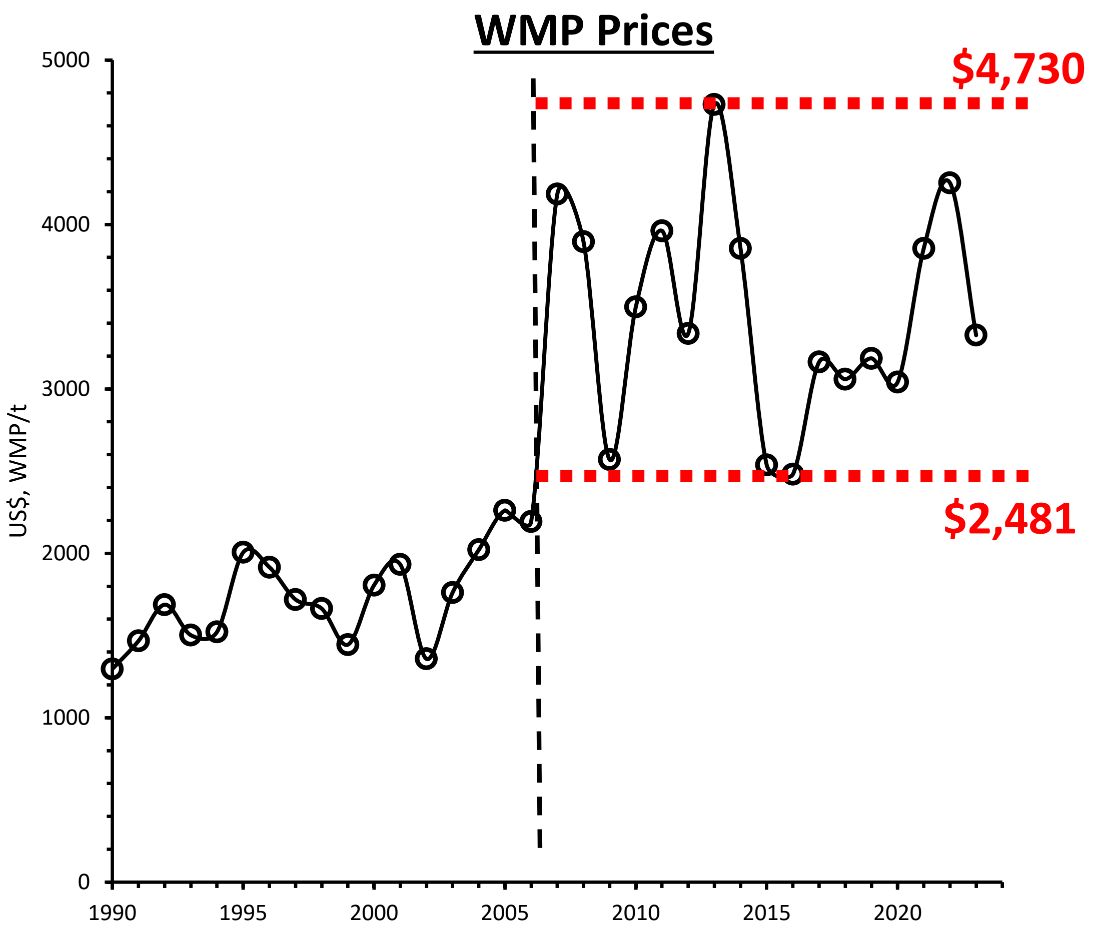
Elite athletes

- Preserve the Core;
- Disrupt the edges;

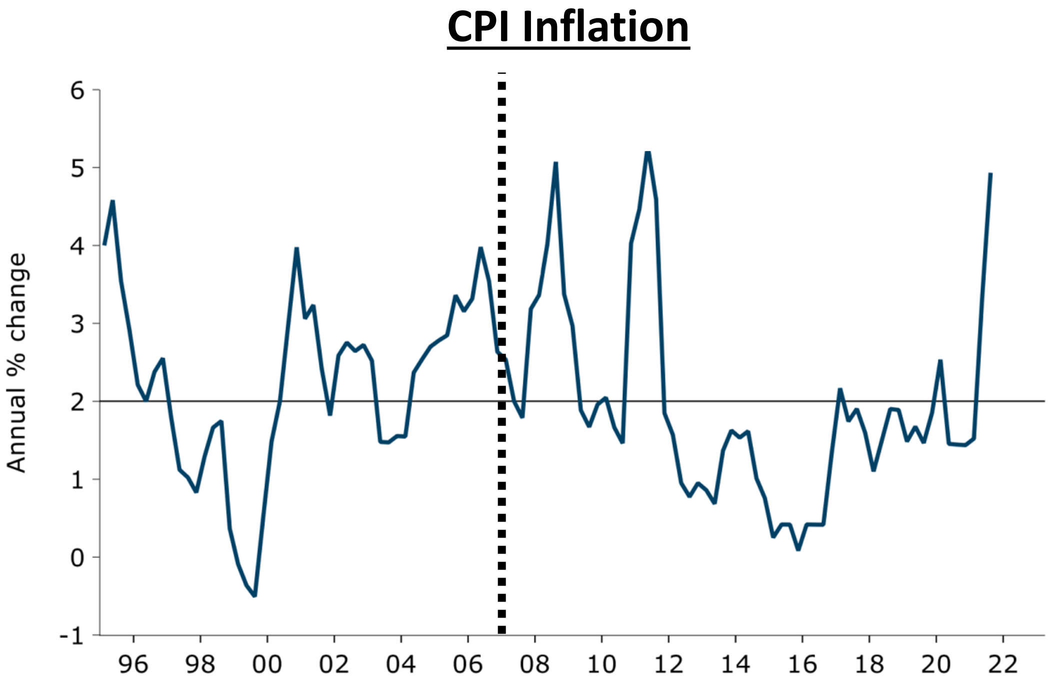
"Farming looks mighty easy when your plow is a pencil and you're a thousand miles from the corn field."

- Dwight D. Eisenhower

Price volatility

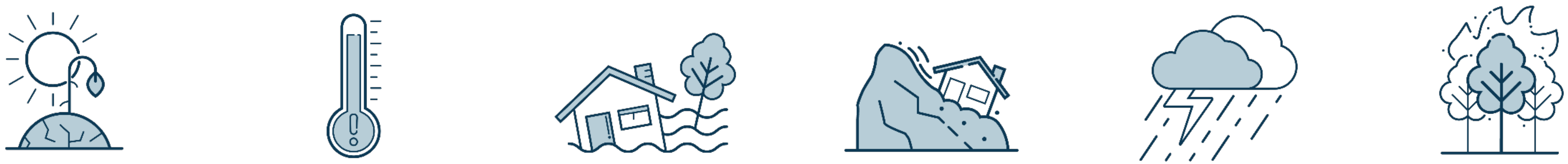


Source: FAO Dairy Price Index: https://www.fao.org/markets-and-trade/commodities/dairy/fao-dairy-price-index/es/



Source: Stats NZ, Macrobond ANZ Research

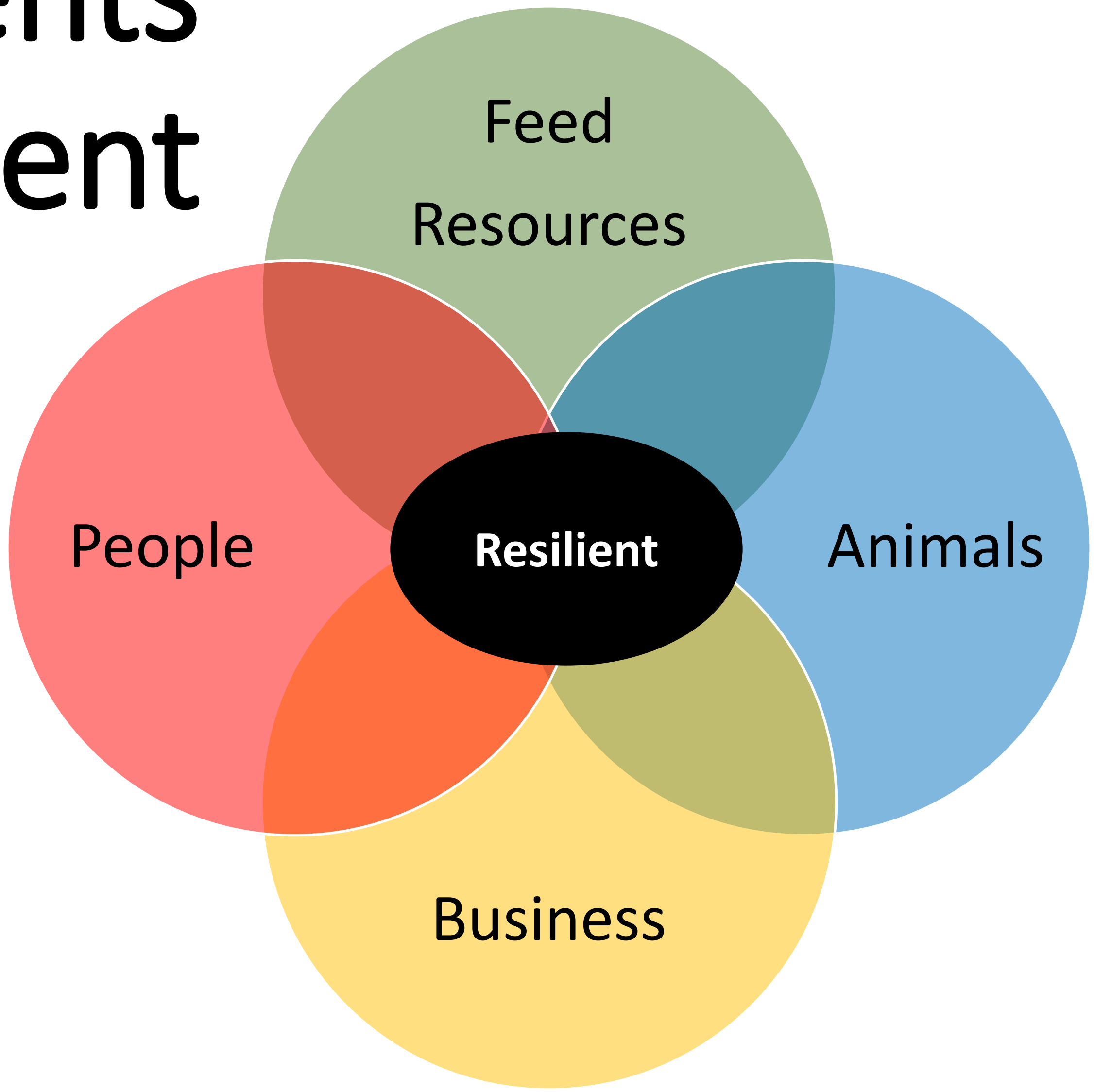
Risk of adverse weather events increasing globally



	Drought	Extreme Temperature	Flood	Landslide	Storm	Wildfire
1980 – 1999	263	130	1,389	254	1,457	163
2000 – 2019	338	432	3,254	376	2,043	238
	↑ 29%	↑ 232%	↑ 134%	↑ 48%	↑ 40%	↑ 46%

Source: UN Office for Disaster Risk Reduction

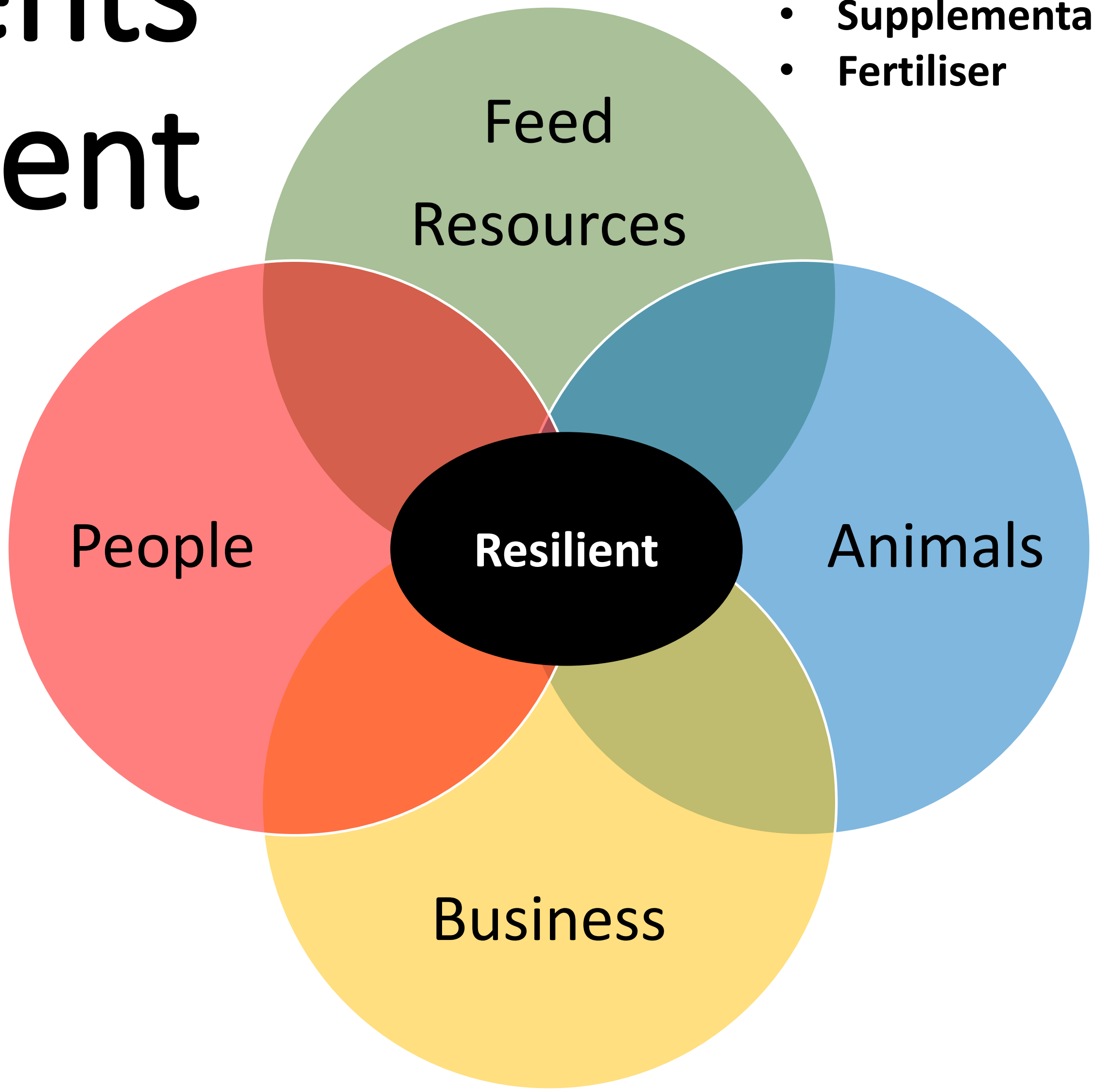
Components of a Resilient System



Adapted from Roche and Horan, 2013

Components of a Resilient System

- **Pastures**
- **Supplementary feeds**
- **Fertiliser**



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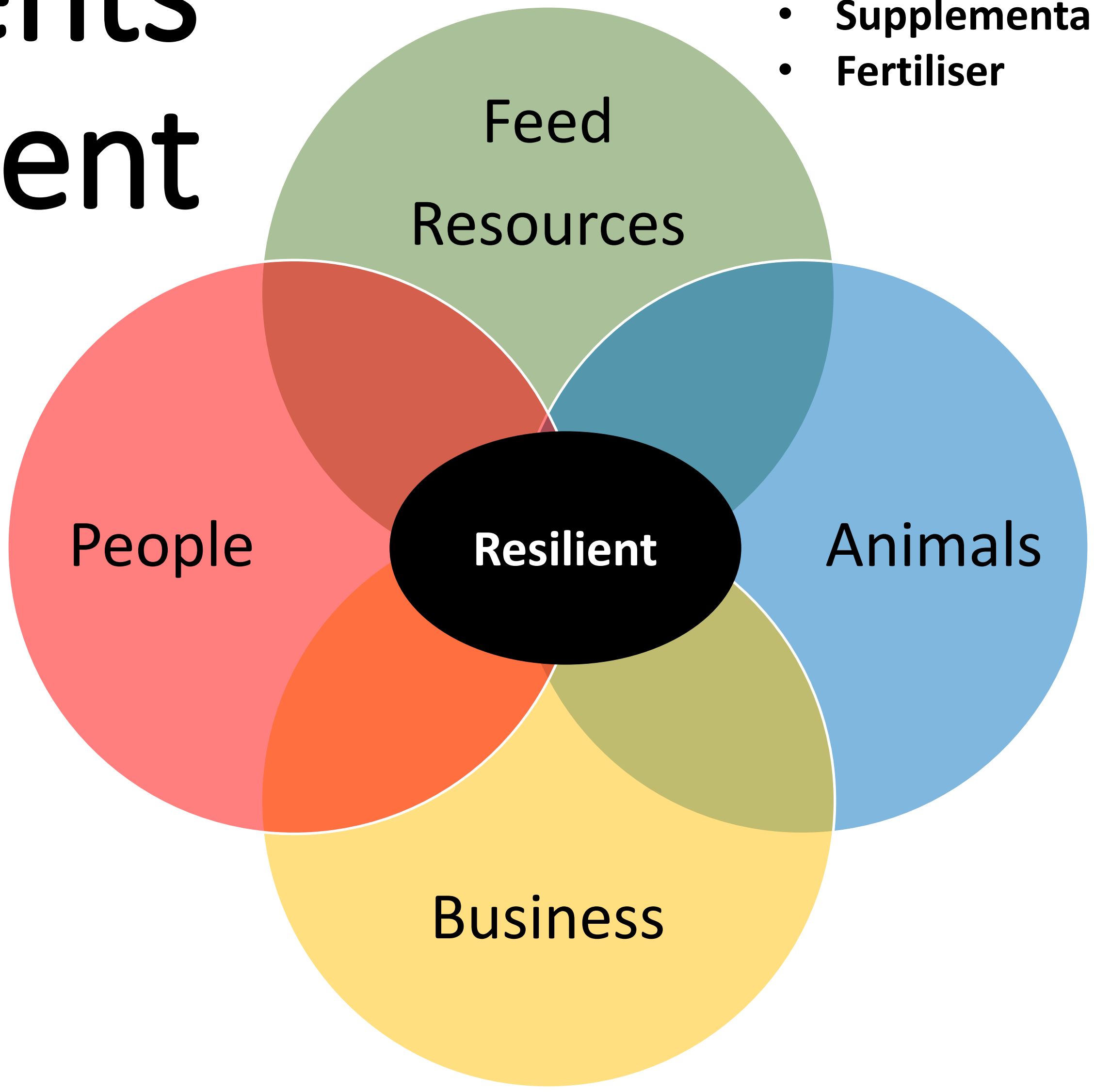
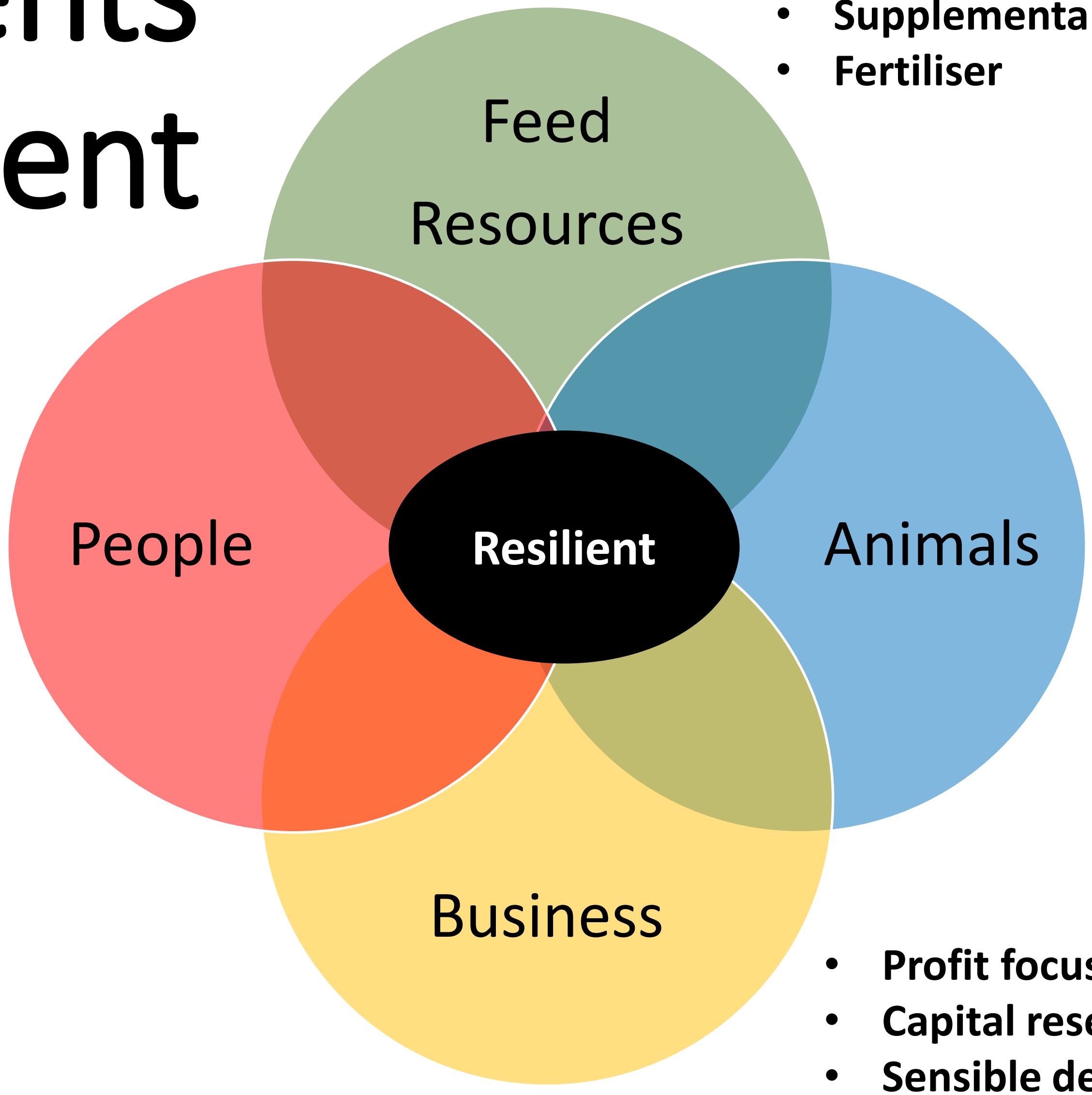


- Pastures
- Supplementary feeds
- Fertiliser

- High breeding index
- Fertile
- Healthy
- Physically robust (legs, udder)

