Science and Agricultural Sustainability

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Ministry for Primary Industries
Manatū Ahu Matua

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“The first farmer was the first man.
And all historic nobility rests on the possession and use of land ”

- Ralph Waldo Emerson

The world is facing a massive challenge

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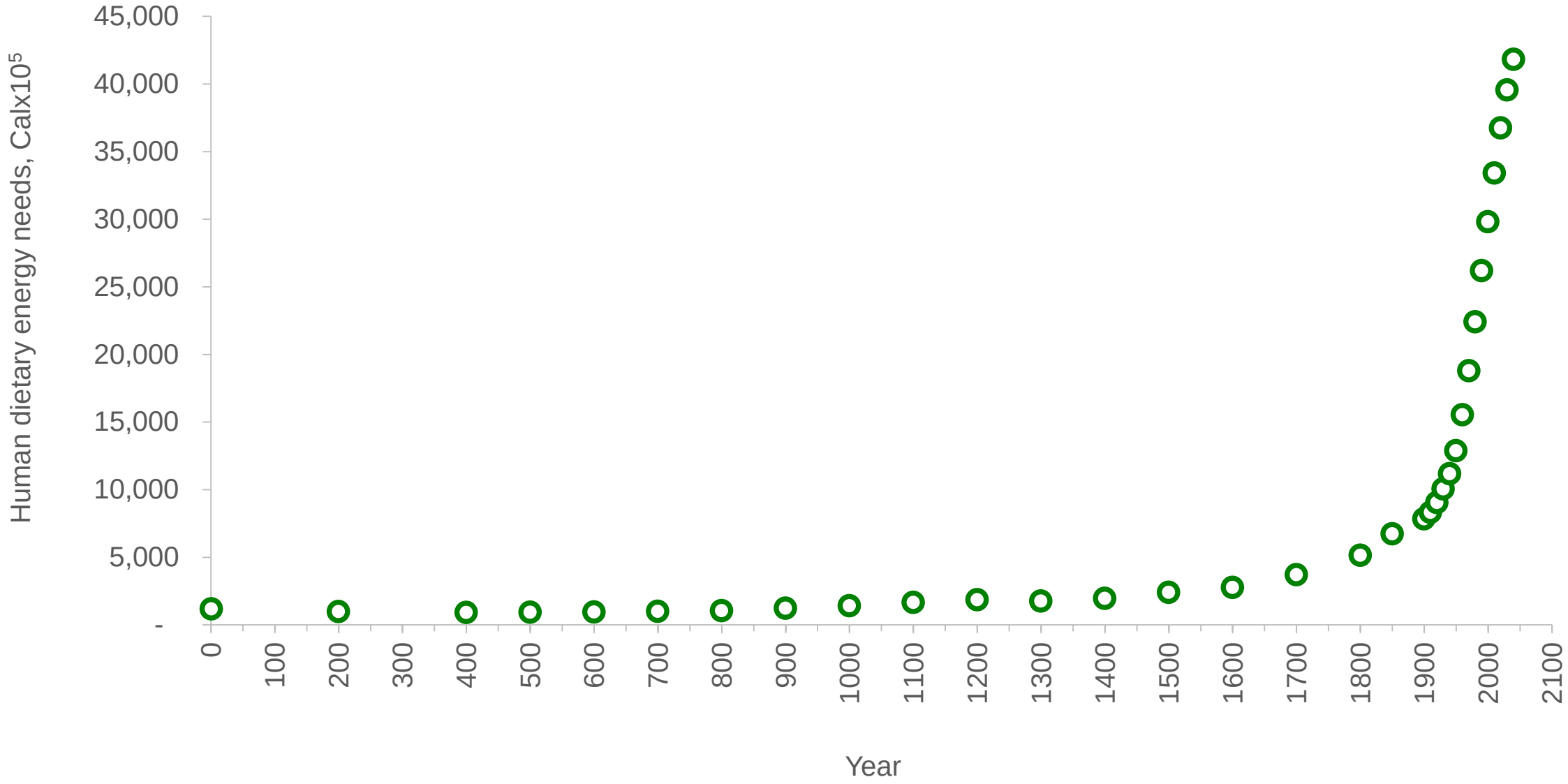
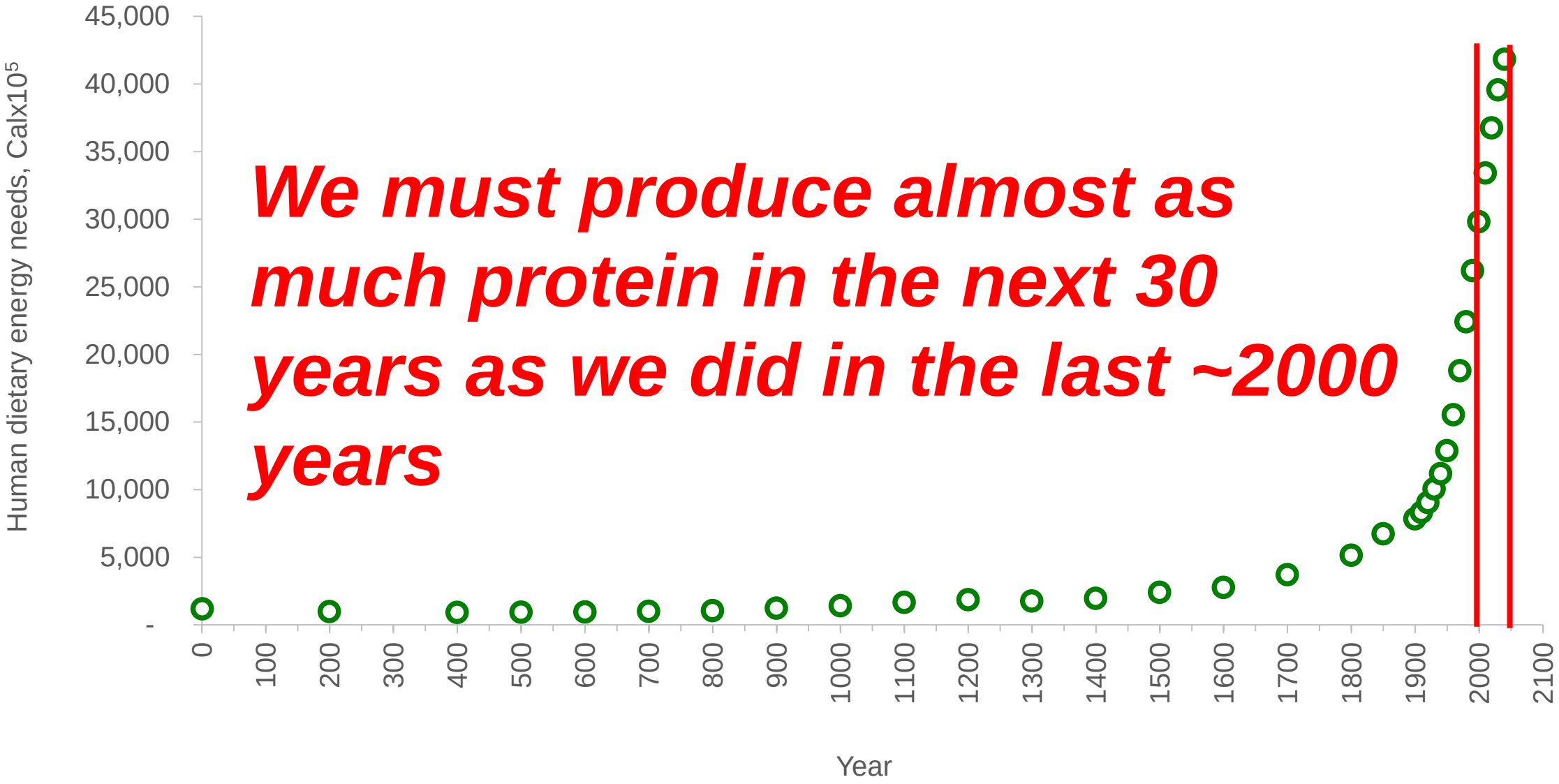


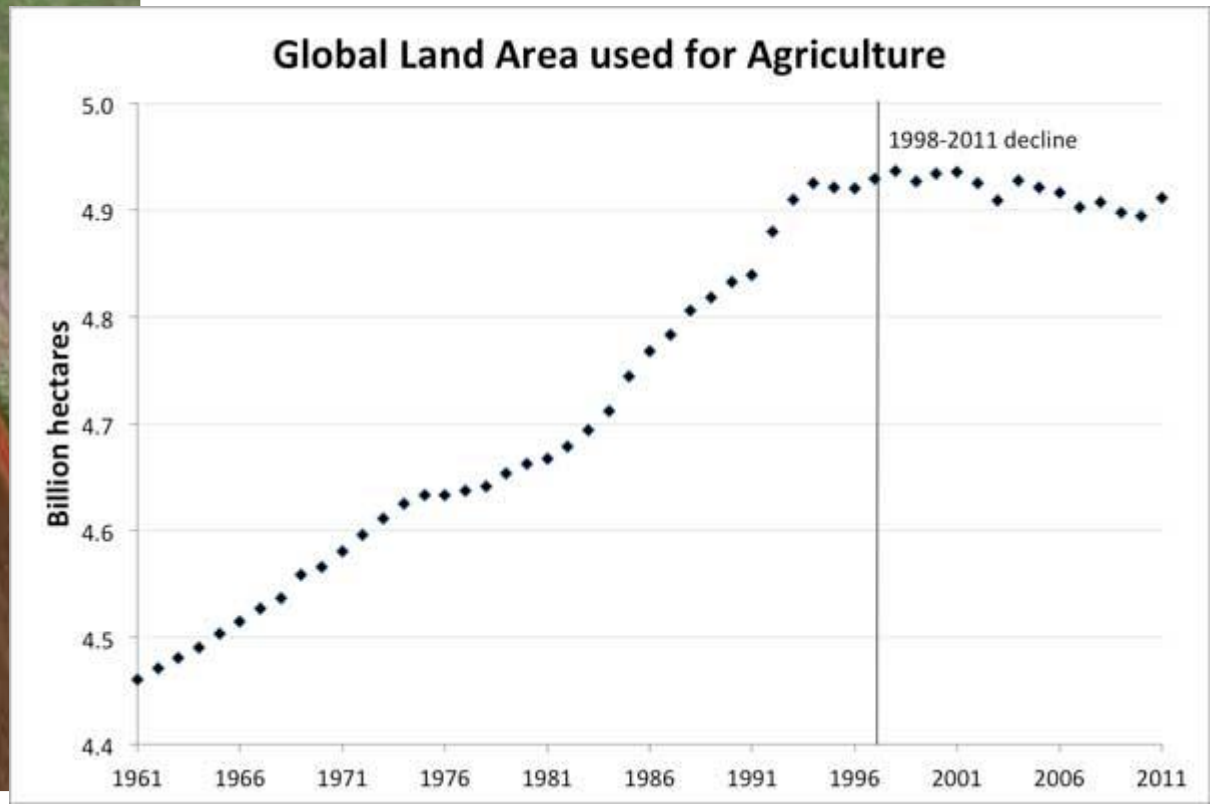
The world is facing a massive challenge



World Hunger Continues Dramatic Rise

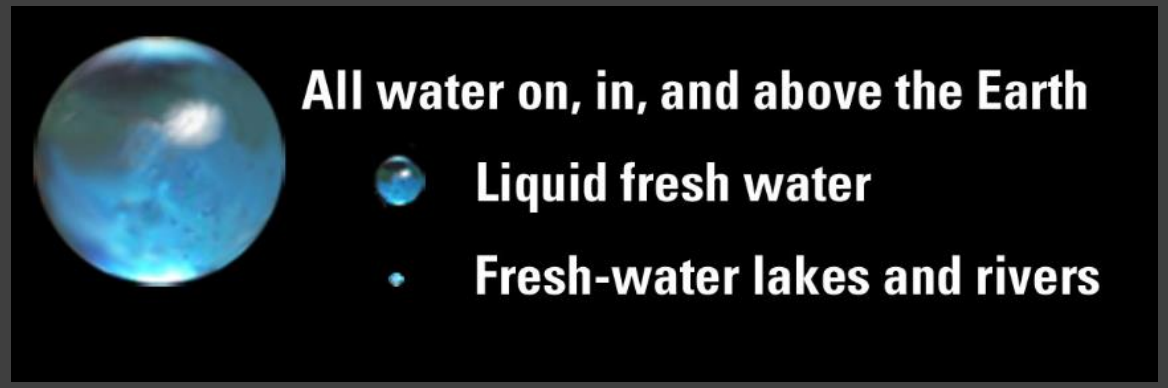
Number of undernourished people worldwide from 2005 to 2021*