Adapted from Roche and Horan, 2013

Components of a Resilient System



- Pastures
- Supplementary feeds
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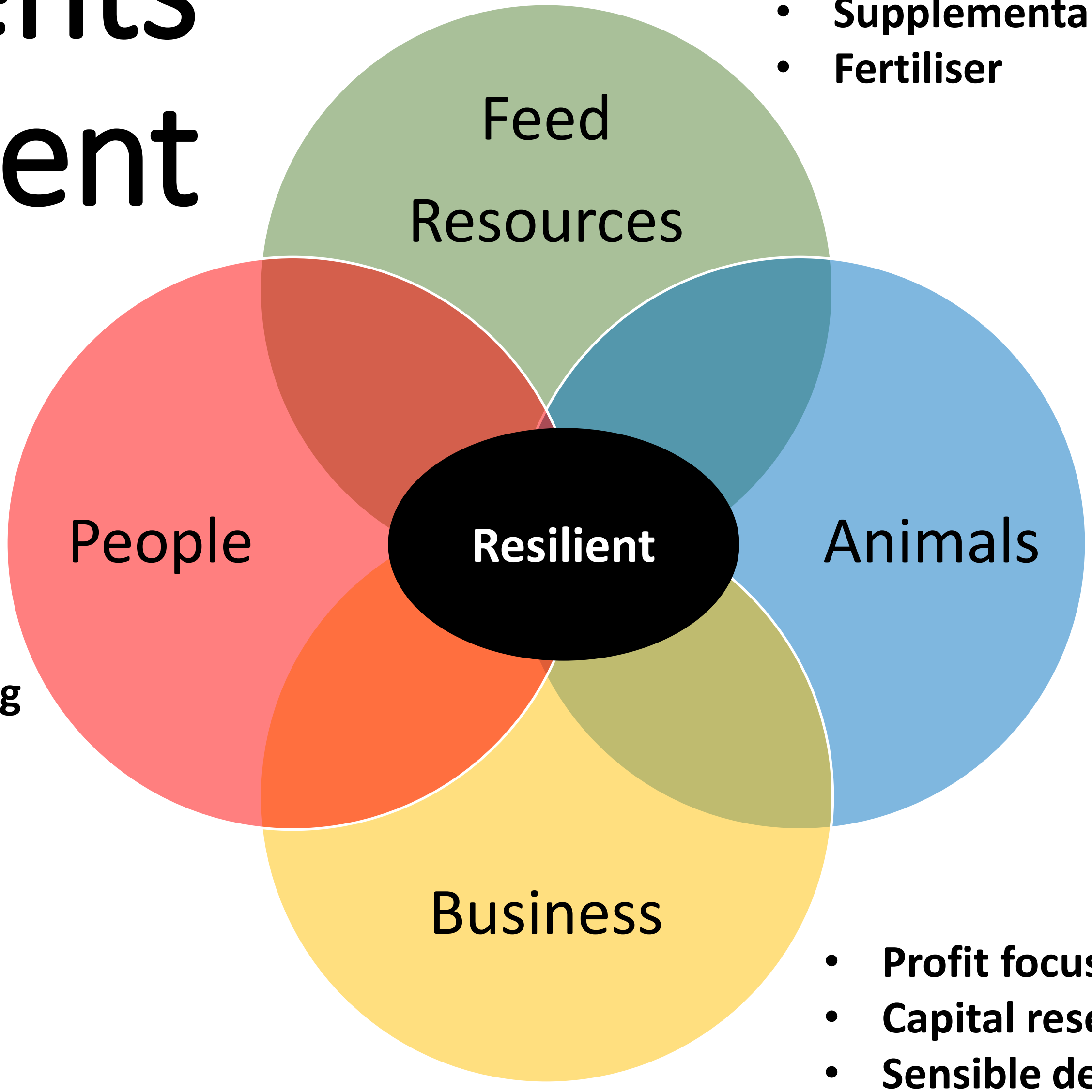
- High breeding index
- Fertile
- Healthy
- Physically robust (legs, udder)

- Profit focussed
- Capital reserves
- Sensible debt to asset ratio
- Environmental footprint minimised

Adapted from Roche and Horan, 2013

Components of a Resilient System

- Pastures
- Supplementary feeds
- Fertiliser

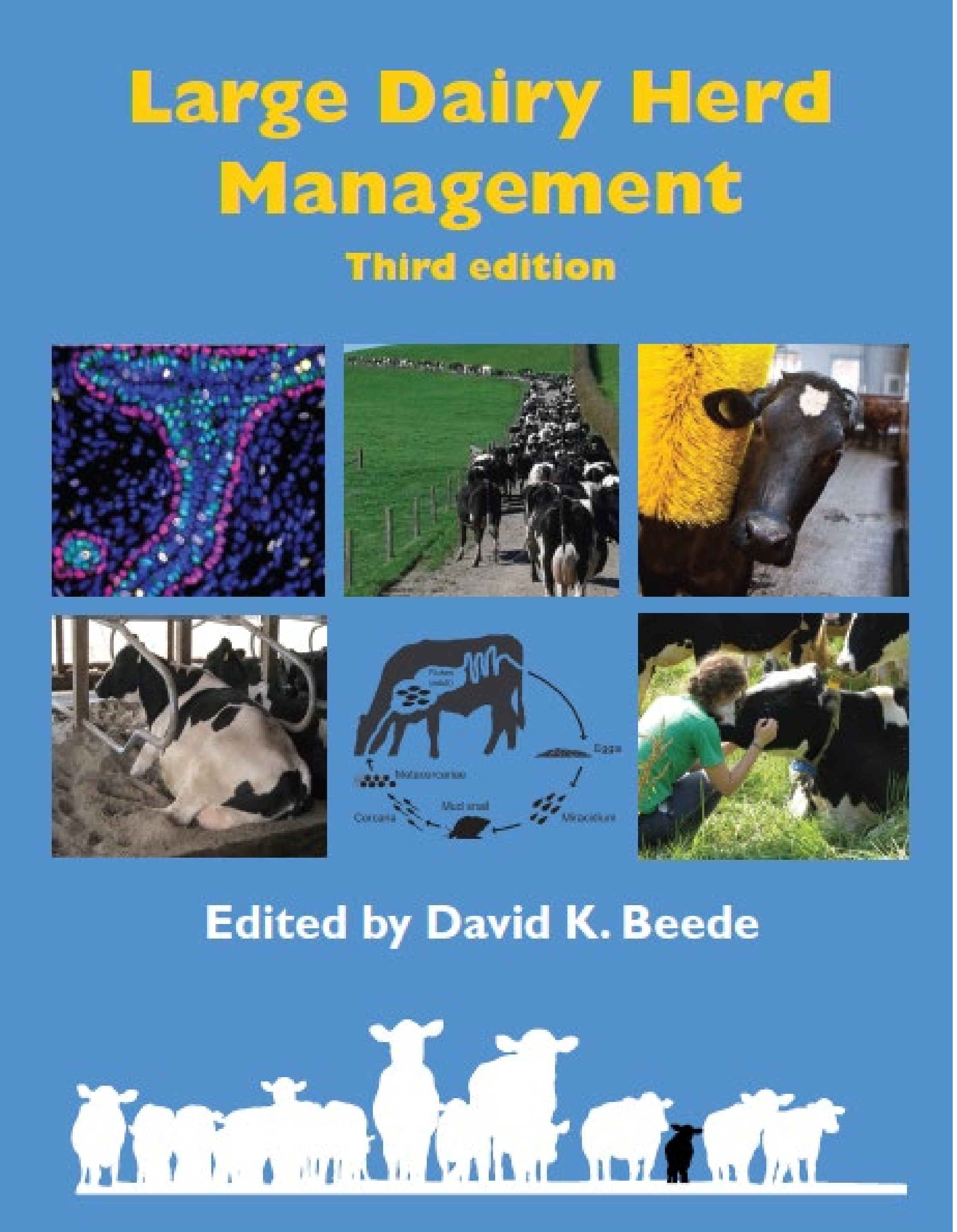


- High breeding index
- Fertile
- Healthy
- Physically robust (legs, udder)

- Simple & repeatable
- Reasonable hours
- Opportunities for training

- Profit focussed
- Capital reserves
- Sensible debt to asset ratio
- Environmental footprint minimised

Adapted from Roche and Horan, 2013



Resilience

resilient grazing systems are defined by:

- **High levels of pasture utilisation**;
  - Drives revenue
    - correct stocking rate;
    - right cow.
- **low exposure to external price fluctuations**;
  - Manage costs,
- **Simple repeatable systems**.

Feed Resources

NEW ZEALAND JOURNAL OF AGRICULTURAL RESEARCH
https://doi.org/10.1080/00288233.2023.2168707

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REVIEW ARTICLE

OPEN ACCESS Check for updates

Farm systems research at Ruakura – a 60-year legacy underpinning profitable and sustainable pasture-based dairy systems

Kevin A. Macdonald[a] and John R. Roche[b]

[a]DairyNZ, Hamilton, New Zealand; [b]School of Biological Sciences, University of Auckland, Auckland, New Zealand

ABSTRACT
The Number 2 Dairy (No. 2 Dairy) unit at Ruakura, Hamilton, New Zealand was established as a dairy research farm in 1943 and became recognised globally as one of the leading institutes for farm systems science. The research undertaken was fundamental to the 'systemisation' of component research into replicable, efficient, competitive, and sustainable dairy systems. From McMeekan's seminal research in the 1950s on rotational grazing to the experiments of Carter, Campbell, Bryant, Penno and others, who brought greater resolution to the key principles influencing successful outcomes on-farm, the more than 60 years of experimental research led to 'good practice' rules that were to transcend geographical, climatic, and system-level interactions. Much of the research can only be found in Annual Reports or in summary form in conference proceedings and not in an electronic form. Our objective was to collate and discuss the research undertaken, thereby ensuring that the legacy of this great work and the wisdom amassed are not lost. To this end, we have compiled a compendium of the research undertaken at No. 2 Dairy, with the hope that it be used to inform the scientific rationale for system design and to stimulate future hypotheses for system improvement.

ARTICLE HISTORY
Received 30 August 2022
Accepted 11 January 2023

KEYWORDS
No. 2 Dairy; grazing systems; rotational grazing; set stocked; stocking rate

Introduction

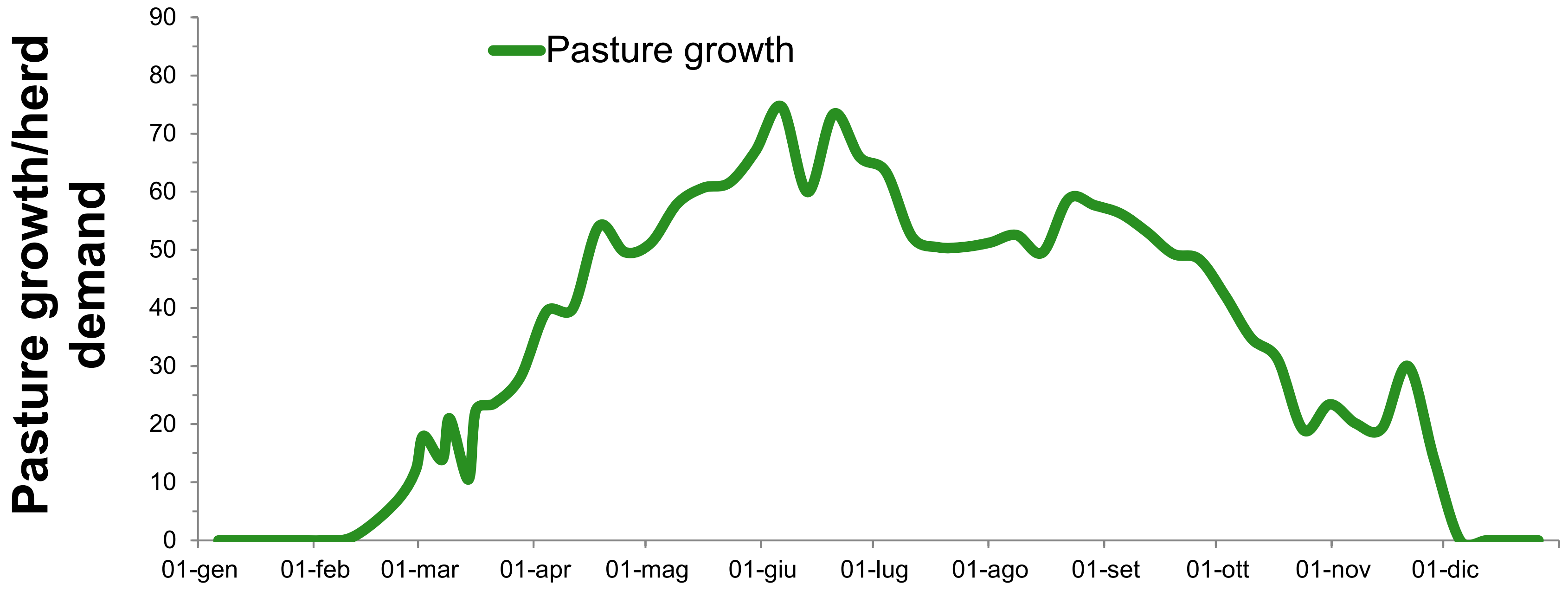
Globally, the traditional New Zealand system of dairy production is regarded as the archetypal grazing system (Roche et al. 2017a, 2017b) and it is a prototype for a circular bioeconomy (Muscat et al. 2021), wherein outputs are provided for, primarily, by natural inputs, with little, if any, need for imported inputs beyond superphosphate and some replacement potassium fertiliser. It truly reflects the capture of solar energy in the most nutritionally complete food for human consumption (Park 2009; Gorska-Warsewicz et al. 2019). The system has been imitated by a few (e.g. Ireland, Australia, the UK, South Africa, the UK; Roche et al. 2017a, 2017b), but New Zealand's latitudinal situation as well as the maritime

CONTACT Kevin A. Macdonald kevin.macdonald@dairynz.co.nz

Basic philosophy

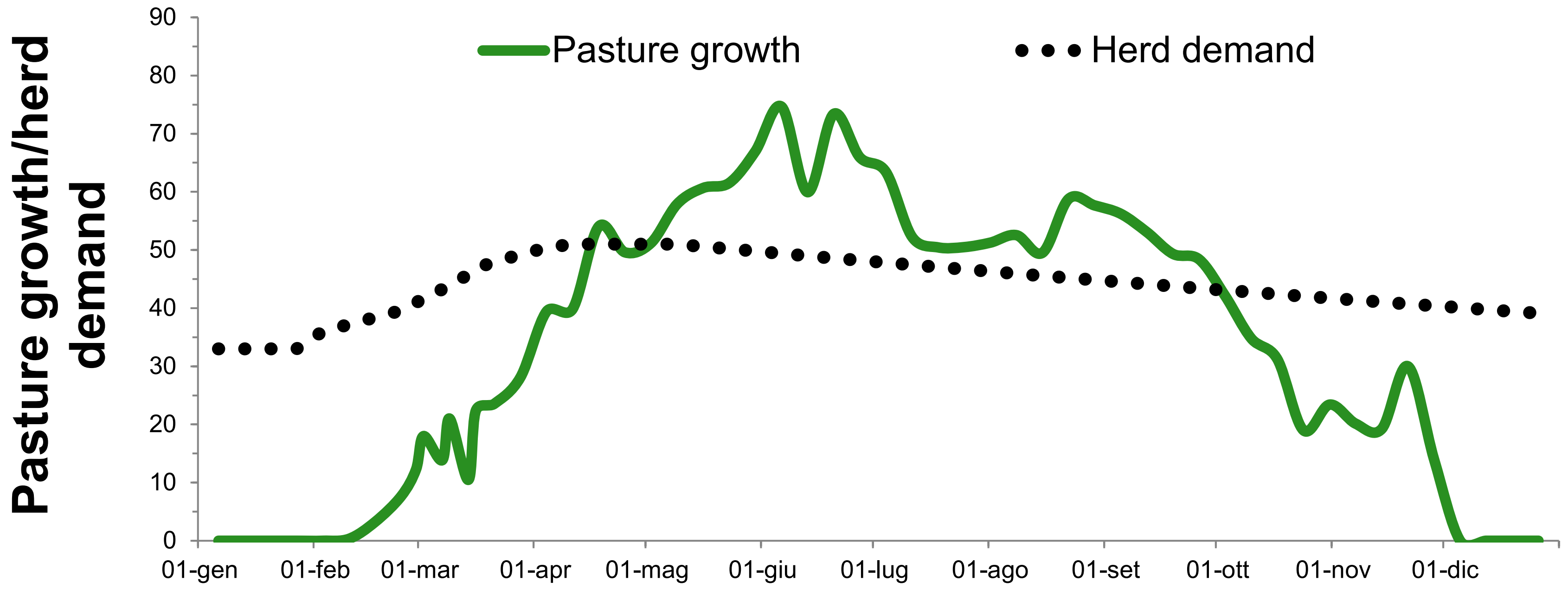
- Grow and harvest as much pasture as possible

- Soil fertility and pH optimized
- Nitrogen fertiliser used to recommended levels



Basic philosophy

- Grow and harvest as much pasture as possible
- Get the cow to eat as much of this as she can



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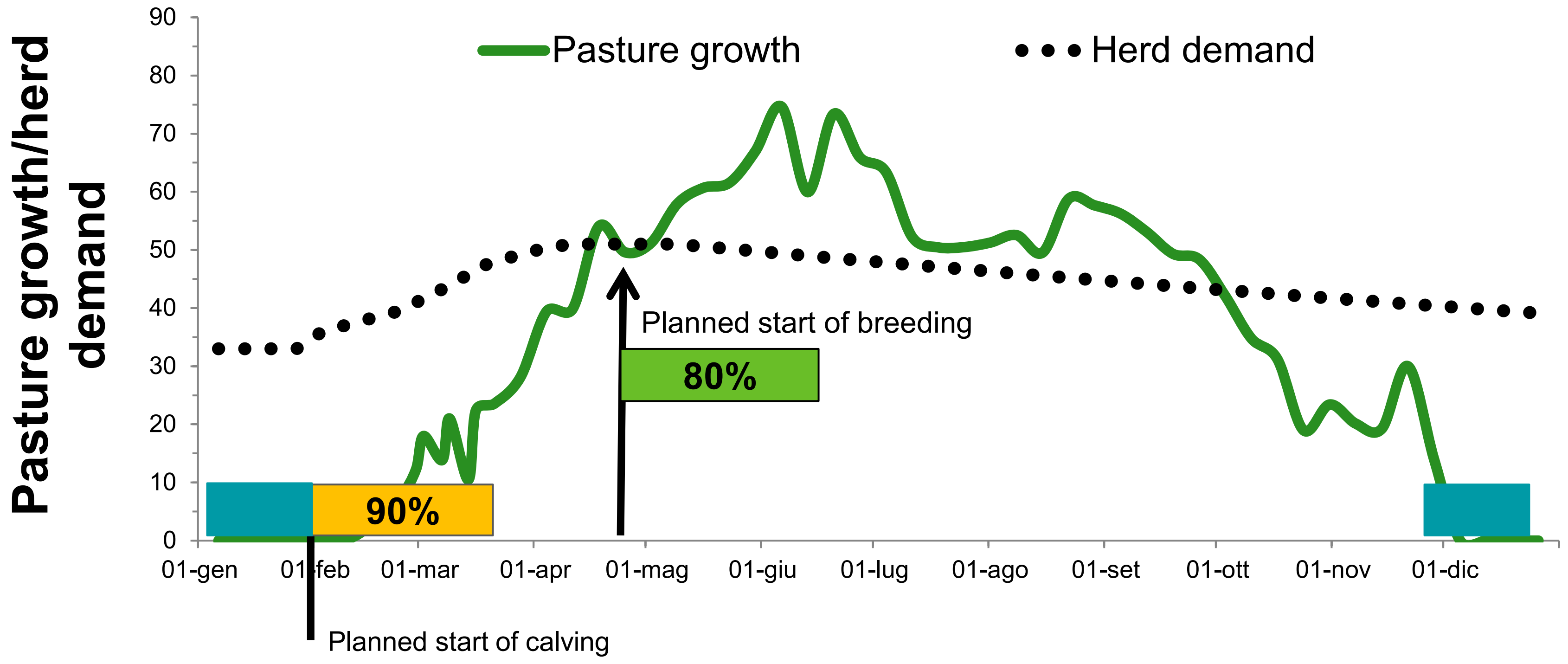

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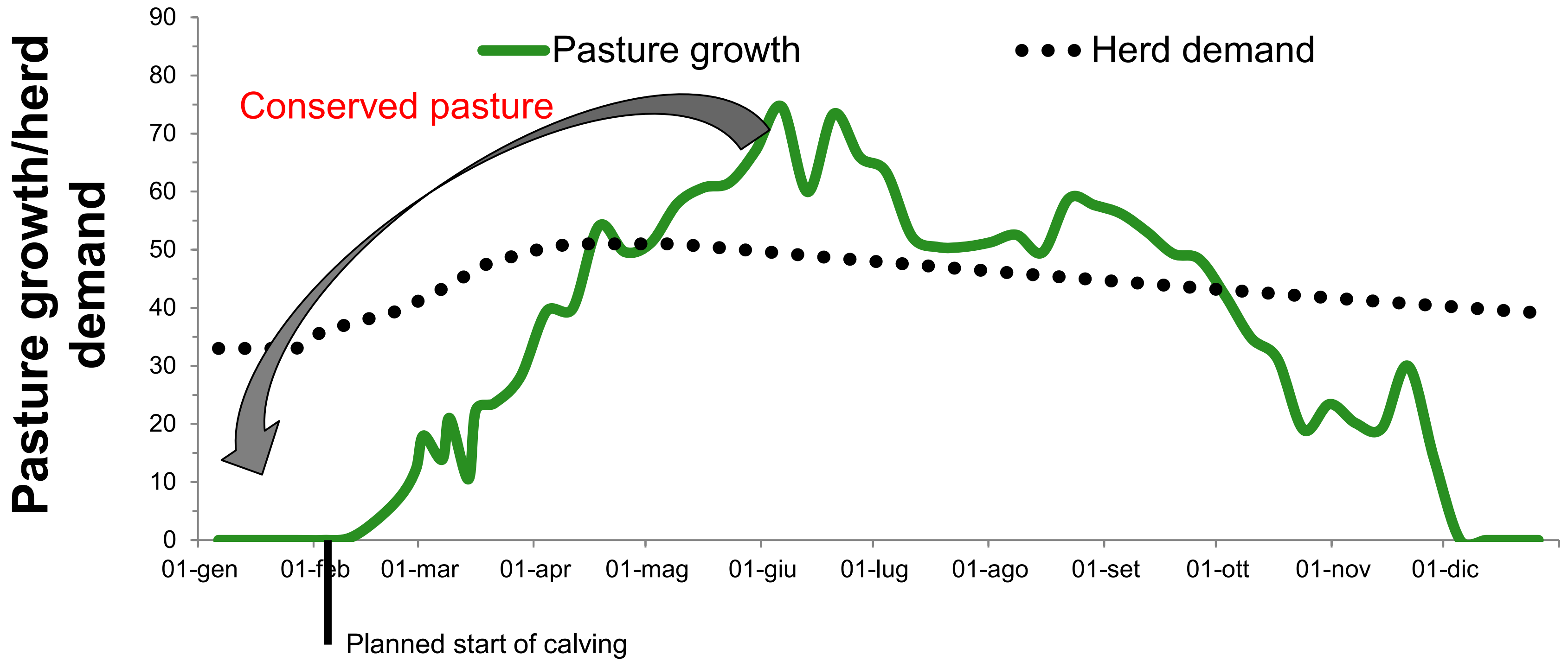