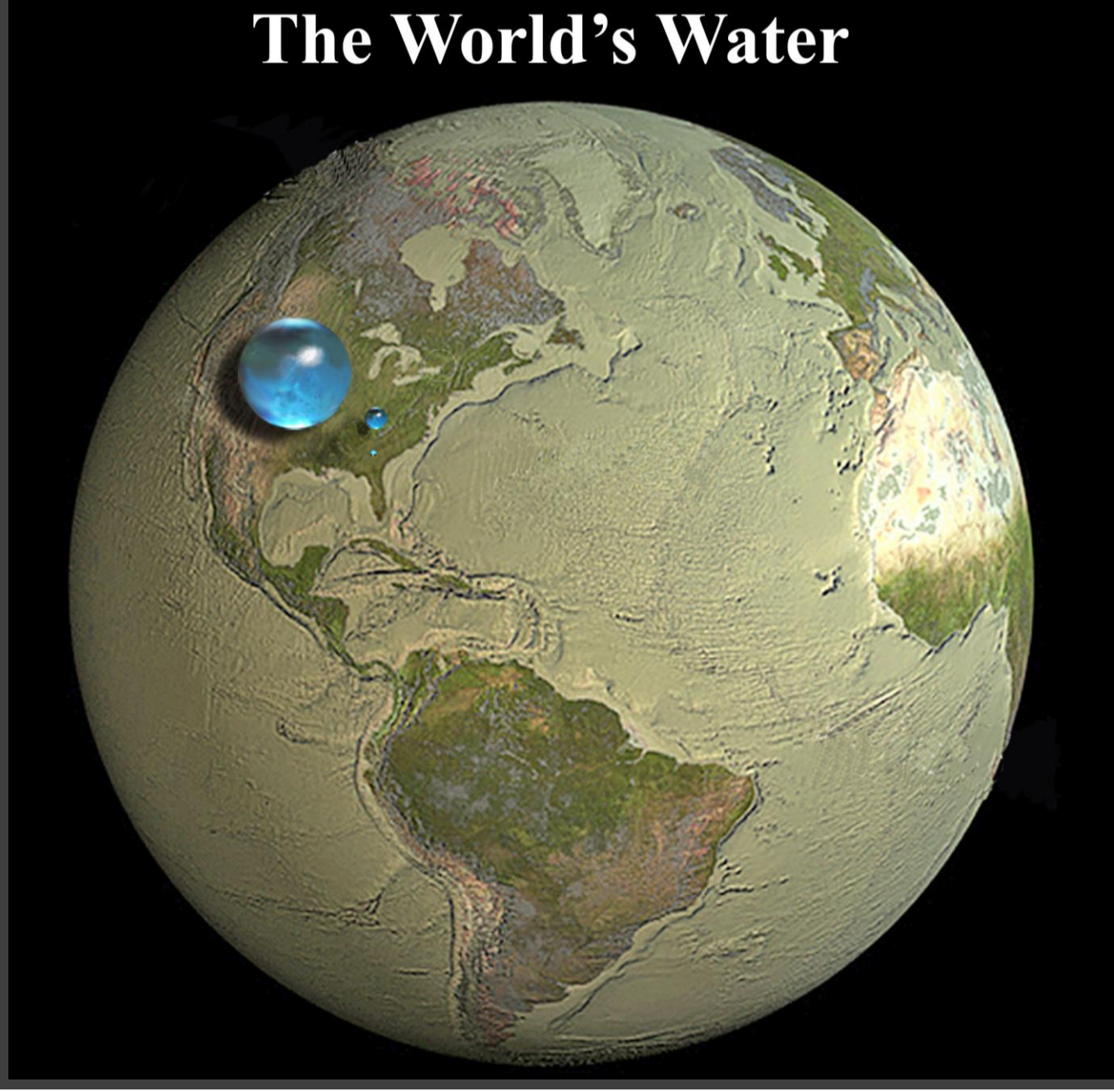
* 2020: Middle estimate. 2021: Middle estimate, projection
Source: UN Food and Agriculture Organization



And we cannot use more land!