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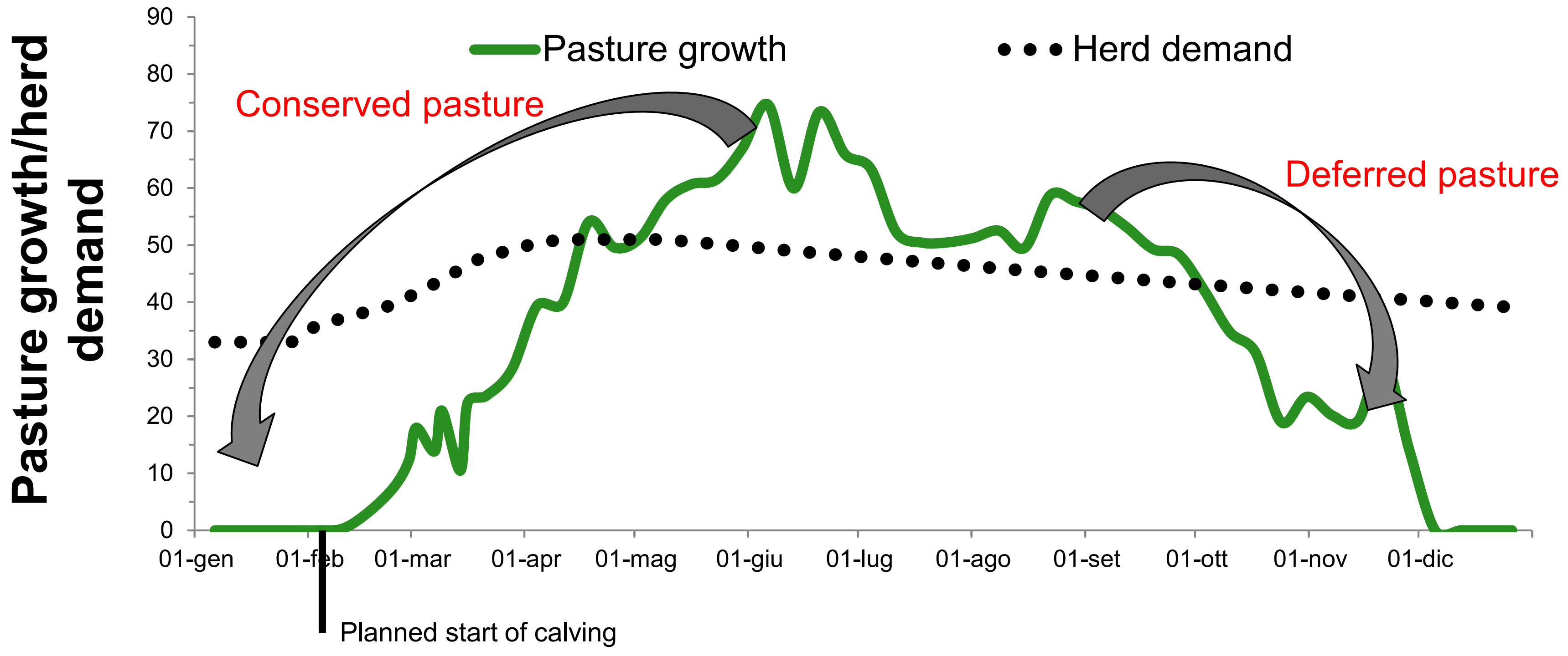
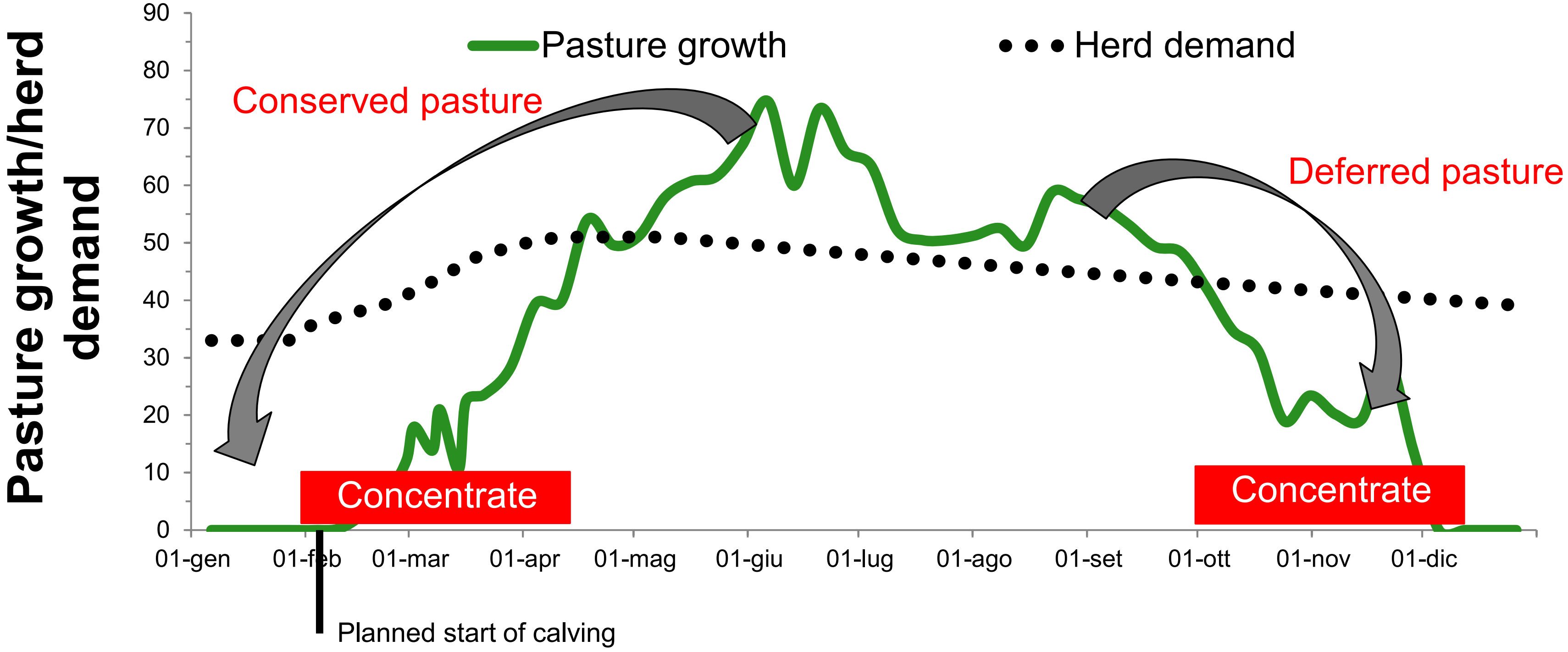


Basic philosophy

- Grow and harvest as much pasture as possible
- Get the cow to eat as much of this as she can
- Supplement deficits in supply with conserved or purchased feeds




The resilient cow

NEW ZEALAND JOURNAL OF AGRICULTURAL RESEARCH
https://doi.org/10.1080/[illegible]

REVIEW ARTICLE

OPEN ACCESS

Farm systems research at Ruakura – a 60-year legacy underpinning profitable and sustainable pasture-based dairy systems

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Table 10: The effects of grazing strategy (Rotational Grazing vs Set Stocking), Stocking rate (Low:2.35 cows/ha vs High: 2.95 cows/ha), and cow genetic merit (HGM vs LGM) on milk fat production/cow and per ha and the % increase in milk production from genetic merit, stocking rate, and grazing strategy.

	Rotational Grazing		Set Stocking	
Stocking Rate, cows/ha	**2.35**	**2.95**	**2.35**	**2.95**
Per cow				
HGM	189	184	170	149
LGM	162	155	148	127
Difference	26	29	21	22
Per ha				
HGM	443	543	398	440
LGM	381	457	348	375
Difference	62	86	50	64
%increase/ha				
GM	16%	19%	14%	17%
SR		39%		39%
Grazing strategy			23%	33%

Macdonald and Roche, 2023. Farm systems research at Ruakura – a 60-year legacy underpinning profitable and sustainable pasture-based dairy systems. NZ Journal of Agricultural Research. 67(2) 105-222.

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Animal (2018), 12:S2, pp s350–s362 © The Animal Consortium 2018
doi:10.1017/S1751731118002471

animal

Review: New considerations to refine breeding objectives of dairy cows for increasing robustness and sustainability of grass-based milk production systems

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[1]DairyNZ, Hamilton 3240, New Zealand; [2]School of Biological Sciences, University of Auckland, Private Bag 92019, Auckland 1142, New Zealand; [3]Teagasc Moorepark, Fermoy, Co. Cork P61 C996, Ireland; [4]INRA, Agrocampus Ouest, UMR Physiologie, Environnement et Génétique pour l'Animal et les Systèmes d'Elevage, 16 Le Clos, F-35590, Saint Gilles, France

(Received 4 February 2018; Accepted 7 September 2018; First published online 13 November 2018)

Although food from grazed animals is increasingly sought by consumers because of perceived animal welfare advantages, grazing systems provide the farmer and the animal with unique challenges. The system is dependent almost daily on the climate for feed supply, with the importation of large amounts of feed from off farm, and associated labour and mechanisation costs, sometimes reducing economic viability. Furthermore, the cow may have to walk long distances and be able to harvest feed efficiently in a highly competitive environment because of the need for high levels of pasture utilisation. She must, also, be: (1) highly fertile, with a requirement for pregnancy within ~80 days post-calving; (2) 'easy care', because of the need for the management of large herds with limited labour; (3) able to walk long distances; and (4) robust to changes in feed supply and quality, so that short-term nutritional insults do not unduly influence her production and reproduction cycles. These are very different and are in addition to demands placed on cows in housed systems offered pre-made mixed rations. Furthermore, additional demands in environmental sustainability and animal welfare, in conjunction with the need for greater system-level biological efficiency (i.e. 'sustainable intensification'), will add to the 'robustness' requirements of cows in the future. Increasingly, there is evidence that certain genotypes of cows perform better or worse in grazing systems, indicating a genotype × environment interaction. This has led to the development of tailored breeding objectives within countries for important heritable traits to maximise the profitability and sustainability of their production system. To date, these breeding objectives have focussed on the more easily measured traits and those of highest relative economic importance. In the future, there will be greater emphasis on more difficult to measure traits that are important to the quality of life of the animal in each production system and to reduce the system's environmental footprint.

Keywords: pasture-based, dairy production systems, robustness, breeding objectives, profitability

Implications

The existence of genotype × environment interactions means that the extremes of dairy production systems will benefit from individualised system-level breeding objectives. For systems to remain robust to economic and consumer-led drivers, future grazing systems will require cows that have a lower environmental footprint and thrive in an environment that has periodic interruptions to feed supply, while being 'easy care' and efficient converters of foraged feed into milk.

[a] John Roche was the invited contributor to the 2018 International Symposium on Nutrition of Herbivores. Other authors are listed alphabetically.
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Introduction

Robustness, in any system, reflects the ability of the system to absorb and withstand change and rebound from challenges to achieve the same or greater performance (Roche and Horan, 2013). This is true for businesses, animals and the people who manage them. Historically, the aim of agricultural production systems was to ensure adequate amounts of high quality foodstuffs for people. However, with the exponential increase in food production since the 1960s and the associated improvement in the nutrition of most of the world's population, the focus has shifted from a need for food, to a desire for a more multi-faceted approach to food production. Future global food production systems, therefore, face a four-fold challenge:

Characteristics of a resilient cow?

- High DMI;
- Robust to fluctuations in feed supply;
- High milksolids;
- Good fertility and longevity;
- Healthy;
- Easy care and docile;
- Low environmental footprint.

J. Dairy Sci. 103:10311–10320
https://doi.org/10.3168/jds.2019-17544

Economic assessment of Holstein-Friesian dairy cows of divergent Economic Breeding Index evaluated under seasonal calving pasture-based management

M. O'Sullivan,[1,2] L. Shalloo,[1] K. M. Pierce,[2] and F. Buckley[1,2*]
[1]Animal and Grassland Research and Innovation Centre, Teagasc Moorepark, Fermoy, Co. Cork, P61 C997 Ireland
[2]School of Agriculture and Food Science, University College Dublin, Belfield, Dublin, D04 N2E5 Ireland

ABSTRACT

The objective of this study was to investigate the economic performance of 2 genetic groups (GG) of Holstein-Friesian dairy cows of divergent Economic Breeding Index (EBI), evaluated within 3 contrasting spring-calving pasture-based feeding treatments (FT). The study was a simulated economic appraisal, using the Moorepark Dairy Systems Model, a stochastic budgetary simulation model integrating biological data obtained from a 4-yr experiment conducted from 2013 to 2016. The 2 divergent GG were (1) high EBI representative of the top 5% nationally (elite) and (2) EBI representative of the national average (NA). The 3 FT were reflective of slight restriction to generous feeding. The elite GG had the lowest replacement rate, and therefore had lower replacement costs and an older and more productive parity structure. The elite GG consistently had higher sales of milk (on average +3% or +18,370 kg of milk) and milk solids (milk fat plus protein yield; +8.7% or +4,520 kg) compared with the NA GG across the 3 FT scenarios. Milk income was consequently greater for elite versus NA (on average +9.5% or +€21,489) cows. Livestock sales were greater (on average +13.2% or +€4,715) for NA compared with elite cows. Baseline net farm profit and net profit/ha at a base milk price of 29.5 cents per liter (3.3% protein and 3.6% fat) were on average €31,156, and €772 greater for elite compared with NA cows across the 3 FT. Greater profitability achieved with elite cows in each of the FT investigated demonstrated the adaptability of high-EBI cows across different levels of feeding intensities in seasonal pasture-based feeding systems. Sensitivity analysis of varying milk price and concentrate cost did not result in a reranking of GG for farm profit. This study clearly demonstrates the power of a suitably constructed genetic-selection index together with a well-considered breeding program to deliver genetics capable of favorable change to farm physical performance and profit over a relatively short duration.
Key words: replacement cost, profitability

INTRODUCTION

Pasture-based systems of milk production are commonly practiced in New Zealand, Latin America, parts of the United States, and various parts of Europe (Washburn and Mullen, 2014). Milk production in both Ireland and New Zealand is based predominantly on a seasonal calving pasture-based system where the primary feed source of lactating dairy cows is grazed grass (Shalloo et al., 2004a; Dillon et al., 2005; Hanrahan et al., 2018), which typically comprises >82% of the diet (O'Brien et al., 2018). Irrespective of location, the goals of pasture-based producers are generally similar: to match pasture resources with the nutritional requirements of the herd (Washburn and Mullen, 2014). Hence, the relative importance of fertility is greater in seasonal systems of milk production compared with nonseasonal systems to maximize the use of low-cost grazed grass in the diet of the lactating cow (Veerkamp et al., 2002; Shalloo et al., 2014). In addition, the challenges presented by pasture-based systems are universal, including energy expenditure associated with grazing activity (Dohme-Meier et al., 2014), variability in seasonal weather conditions, and a fluctuating feed supply both in terms of availability and quality (Bargo et al., 2003; Van Vuuren and Van den Pol-van Dasselaar, 2006). Therefore, the identification of appropriate genetics for pasture-based systems is a prerequisite to achieving optimal physical and economic efficiency. There is a requirement that resilient animals capable of efficient production of milk solids (predominantly from pasture) combined with high fertility performance are selected (Washburn and Mullen, 2014; Delaby et al., 2018).

The Irish dairy industry has an export-orientated product mix, of which over 90% is exported internationally (Geary et al., 2010). Given the associated dynamics of volatility in world dairy commodity prices

Received September 4, 2019.
Accepted July 9, 2020.
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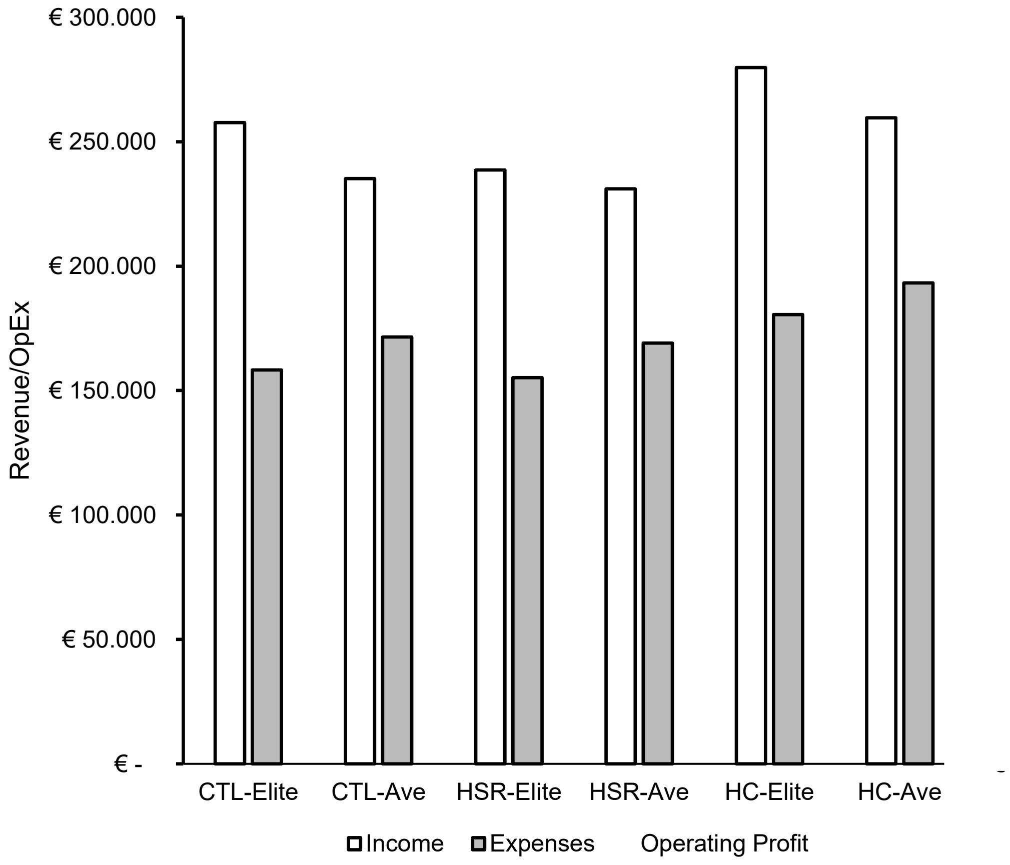

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ABSTRACT

The objective of this study was to investigate the economic performance of 2 genetic groups (GG) of Holstein-Friesian dairy cows of divergent Economic Breeding Index (EBI), evaluated within 3 contrasting spring-calving pasture-based feeding treatments (FT). The study was a simulated economic appraisal, using the Moorepark Dairy Systems Model, a stochastic budgetary simulation model integrating biological data obtained from a 4-yr experiment conducted from 2013 to 2016. The 2 divergent GG were (1) high EBI representative of the top 5% nationally (elite) and (2) EBI representative of the national average (NA). The 3 FT were reflective of slight restriction to generous feeding. The elite GG had the lowest replacement rate, and therefore had lower replacement costs and an older and more productive parity structure. The elite GG consistently had higher sales of milk (on average +3% or +18,370 kg of milk) and milk solids (milk fat plus protein yield; +8.7% or +4,520 kg) compared with the NA GG across the 3 FT scenarios. Milk income was consequently greater for elite versus NA (on average +9.5% or +€21,489) cows. Livestock sales were greater (on average +13.2% or +€4,715) for NA compared with elite cows. Baseline net farm profit and net profit/ha at a base milk price of 29.5 cents per liter (3.3% protein and 3.6% fat) were on average €31,156, and €772 greater for elite compared with NA cows across the 3 FT. Greater profitability achieved with elite cows in each of the FT investigated demonstrated the adaptability of high-EBI cows across different levels of feeding intensities in seasonal pasture-based feeding systems. Sensitivity analysis of varying milk price and concentrate cost did not result in a reranking of GG for farm profit. This study clearly demonstrates the power of a suitably constructed genetic-selection index together with a well-considered breeding program to deliver genetics capable of favorable change to farm physical performance and profit over a relatively short duration.
Key words: replacement cost, profitability

INTRODUCTION

Pasture-based systems of milk production are commonly practiced in New Zealand, Latin America, parts of the United States, and various parts of Europe (Washburn and Mullen, 2014). Milk production in both Ireland and New Zealand is based predominantly on a seasonal calving pasture-based system where the primary feed source of lactating dairy cows is grazed grass (Shalloo et al., 2004a; Dillon et al., 2005; Hanrahan et al., 2018), which typically comprises >82% of the diet (O'Brien et al., 2018). Irrespective of location, the goals of pasture-based producers are generally similar: to match pasture resources with the nutritional requirements of the herd (Washburn and Mullen, 2014). Hence, the relative importance of fertility is greater in seasonal systems of milk production compared with nonseasonal systems to maximize the use of low-cost grazed grass in the diet of the lactating cow (Veerkamp et al., 2002; Shalloo et al., 2014). In addition, the challenges presented by pasture-based systems are universal, including energy expenditure associated with grazing activity (Dohme-Meier et al., 2014), variability in seasonal weather conditions, and a fluctuating feed supply both in terms of availability and quality (Bargo et al., 2003; Van Vuuren and Van den Pol-van Dasselaar, 2006). Therefore, the identification of appropriate genetics for pasture-based systems is a prerequisite to achieving optimal physical and economic efficiency. There is a requirement that resilient animals capable of efficient production of milk solids (predominantly from pasture) combined with high fertility performance are selected (Washburn and Mullen, 2014; Delaby et al., 2018).