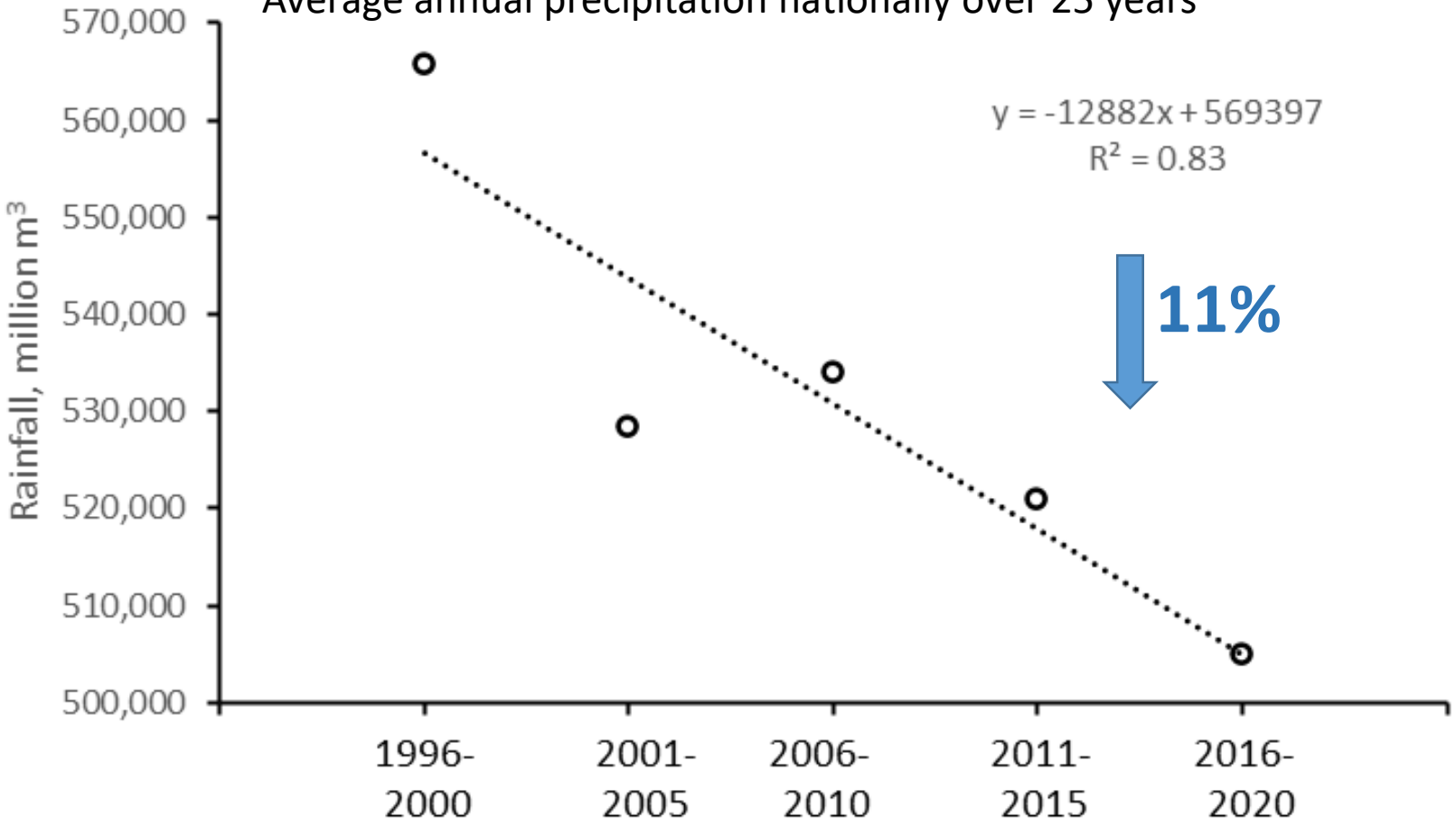
And water is fast becoming the limiting factor in many parts of the world