The Irish dairy industry has an export-orientated product mix, of which over 90% is exported internationally (Geary et al., 2010). Given the associated dynamics of volatility in world dairy commodity prices

Received September 4, 2019.
Accepted July 9, 2020.
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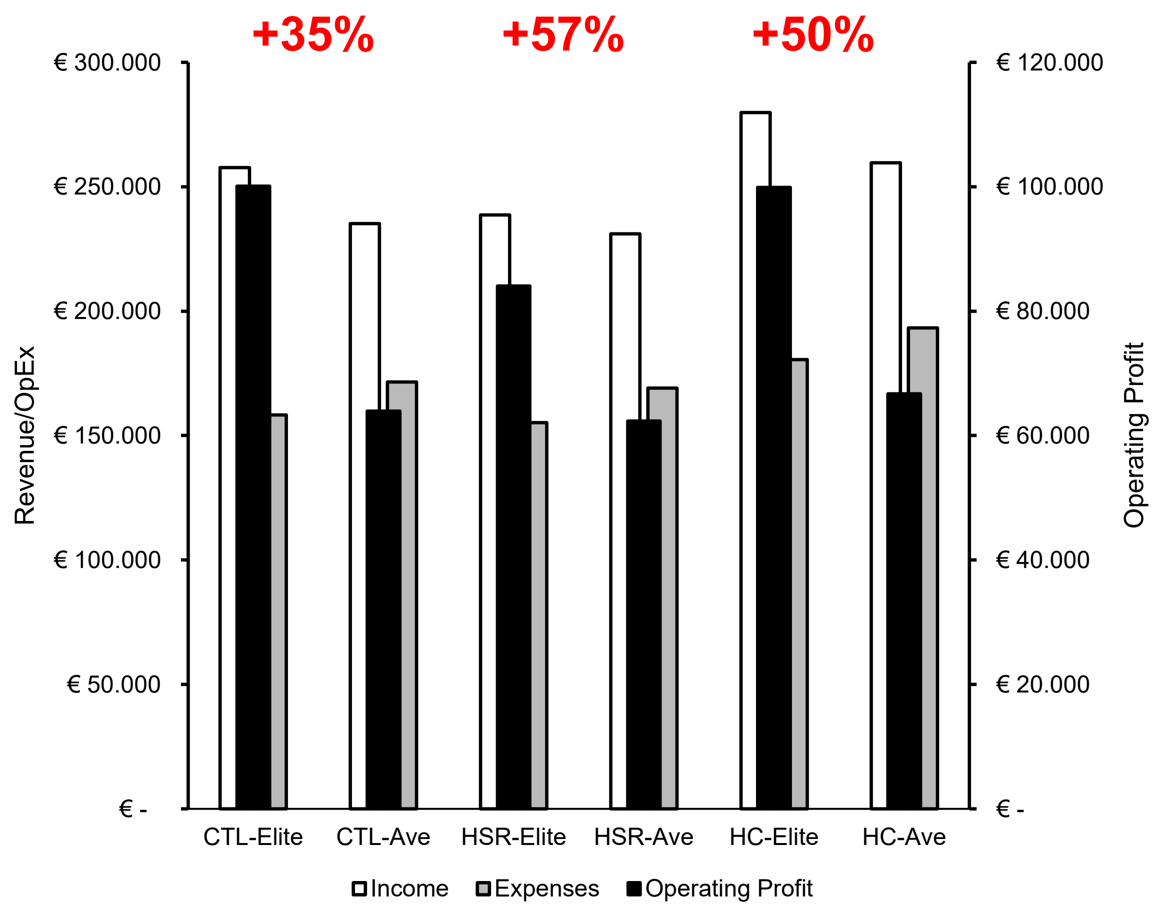

J. Dairy Sci. 103:10311–10320
https://doi.org/10.3168/jds.2019-17544

Economic assessment of Holstein-Friesian dairy cows of divergent Economic Breeding Index evaluated under seasonal calving pasture-based management

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[1]Animal and Grassland Research and Innovation Centre, Teagasc Moorepark, Fermoy, Co. Cork, P61 C997 Ireland
[2]School of Agriculture and Food Science, University College Dublin, Belfield, Dublin, D04 N2E5 Ireland

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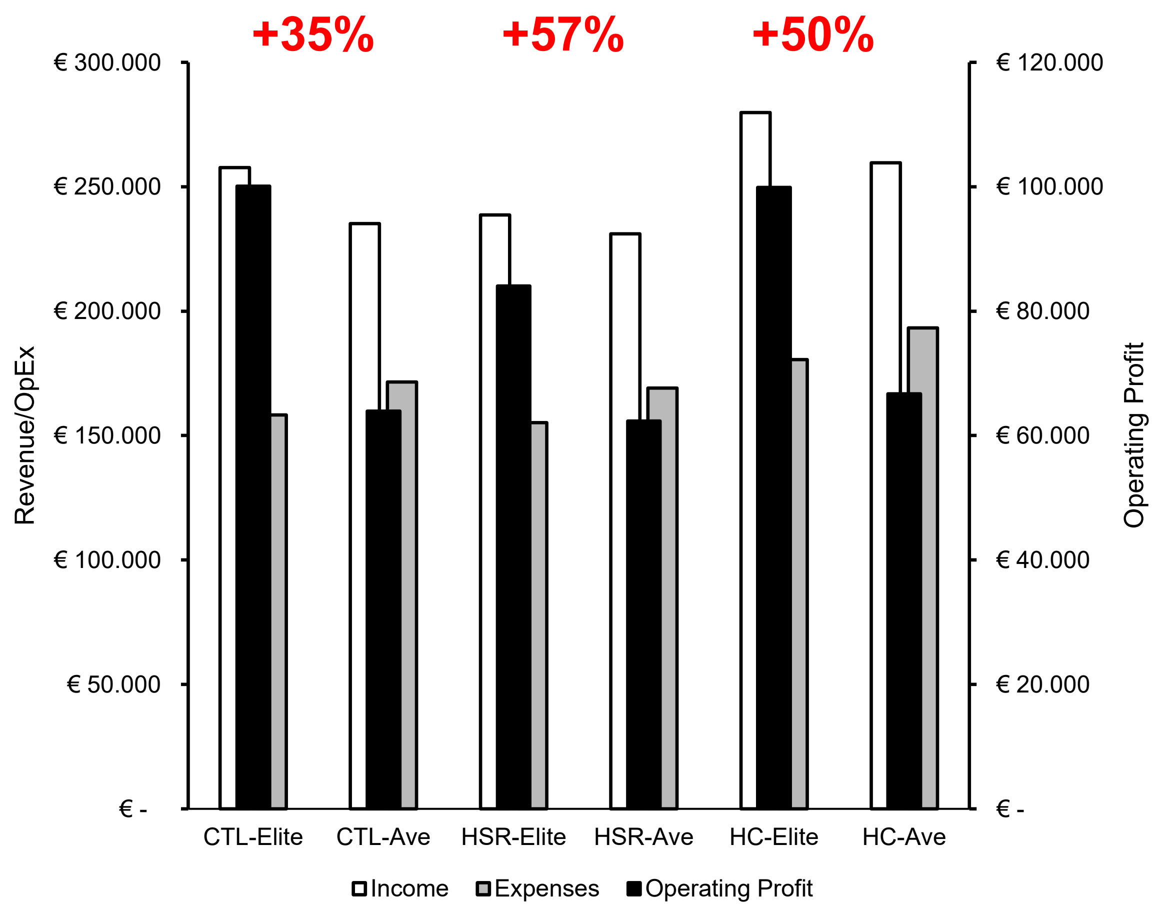
"An ounce of breeding is worth a pound of feeding"

-Old Irish seanfhocail



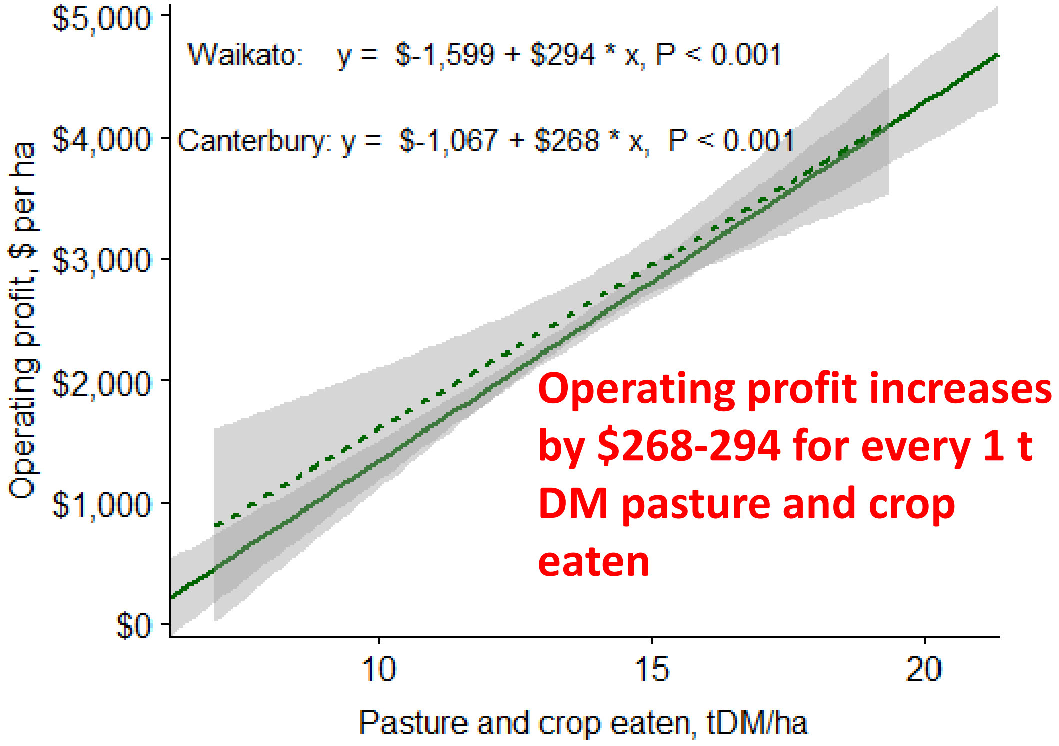
Business resilience

"the farmer is the only man in our economy who has to buy everything he buys at retail - sell everything he sells at wholesale - and pay the freight both ways.."

- John F. Kennedy

Business resilience

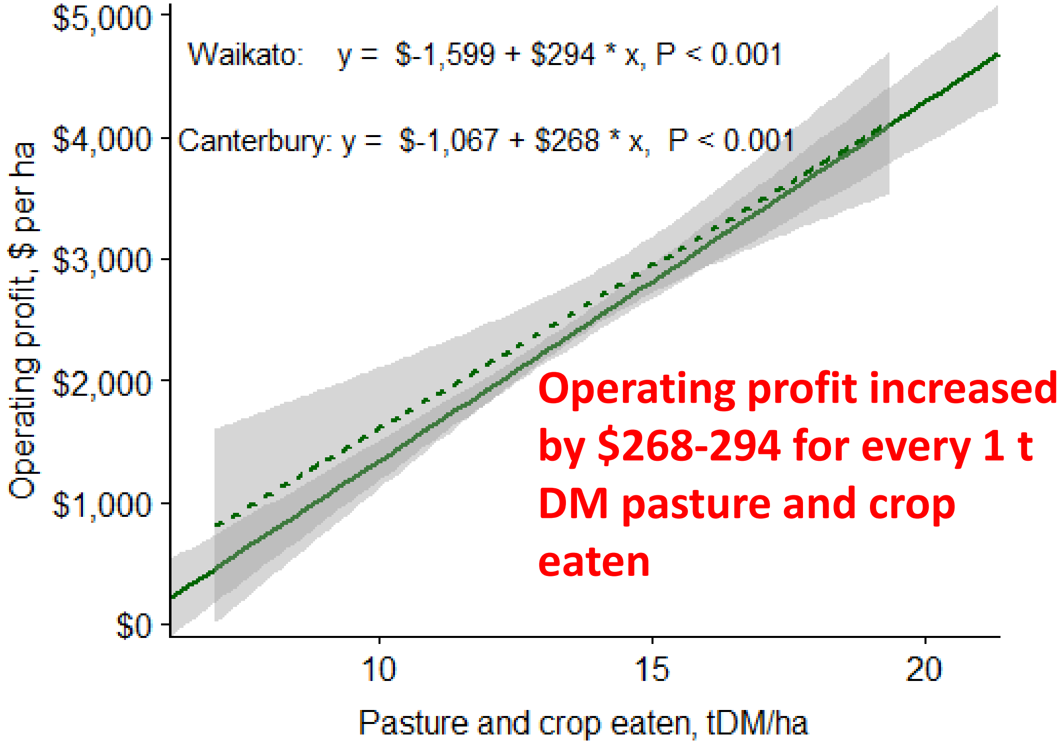
High levels of pasture utilisation



Neal and Roche, 2019. Profitable and resilient dairy farm businesses in New Zealand. Animal Production Science. 60(1) 169-174.

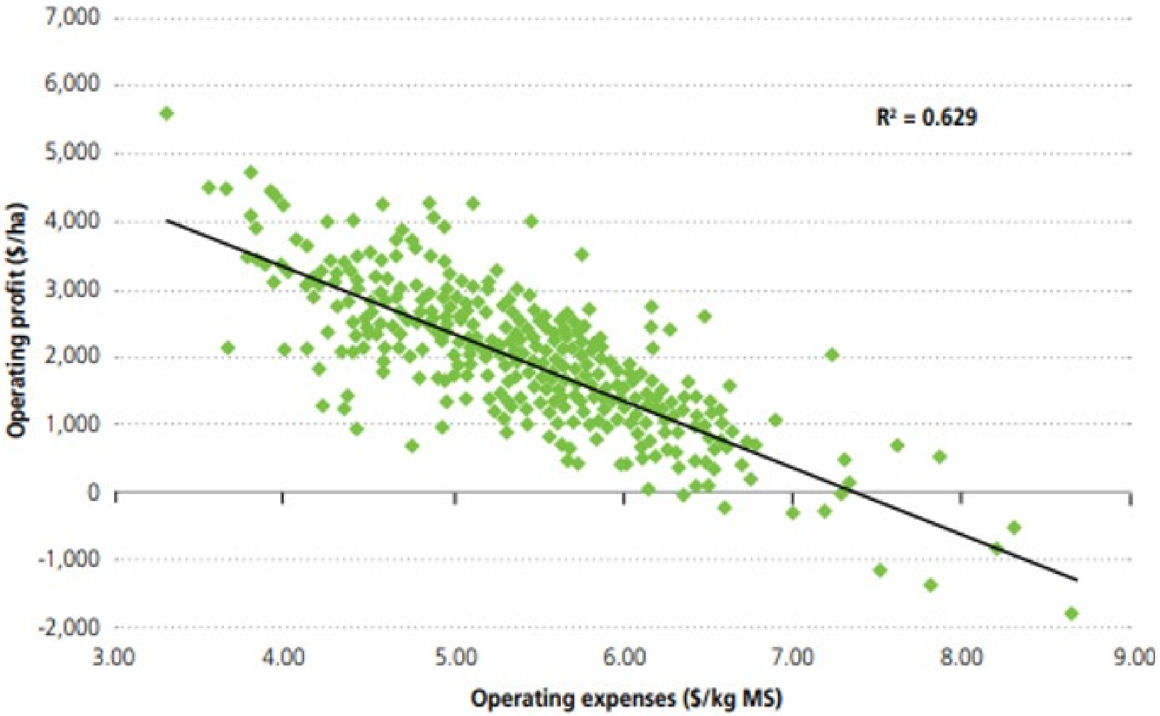
Business resilience

High levels of pasture utilisation



Neal and Roche, 2019. Profitable and resilient dairy farm businesses in New Zealand. Animal Production Science. 60(1) 169-174.

Maintaining cost control



Source: DairyNZ Economic Farm Survey.

CSIRO PUBLISHING
Animal Production Science
https://doi.org/10.1071/AN18572

Profitable and resilient pasture-based dairy farm businesses in New Zealand

Mark Neal[A,C] *and John R. Roche*[A,B]

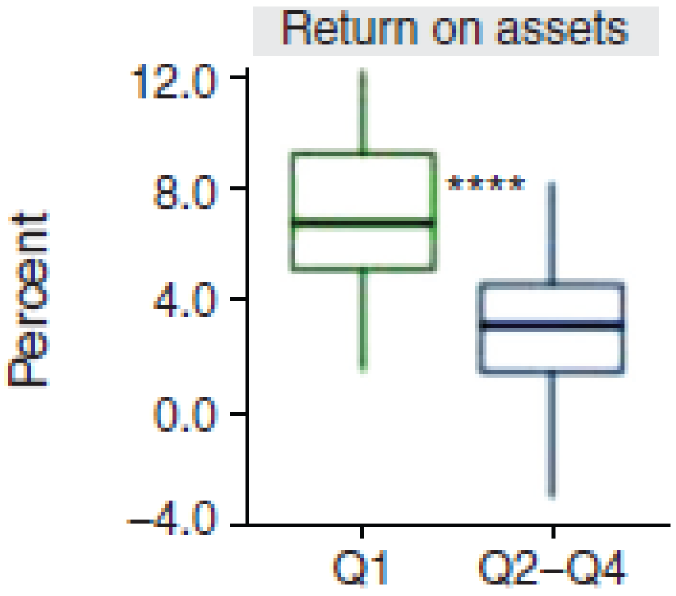


Fig. 1. Characteristics of farms in the Waikato region that are in the top quartile (Q1) ranked by operating return on assets within years, compared with those in the remaining quartiles (Q2–Q4). Significance levels shown are as determined by the Kruskal–Wallis non-parametric test. n.s., $P > 0.05$; *, $P < 0.05$; **, $P < 0.01$; ***, $P < 0.001$; ****, $P < 0.0001$. MS, milksolids.

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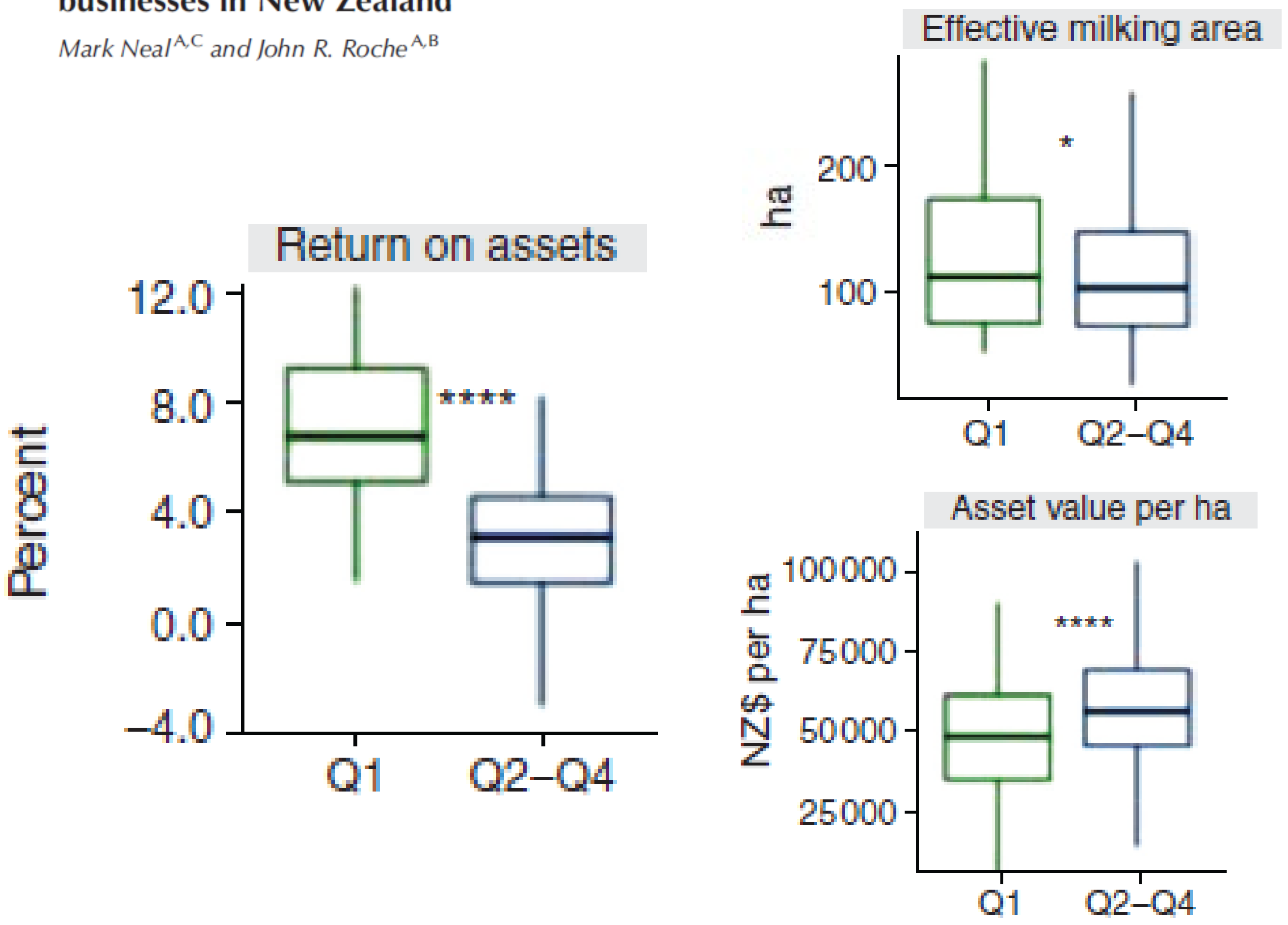
Profitable and resilient pasture-based dairy farm businesses in New Zealand

Mark Neal[A,C] *and John R. Roche*[A,B]

The farm



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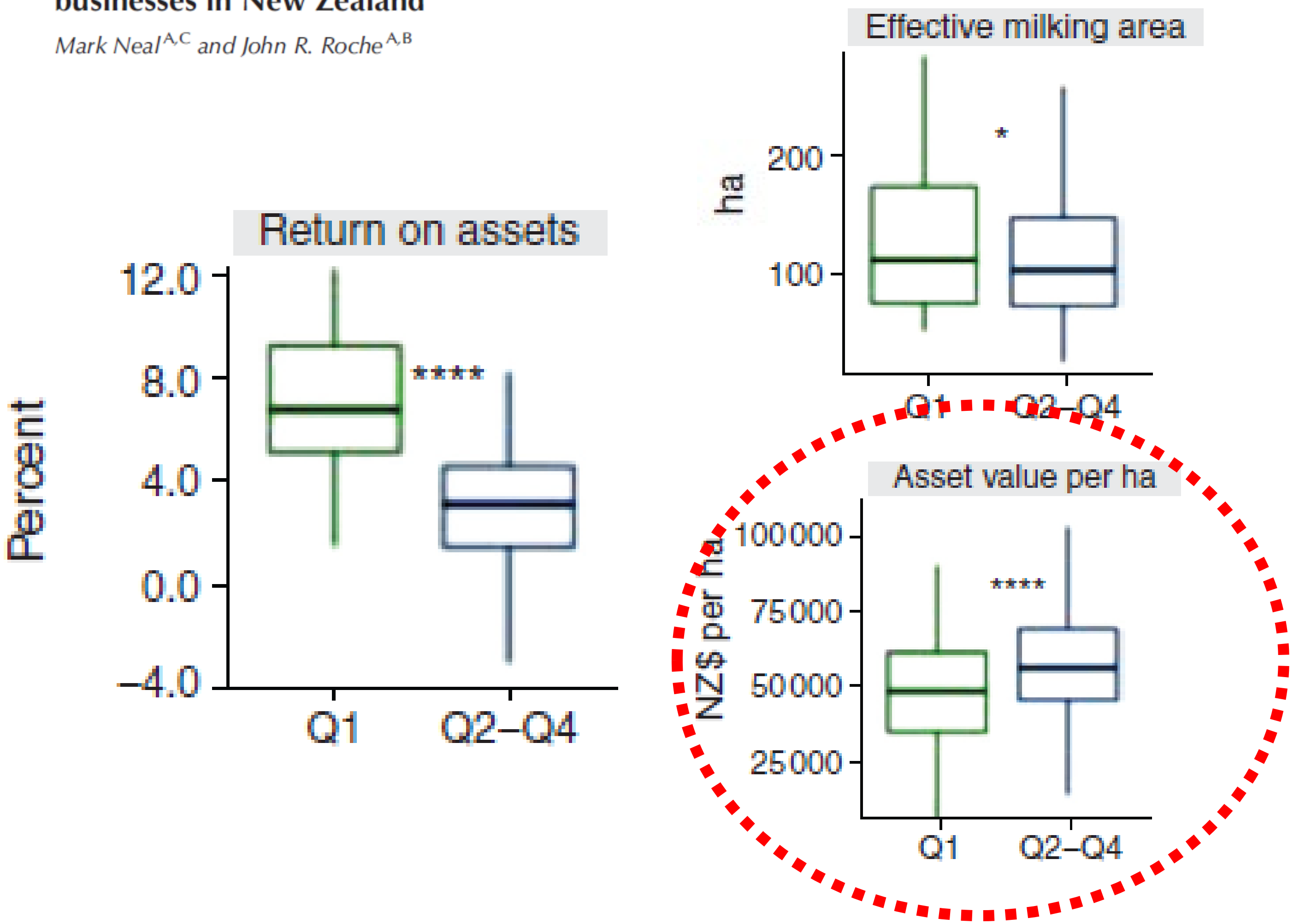

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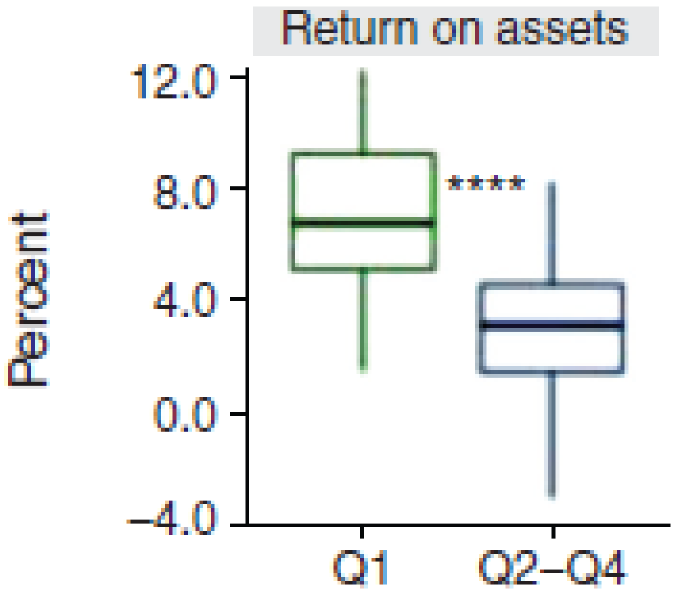

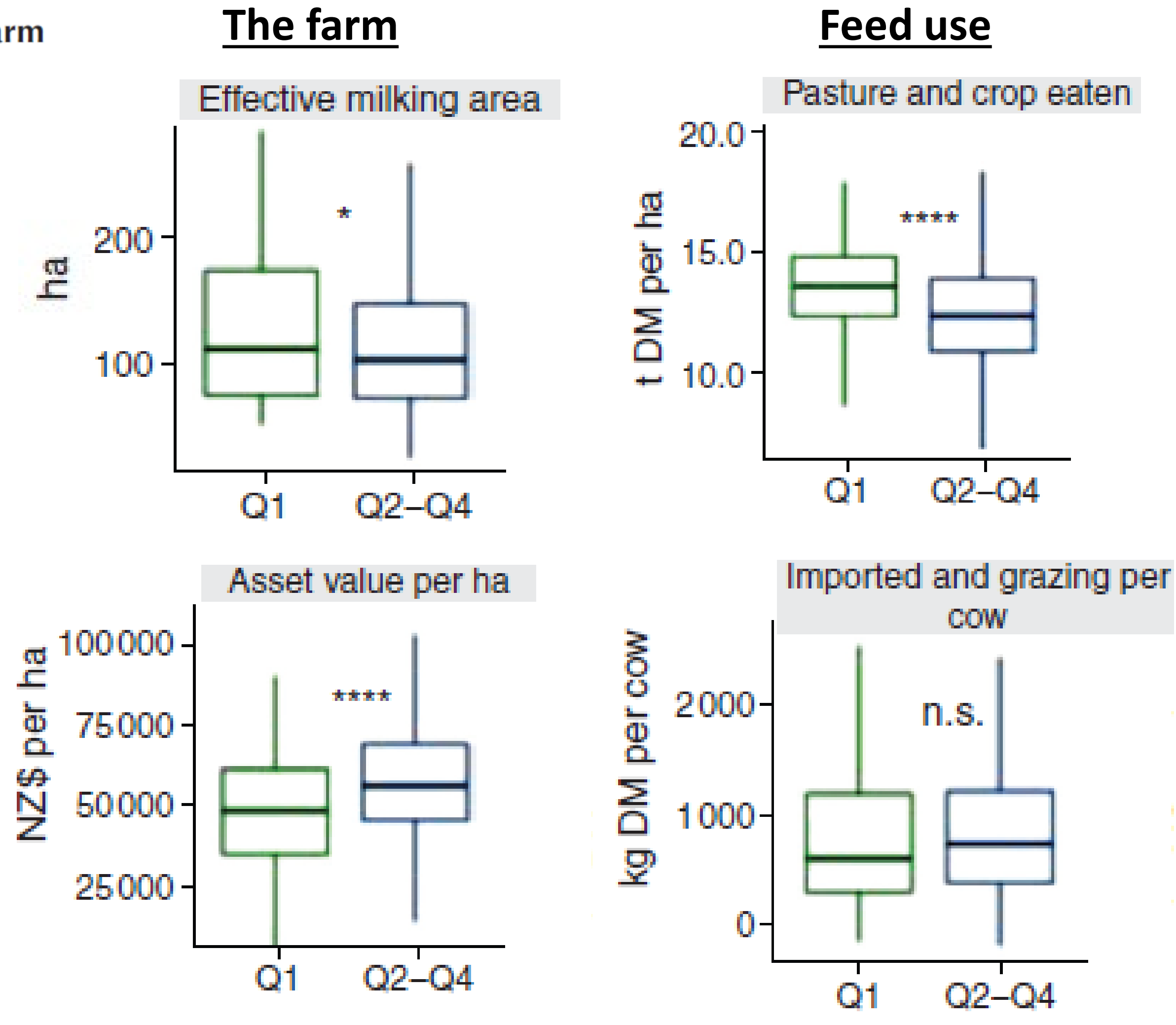

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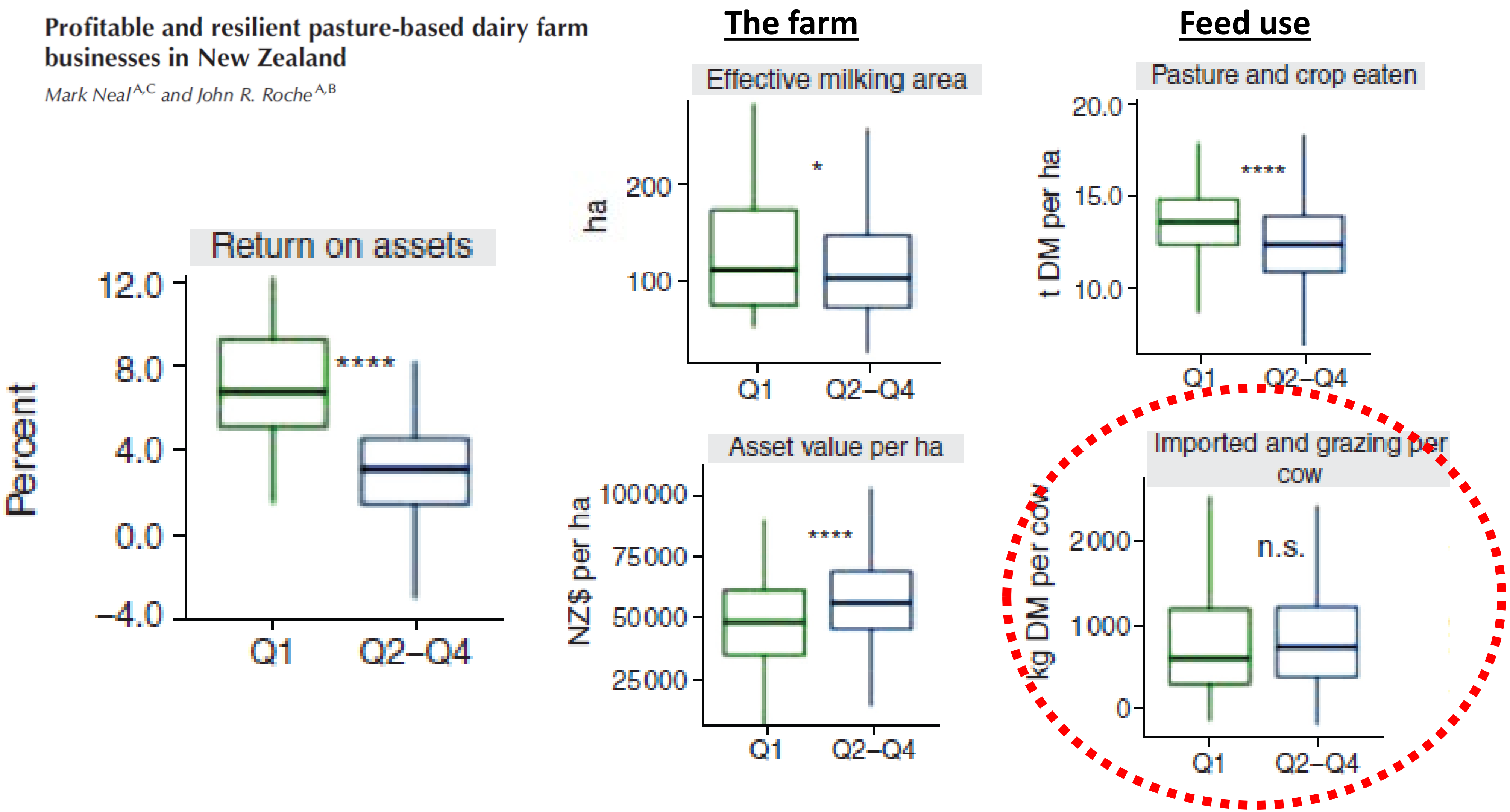

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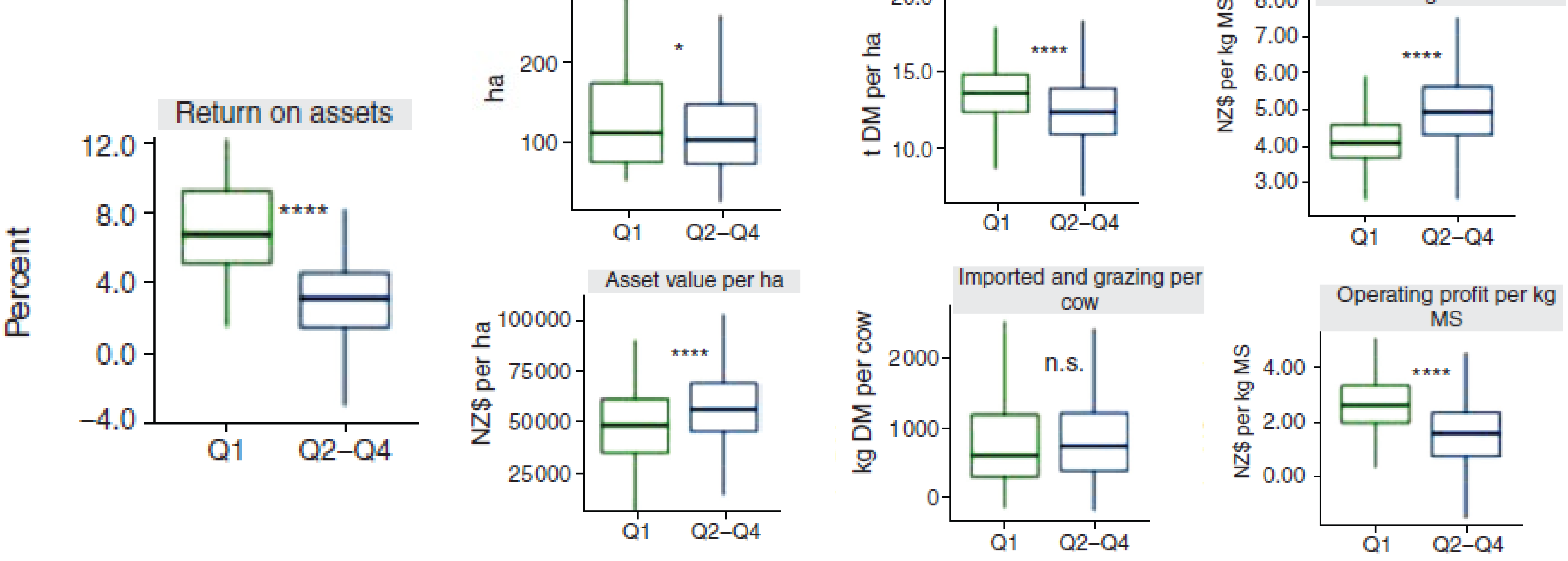

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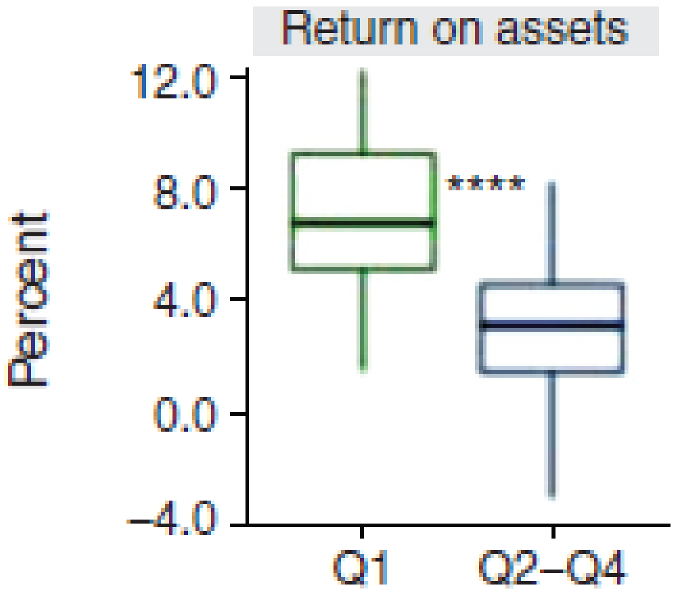

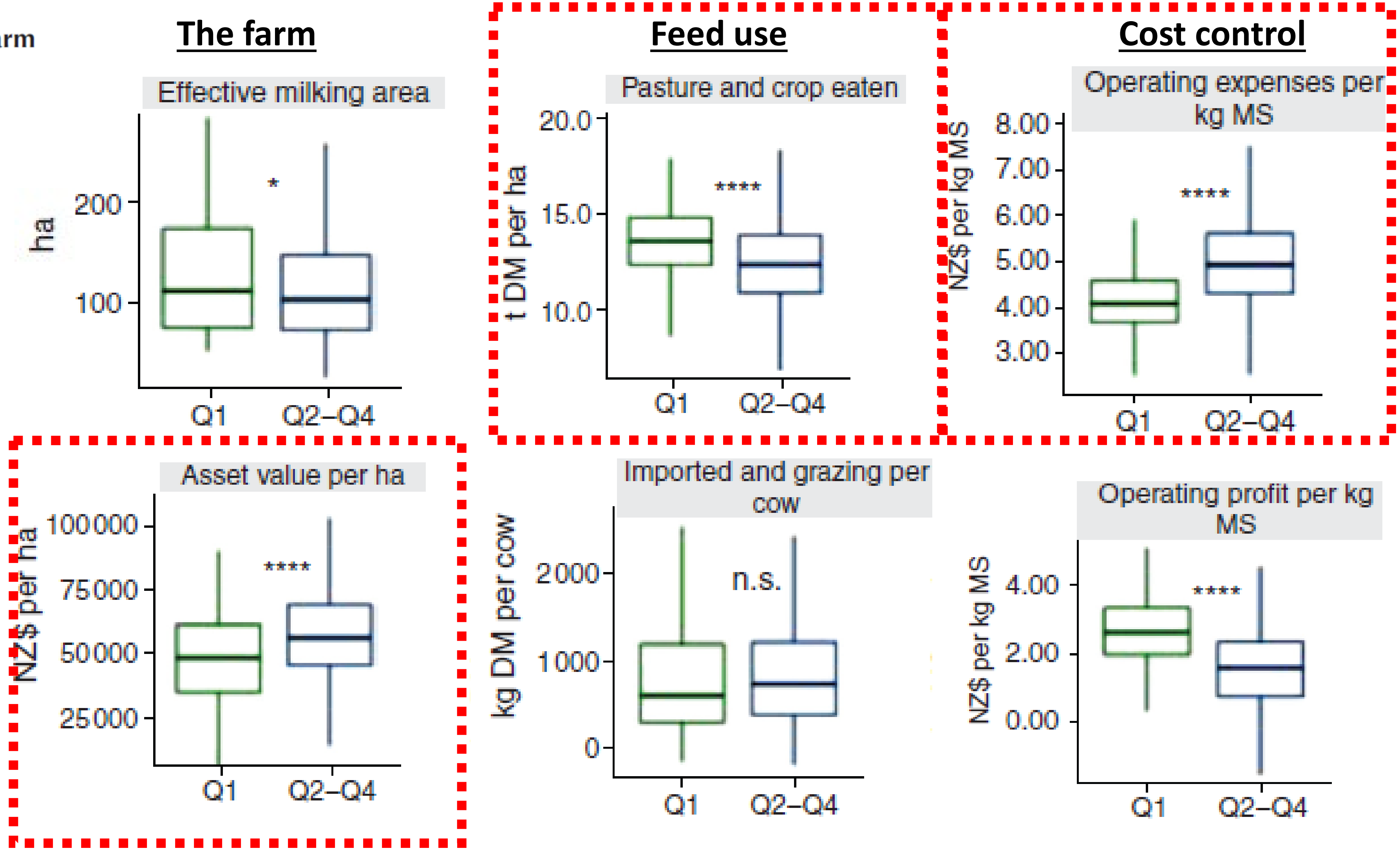

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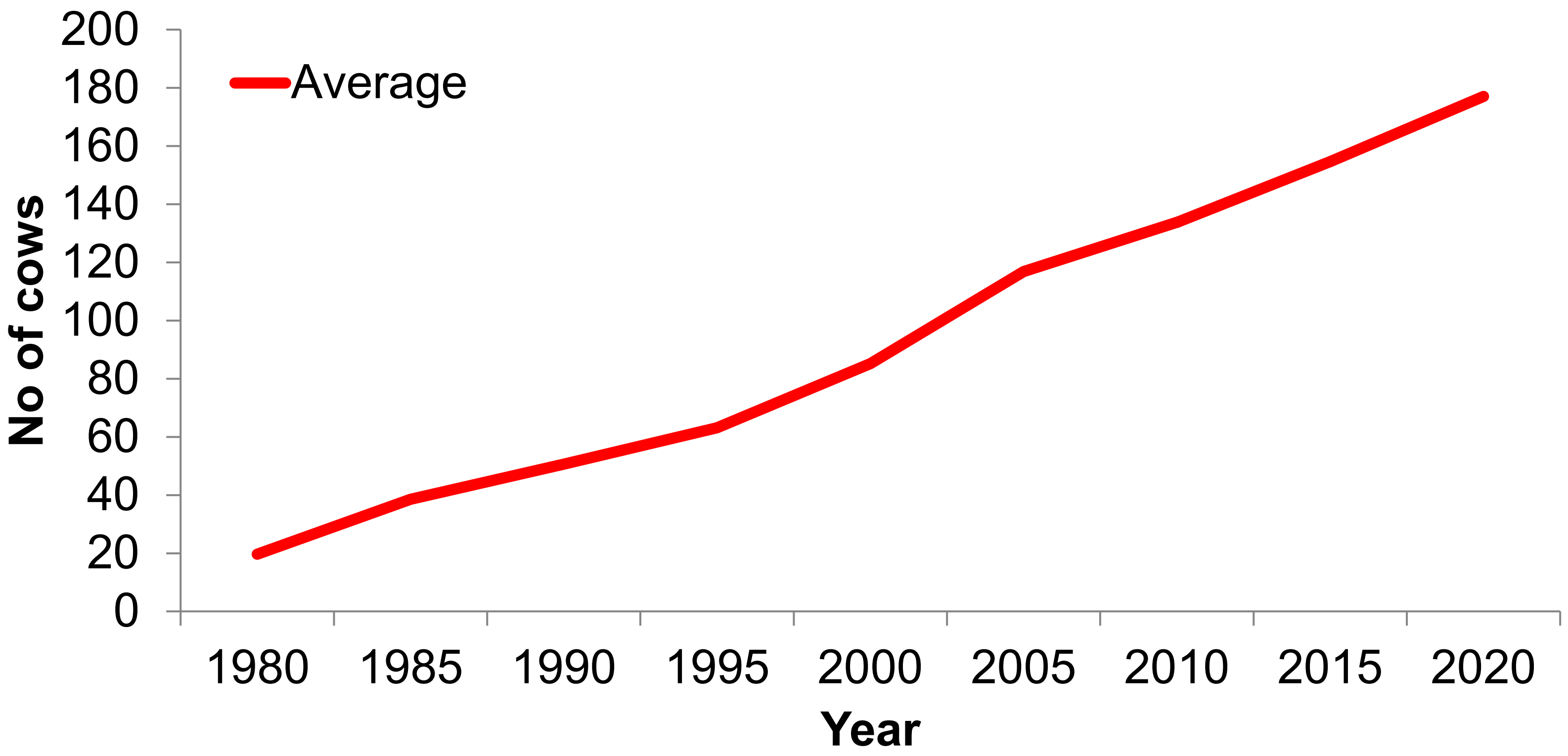
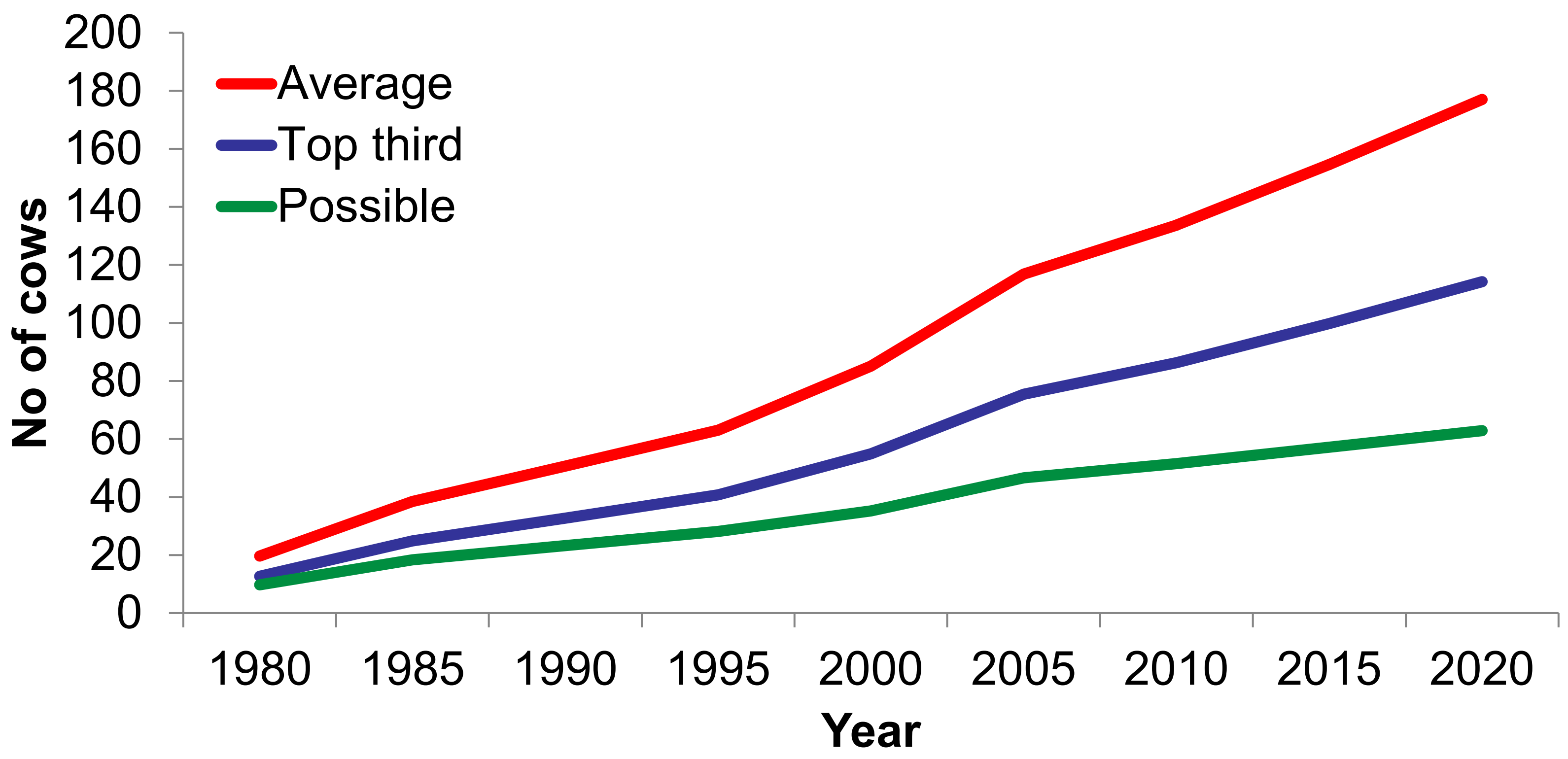
People

Herd size to earn the average national wage in Ireland



Roche and Horan, 2013, Resilient farming systems for an expanding Irish Dairy Industry. Moorepark '13: Irish Dairying – Harvesting the potential. Wednesday 3rd July. 2013.

Herd size to earn the average national wage in Ireland



Skill is more important than scale!
Resilient people leave time for self-improvement

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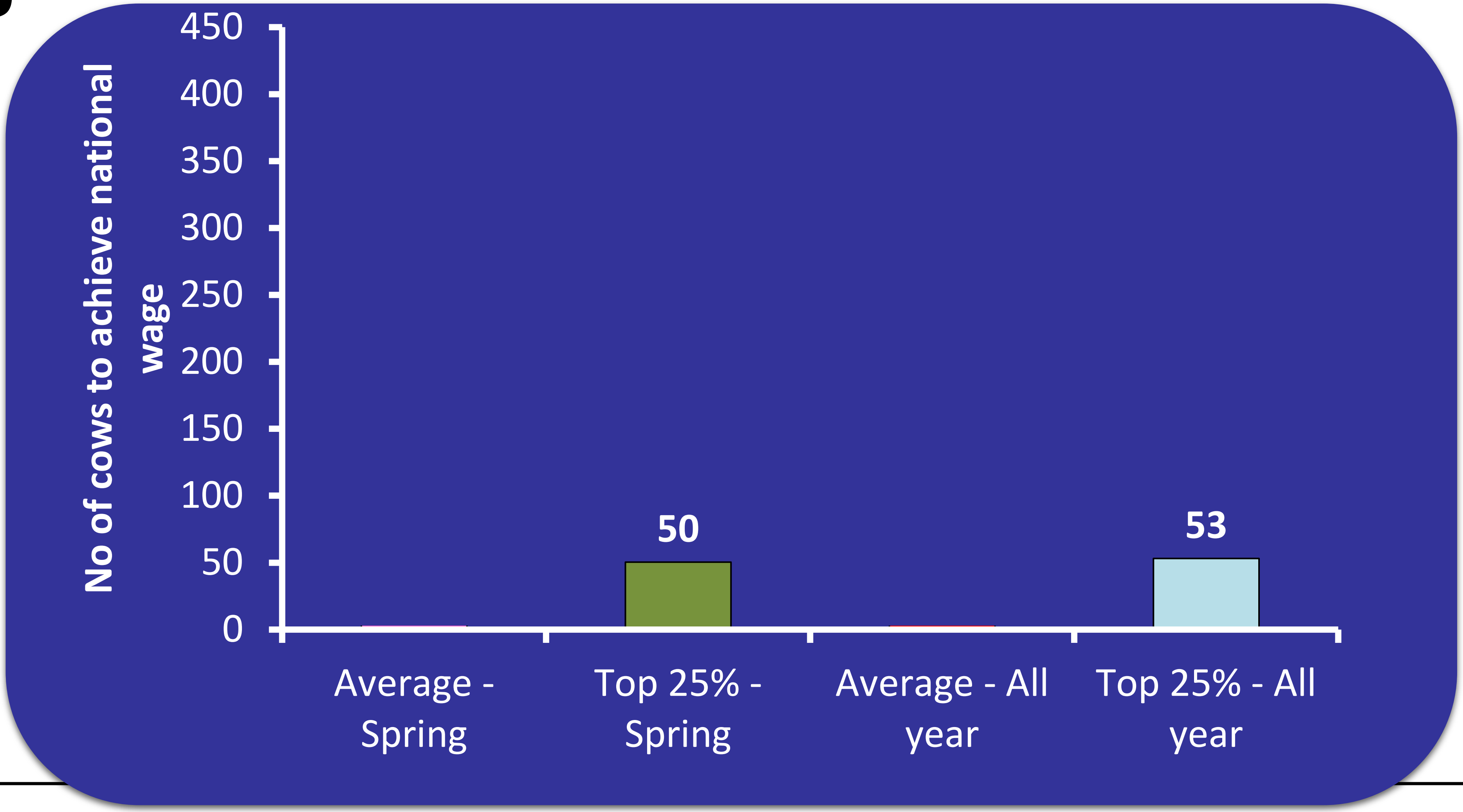
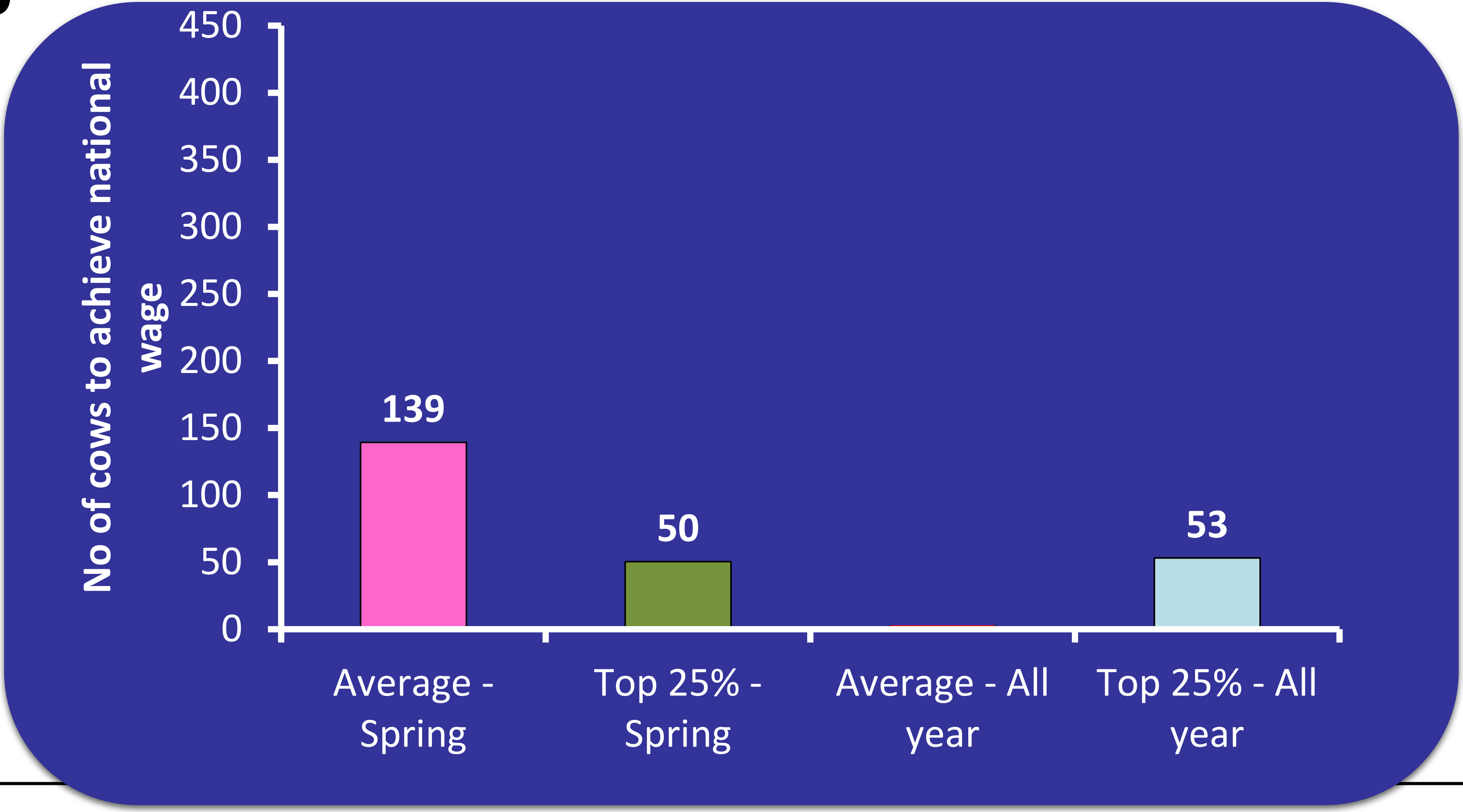
Herd size to earn the average national wage in UK



Ministry for Primary Industries
Manatū Ahu Matua

Herd size to earn the average national wage in UK



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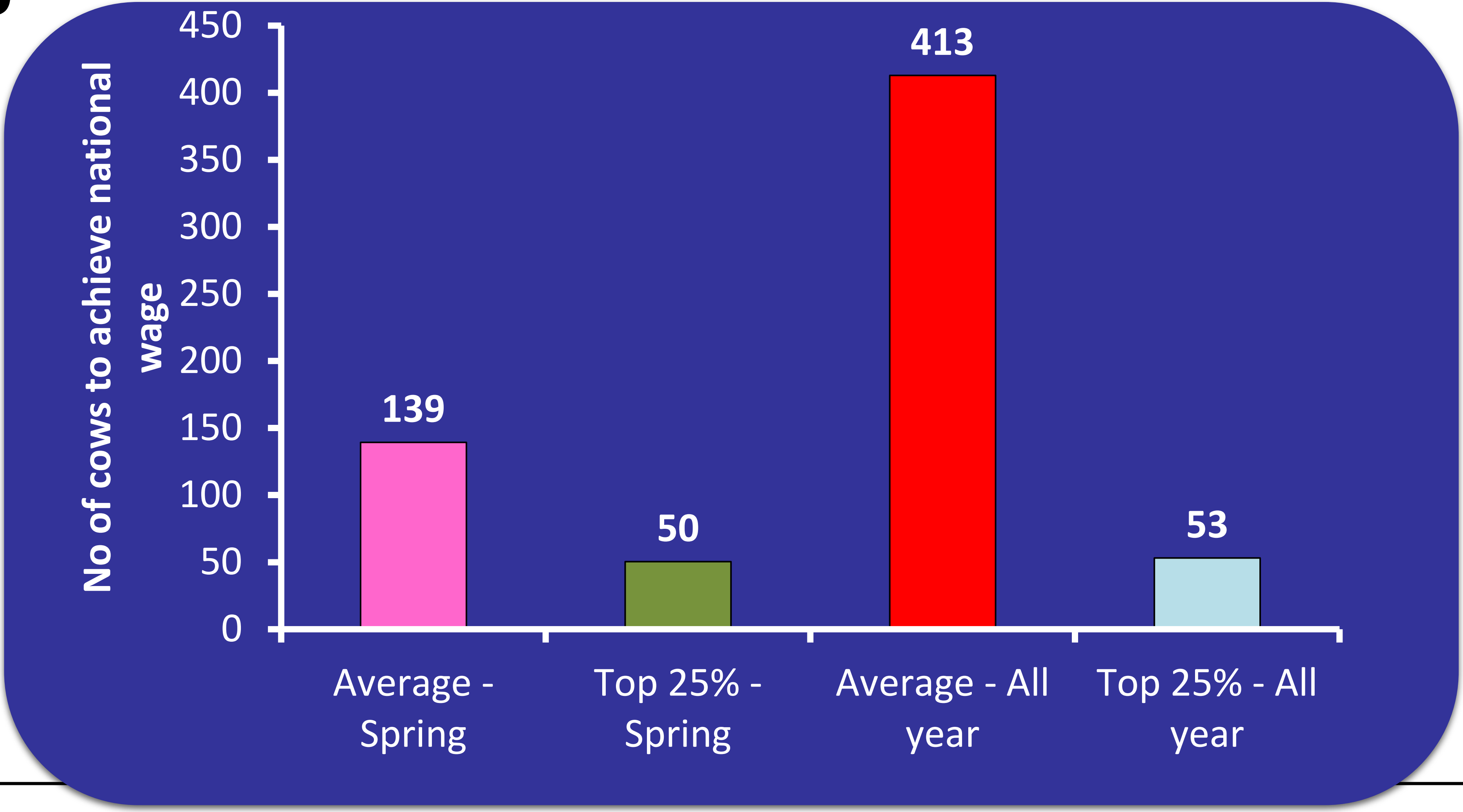
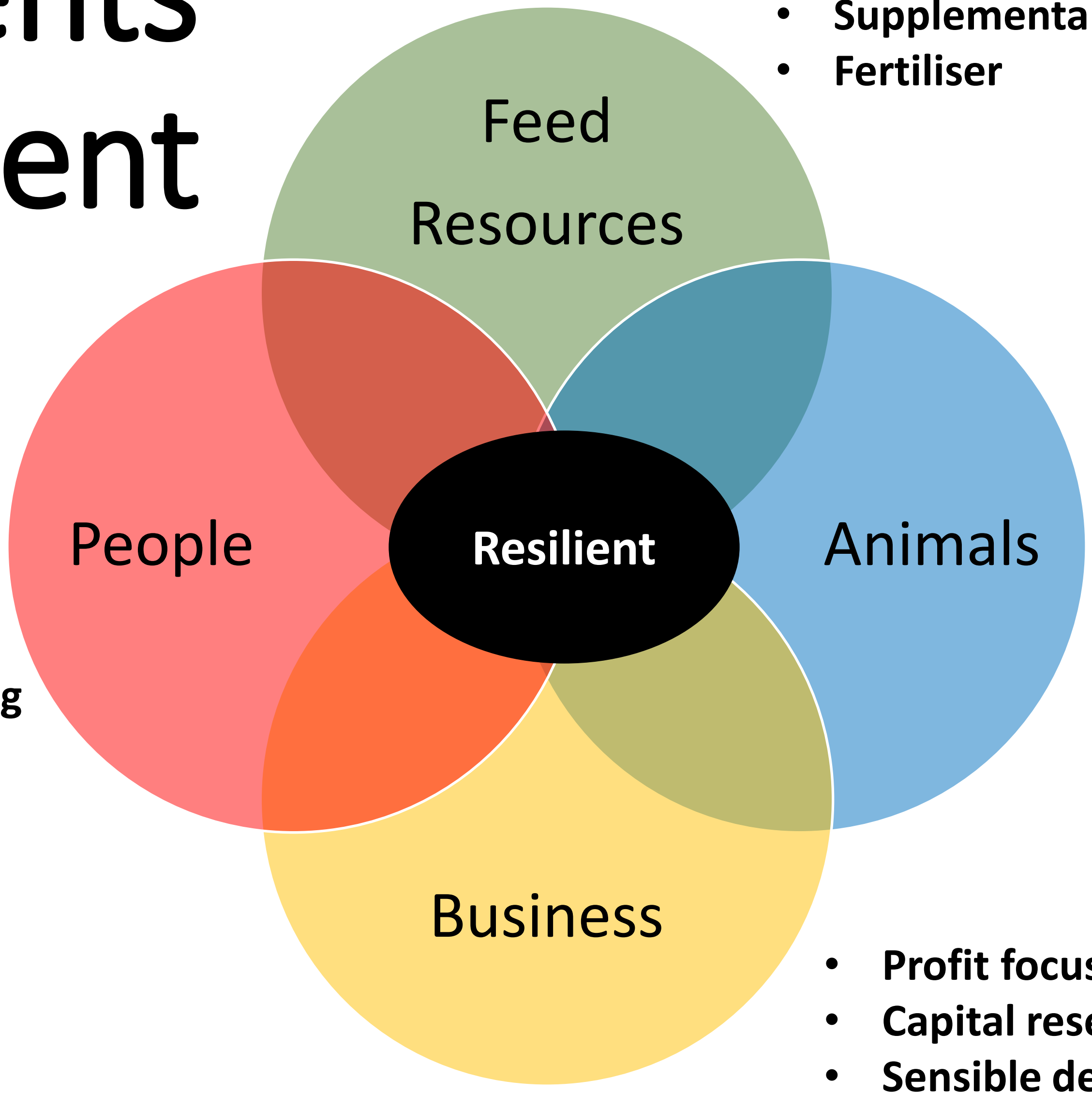


Ministry for Primary Industries
Manatū Ahu Matua

Components of a Resilient System



- Pastures
- Supplementary feeds
- Fertiliser

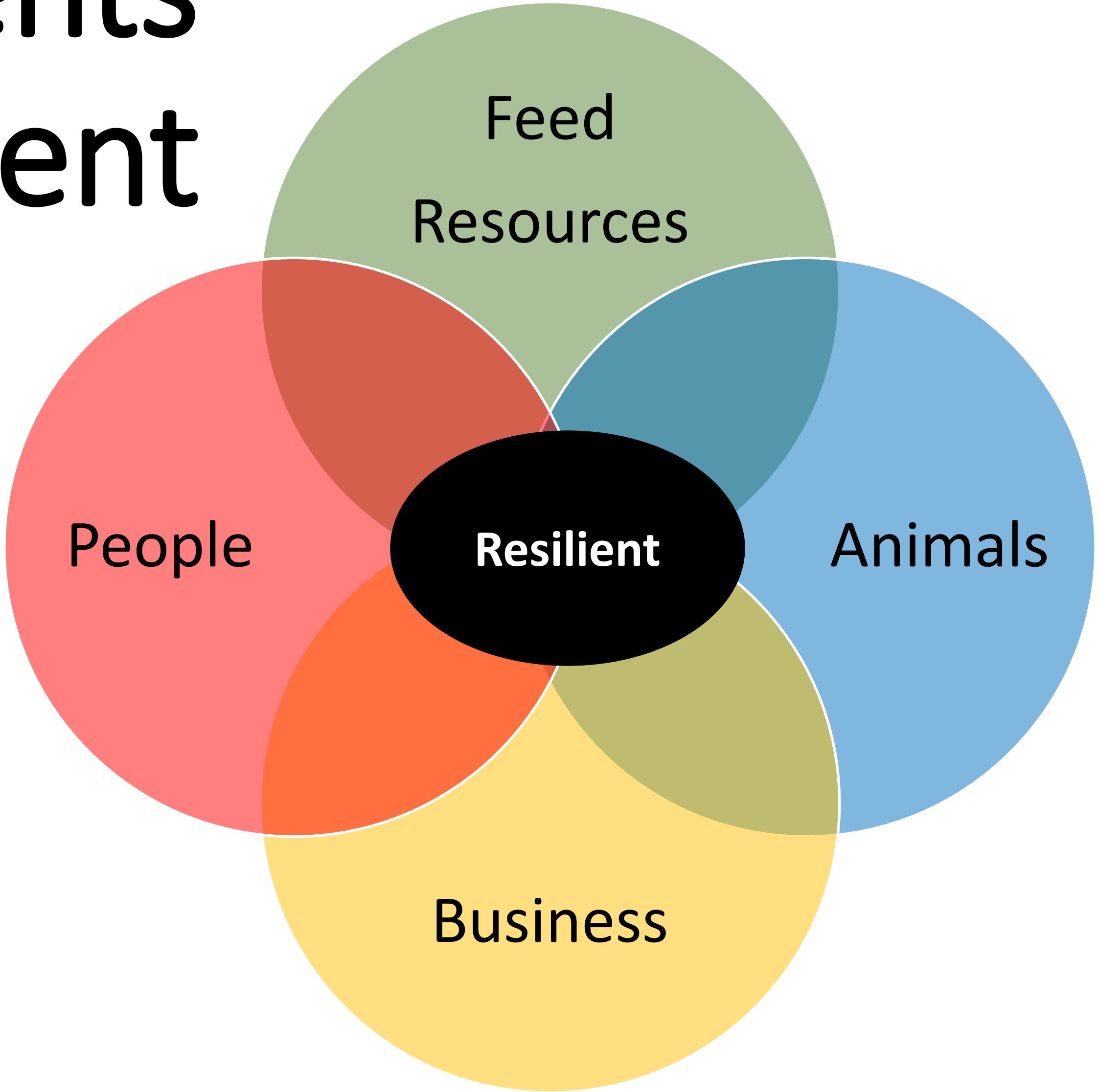
- High breeding index
- Fertile
- Healthy
- Physically robust (legs, udder)

- Simple & repeatable
- Reasonable hours
- Opportunities for training

- Profit focussed
- Capital reserves
- Sensible debt to asset ratio
- Environmental footprint minimised

Adapted from Roche and Horan, 2013

Components of a Resilient System



Consumer

Adapted from Roche and Horan, 2013

"I can calculate the movement of the stars, but not the madness of men"

- Isaac Newton


People are buying the
process,
not just the product!


Consumer

Unique and sometimes overlapping health and wellness priorities across generations

Animal welfare-related
- Cruelty Free, Humane

Social responsibility
- Ethical, B-Corp, fair trade

Clean label
- Free from aluminum, parabens, artificial fragrance
- Natural ingredients

Health needs
- Brain & eye health, hair/skin/nails, mood & stress
- Immune system health, microbiome

All of Gen Z but to lesser degree

Highest indexing group for
- "Provides energy"
- Pregnancy and lactation support
- Reusable packaging

Highest indexing group for
- Consuming ***Better For***™ foods and organic overall

Sustainable packaging
- Less packaging
- Sustainable packaging

Health & need states
- Cellular function
- Cardiovascular health
- Joint health
- Heart health

Environmental sustainability
- Low emissions
- Reduced carbon impact

Health & need states
(Even greater degree than Boomers)
- Cellular function
- Cardiovascular health
- Joint health
- Heart health

What constitutes evidence in a post-science world?

PNAS | July 11, 2017 | vol. 114 | no. 28 | 7313–7318

Emotion shapes the diffusion of moralized content in social networks

William J. Brady[a], Julian A. Wills[a], John T. Jost[a,b], Joshua A. Tucker[b,c], and Jay J. Van Bavel[a,1]

[a]Department of Psychology, New York University, New York, NY 10003; [b]Department of Politics, New York University, New York, NY 10012; and [c]Department of Russian and Slavic Studies, New York University, New York, NY 10012

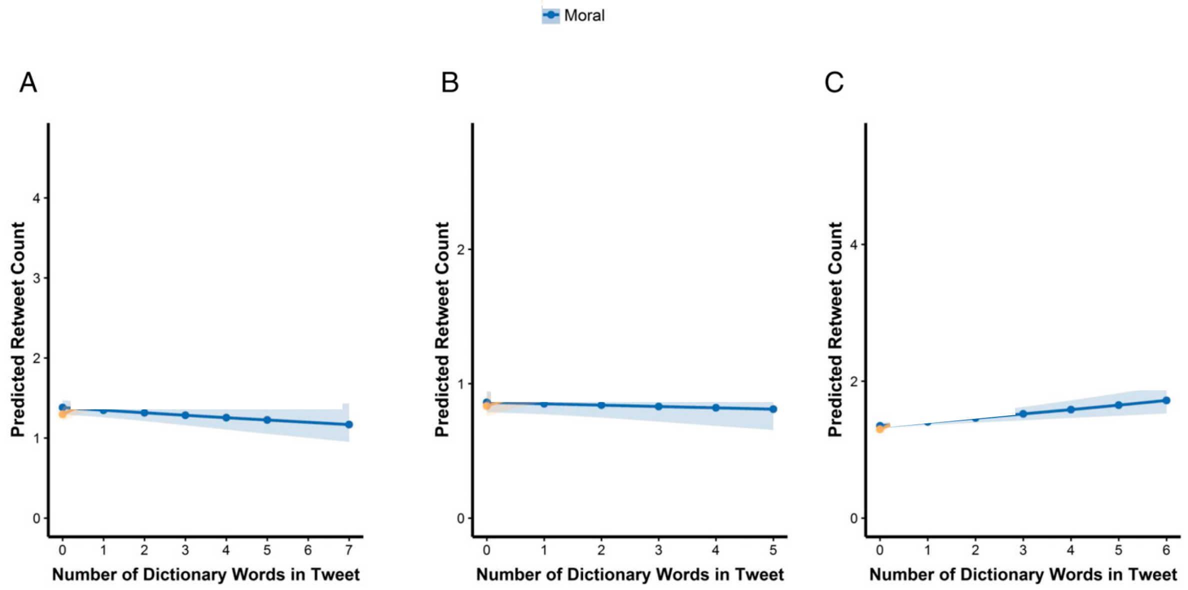
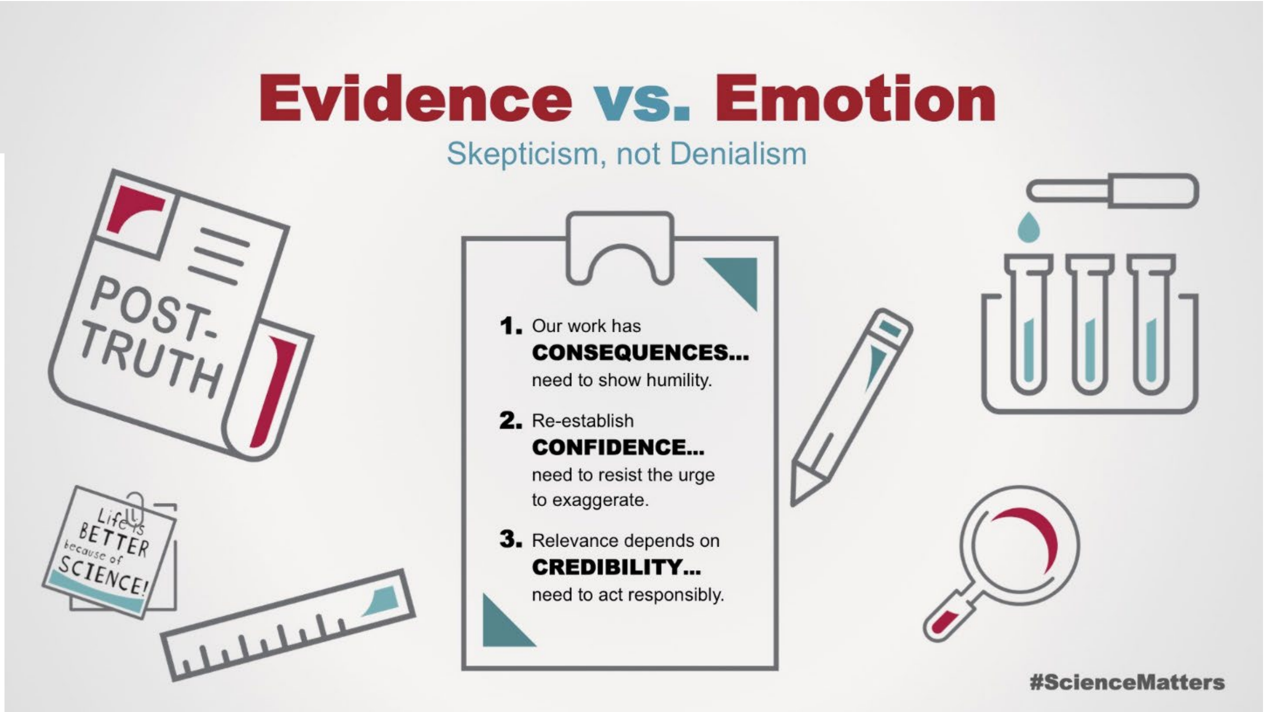


Fig. 1. Moral-emotional language predicts the greatest number of retweets. The graph depicts the number of retweets, at the mean level of continuous and effects-coded covariates, predicted for a given tweet as a function of moral and moral-emotional language present in the tweet. Bands reflect 95% CIs. An increase in moral-emotional language predicted large increases in retweet counts in the domain of (*A*) gun control, (*B*) same-sex marriage, and (*C*) climate change after adjusting for the effects of distinctly moral and distinctly emotional language and covariates.



Ministry for Primary Industries
Manatū Ahu Matua


15%

28%

48%

53%

84%

Confirmation bias

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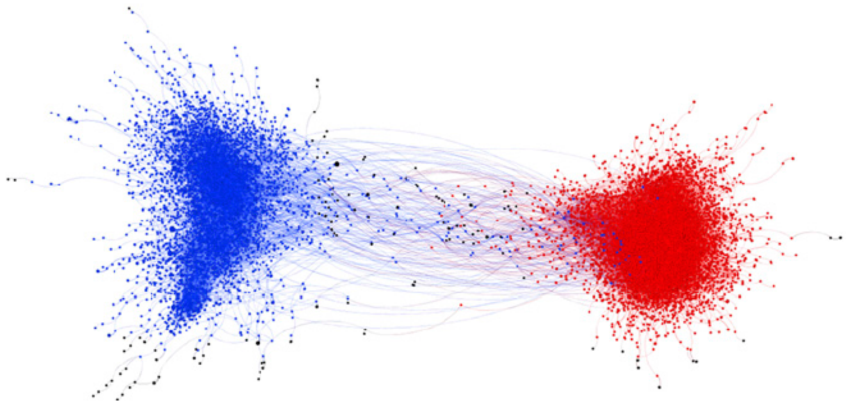
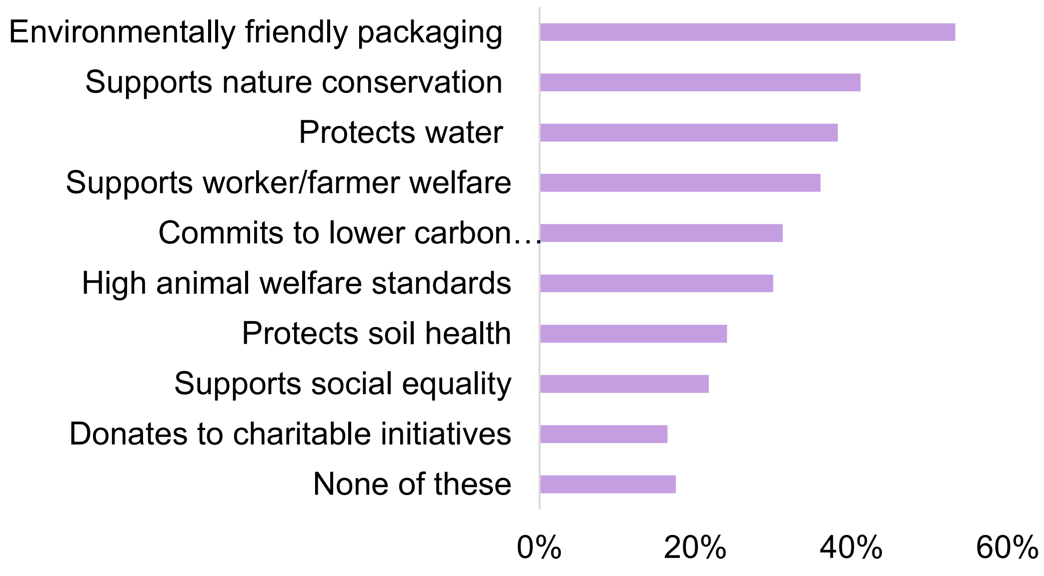


Fig. 3. Network graph of moral contagion shaded by political ideology. The graph represents a depiction of messages containing moral and emotional language, and their retweet activity, across all political topics (gun control, same-sex marriage, climate change). Nodes represent a user who sent a message, and edges (lines) represent a user retweeting another user. The two large communities were shaded based on the mean ideology of each respective community (blue represents a liberal mean, red represents a conservative mean).

Environmentally friendly packaging is most important.

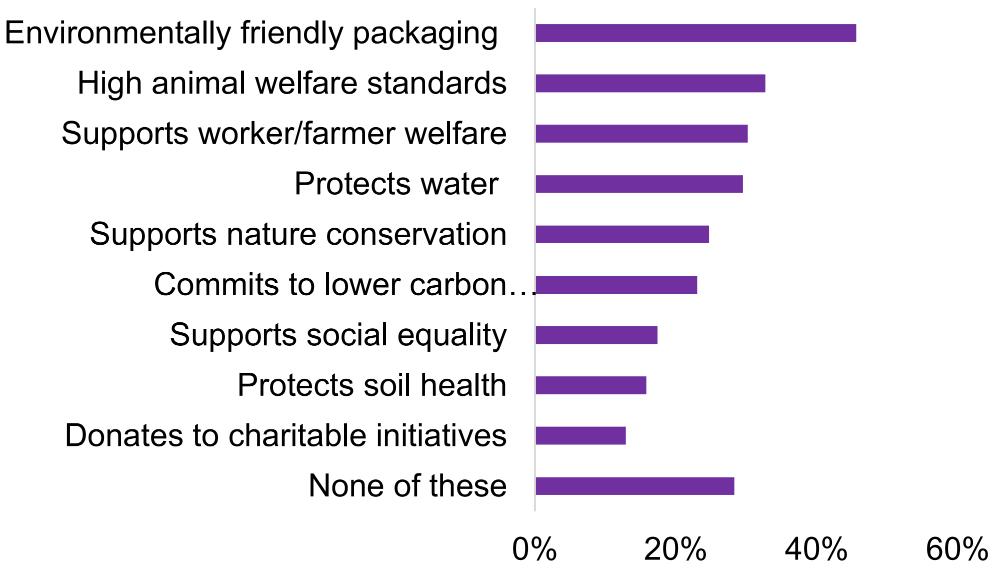
Animal welfare has higher priority amongst New Zealand consumers than other countries

Ethical and environmental priorities



Source: Mintel consumer survey in 35 countries (2021)

Ethical and environmental priorities in New Zealand



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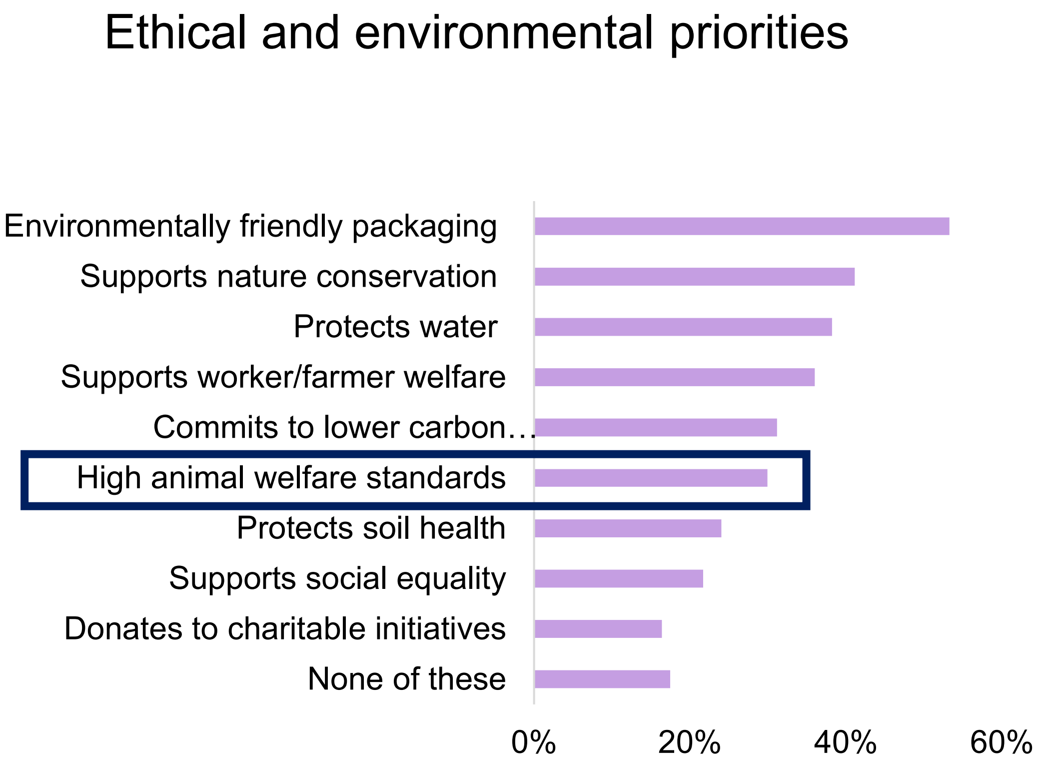

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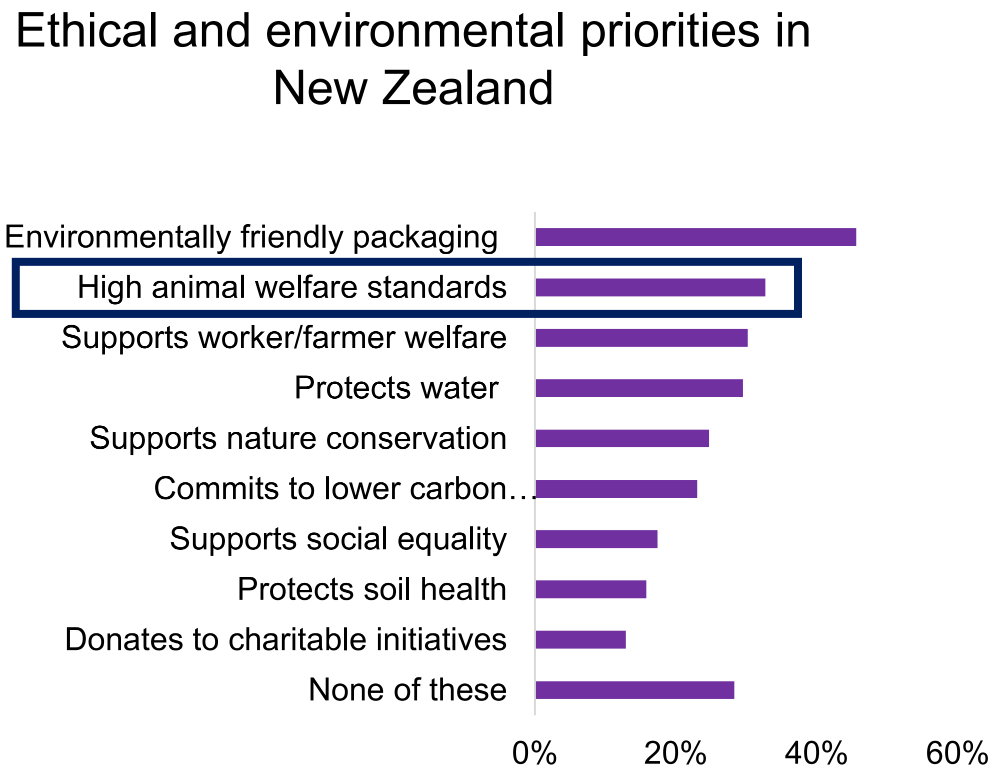

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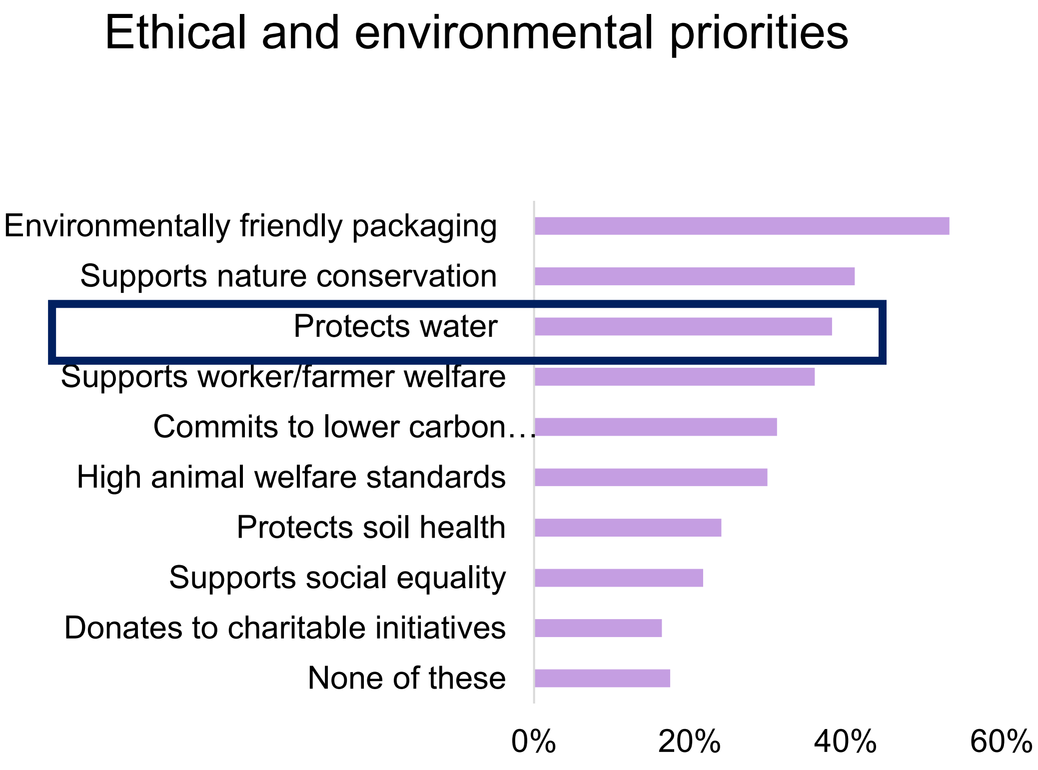

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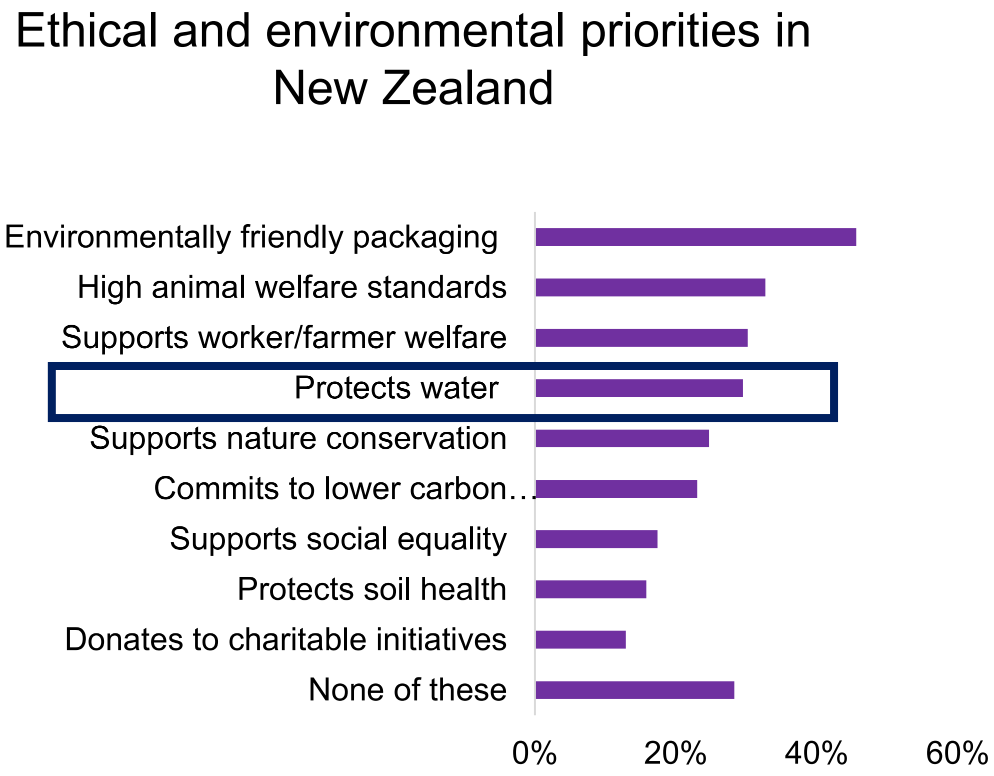

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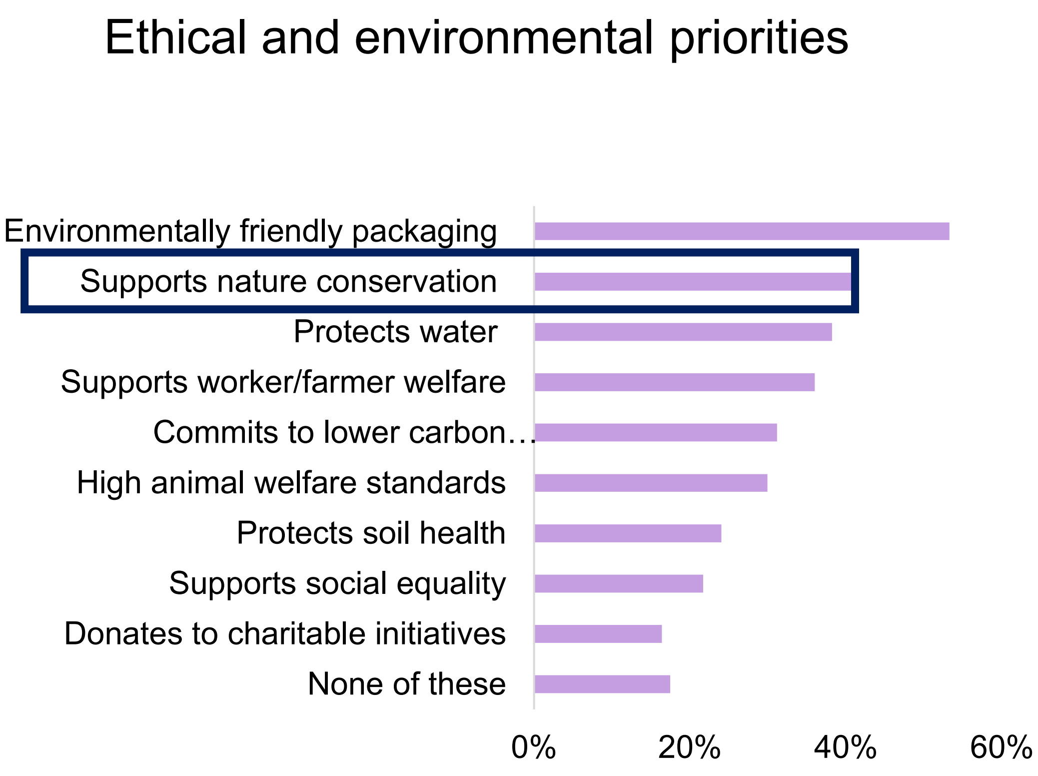
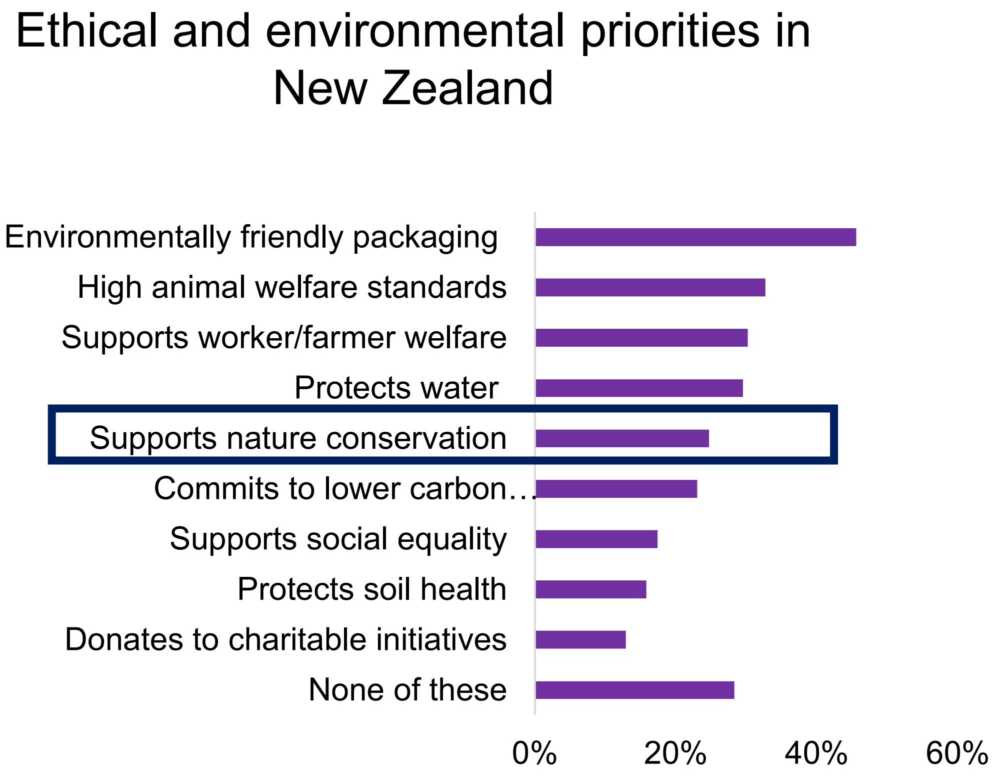


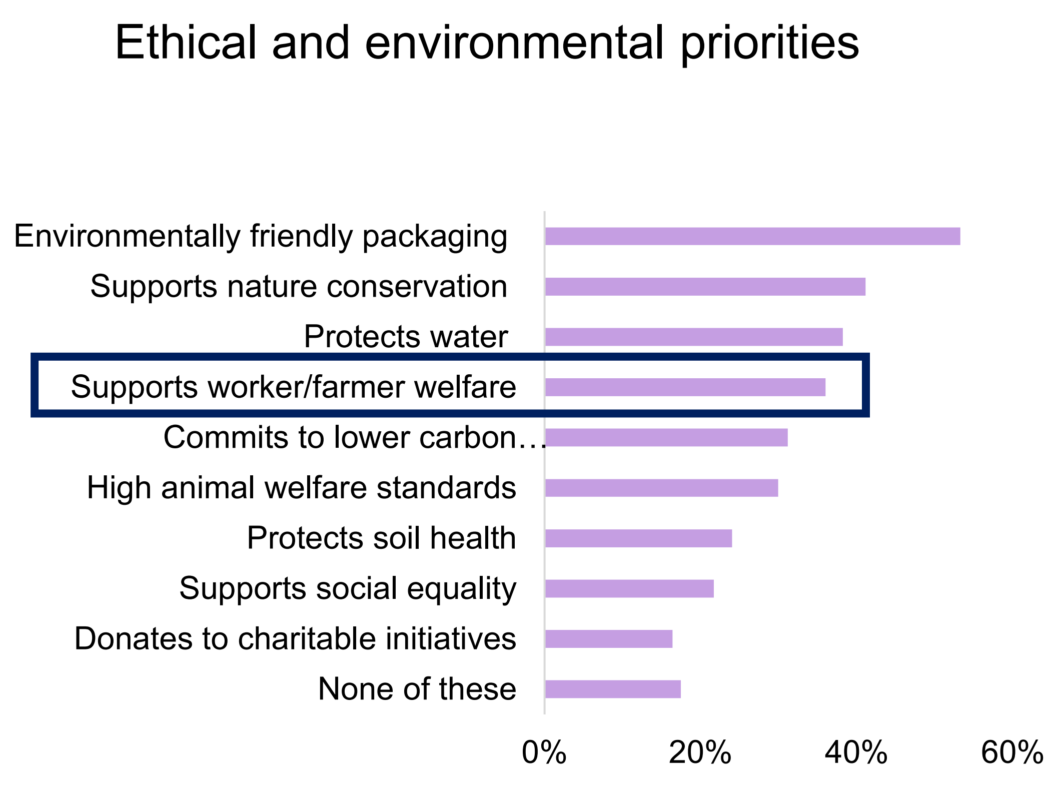
Source: Mintel consumer survey in 35 countries (2021)



Source: Mintel consumer survey in 35 countries (2021)

Environmentally friendly packaging is most important.

Animal welfare has higher priority amongst New Zealand consumers than other countries



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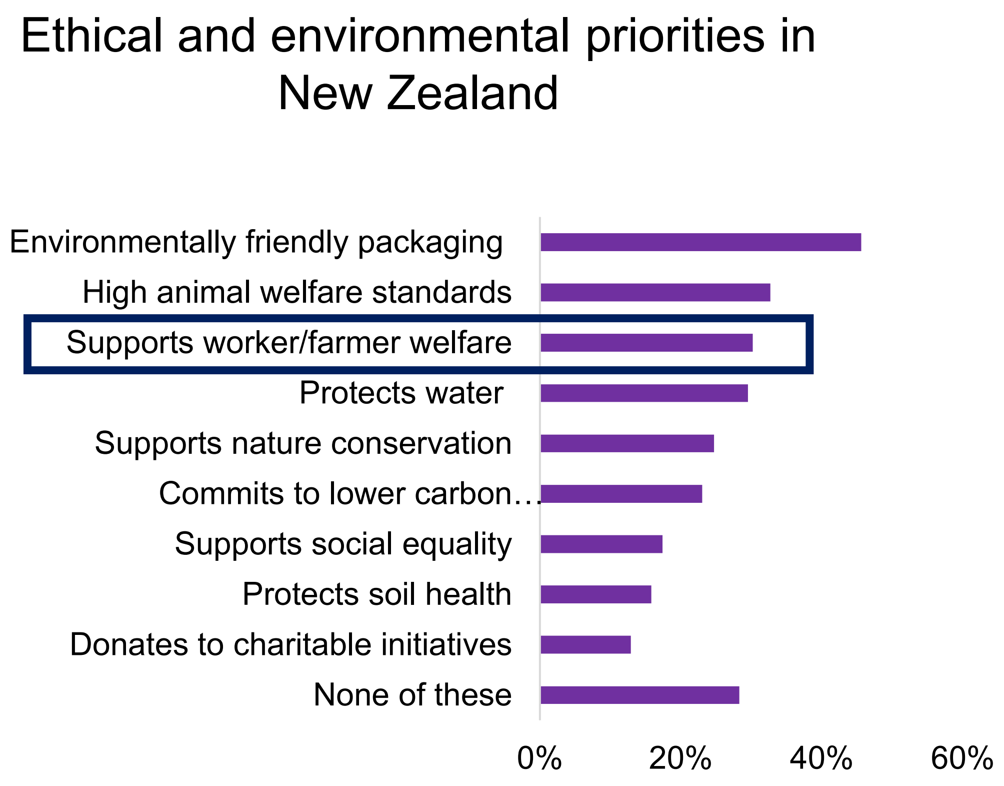

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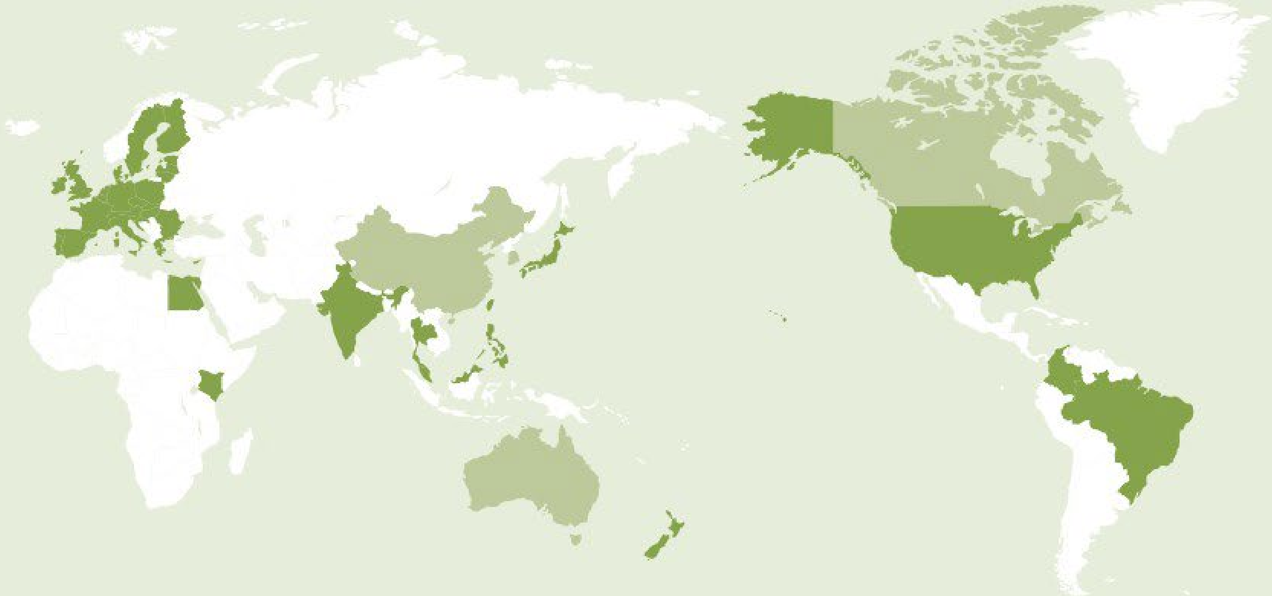
Sustainability reporting an ongoing feature of trade requirements

At a glance: international climate & sustainability disclosure requirements

KEY:

- Mandatory CRD in force
- Mandatory CRD proposed



SECTION OVERVIEW

The global regulatory landscape with respect to ESG reporting is changing at pace. More than 60% of world GDP is now subject to mandatory climate-related disclosures (CRD) measures, either proposed or already in force. This page provides an at-a-glance overview of measures in key markets. These obligations could affect New Zealand companies directly, depending on in-market presence, or indirectly through the supply chain requirements of their customers in those countries. In addition, there is widespread uptake of voluntary reporting under initiatives such as the Task Force on Nature-related Financial Disclosures (TNFD).

UK & EUROPE

United Kingdom
- Mandatory CRD (since 2022)
- Emissions reporting requirements
- Sustainability Disclosure Requirements (since 2023)
- Modern slavery reporting (since 2015)

European Union
- Corporate Sustainability Reporting Directive (from 2026)
- Corporate Sustainability Due Diligence Directive (likely from 2026)

ASIA PACIFIC

India
- Listed issuer ESG disclosures (phased in from 2022)

China
- Listed issuer ESG disclosures (from 2024)
- Emissions reporting requirements (various requirements since 2006)

Taiwan
- Emissions reporting requirements (since 2021)
- Listed issuer ESG disclosures (since 2023)

Hong Kong
- Listed issuer ESG disclosures (since 2023)
- CRD (from 2025)

Korea
- Emissions reporting (amended 2021)
- ESG disclosures (proposed from 2026)
- Human rights in supply chain reporting (from 2024)

Japan
- Emissions reporting (since 2021)
- Listed issuer ESG disclosures (since 2021)
- Sustainability disclosures (proposed from 2025)

Singapore
- Emissions reporting (various requirements since 2012)
- Listed issuer ESG disclosures (since 2023)
- CRD (from 2025)

Thailand
- Listed issuer ESG disclosures (since 2021)
- Emissions reporting (proposed 2024)

Vietnam
- Listed issuer ESG disclosures (since 2020)
- Emissions reporting (since 2022)

Malaysia
- Listed issuer ESG disclosures (since 2023)
- Enhanced CRD and sustainability disclosures (proposed from 2025)

Indonesia
- Listed issuer ESG disclosures (since 2022)
- Environmental and ESG planning (since 2012)

Philippines
- Listed issuer ESG disclosures (from 2025)

AUSTRALIA
- CRD (proposed from 2025)
- Modern slavery reporting (since 2018)
- Emissions reporting requirements (since 2007)

NORTH AMERICA

United States
- CRD (rule finalised in 2024; currently on hold)
- California Climate Accountability Package, including emissions reporting, CRD and carbon offset disclosures (from 2026)
- New York (proposed) and California (since 2010) supply chain due diligence requirements

Canada
- CRD for financial institutions (from 2024)
- Sustainability disclosures (from 2025)
- Human rights supply chain reporting (from 2024)

Source: Chapman Tripp Report for The Aotearoa Circle – April 2024

Sustainability reporting an ongoing feature of trade requirements

More than 60% of the world's GDP is now subject to mandatory climate-related disclosures

At a glance: international climate & disclosure requirements

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SECTION OVERVIEW

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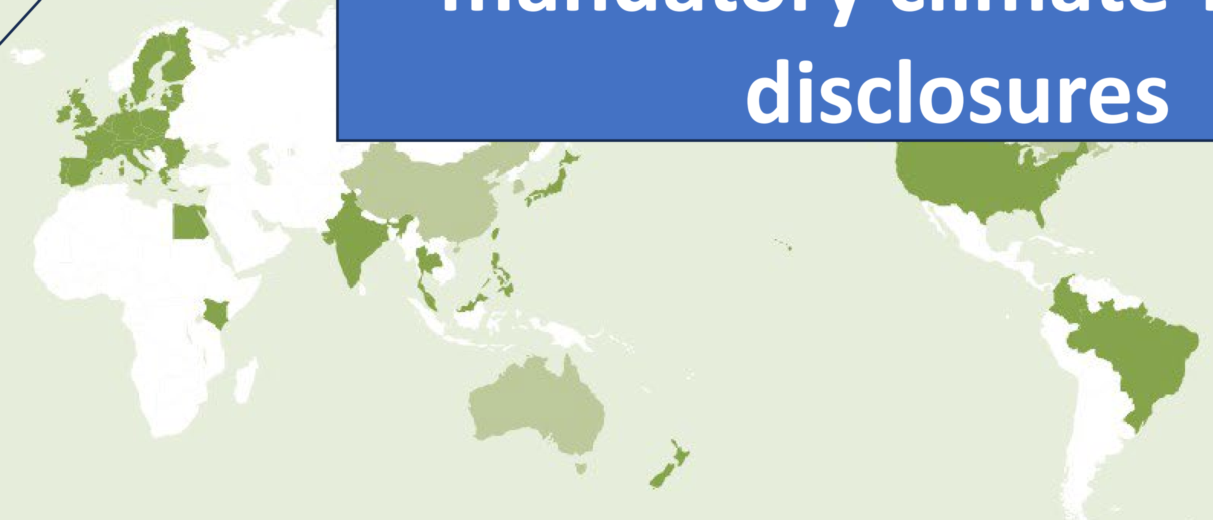

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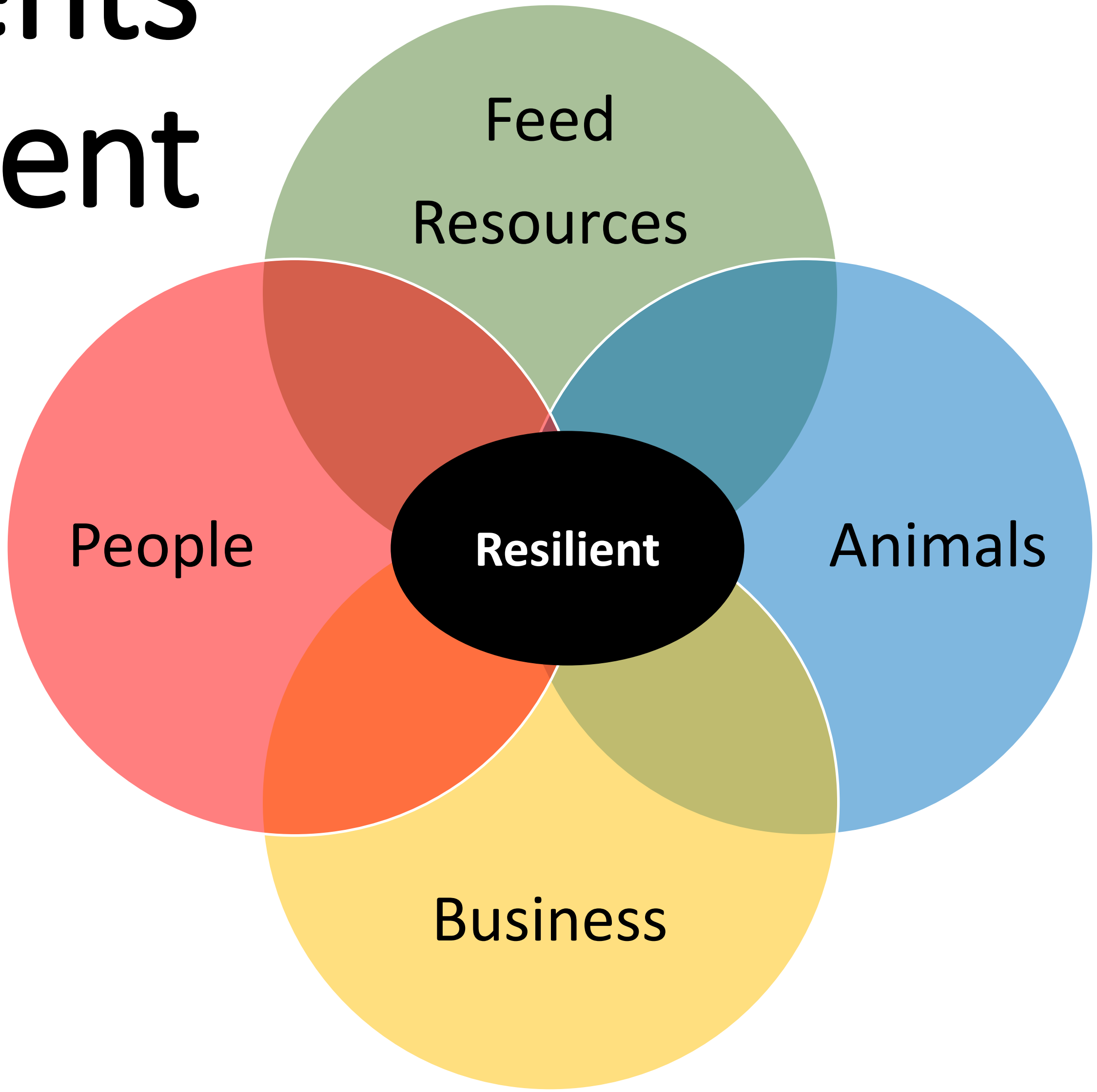
Source: Chapman Tripp Report for The Aotearoa Circle – April 2024

- People
- Planet
- Profit

A balance between economic growth and social and environmental sustainability

Components of a Resilient System



Consumer

Adapted from Roche and Horan, 2013

Gilbert Enoka

Elite athletes

- Preserve the Core;
- Disrupt the edges;

“Get off your horse and drink your milk”

- John Wayne

Contact me:

john.roche@mpi.govt.nz

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Thought for the Day

@down2earth_john

"It is easier to build strong children than to repair broken men"

\- Frederick Douglas


Ministry for Primary Industries
Manatū Ahu Matua
Questions