And rainfall patterns are changing

Average annual precipitation nationally over 25 years



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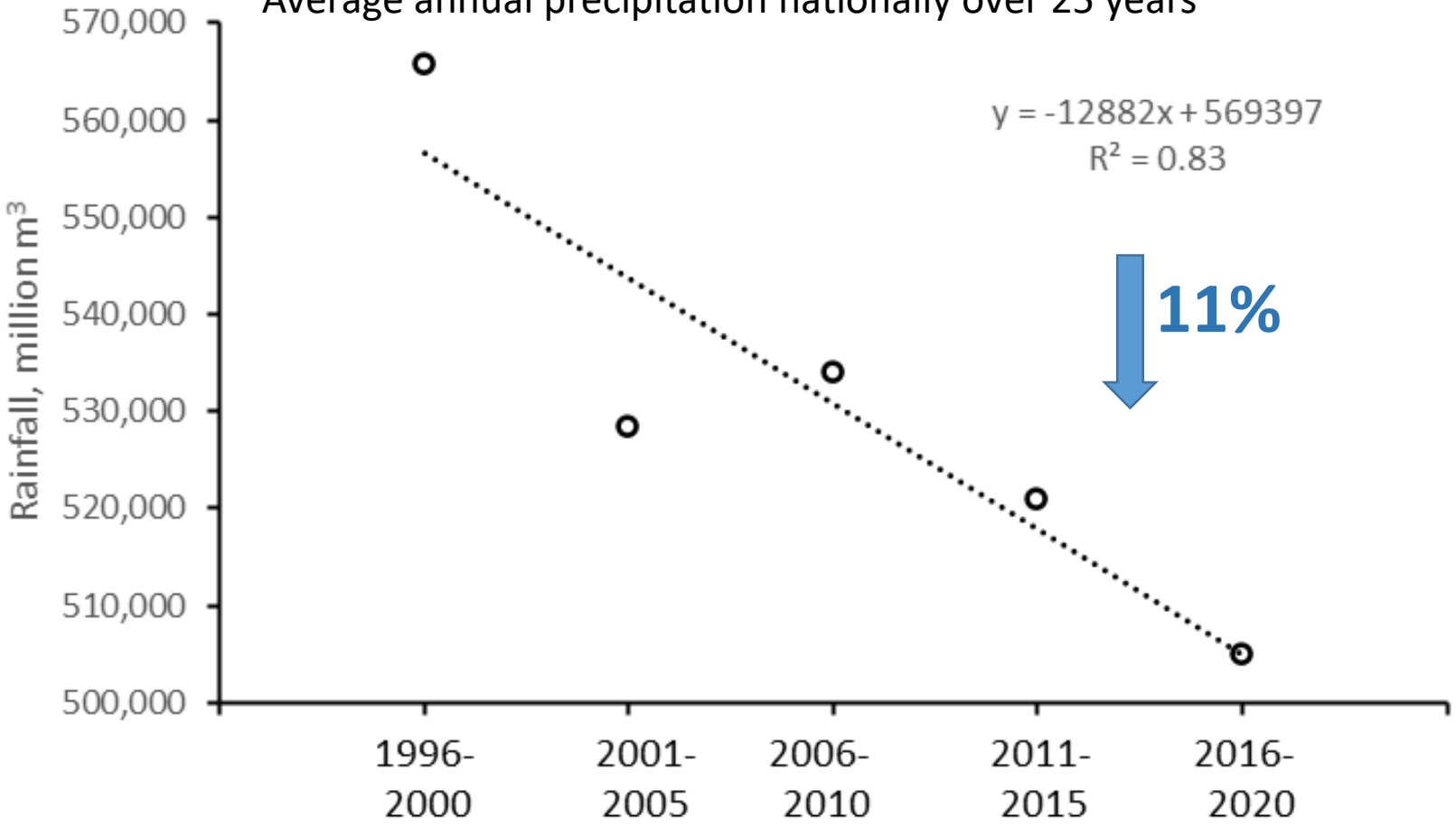
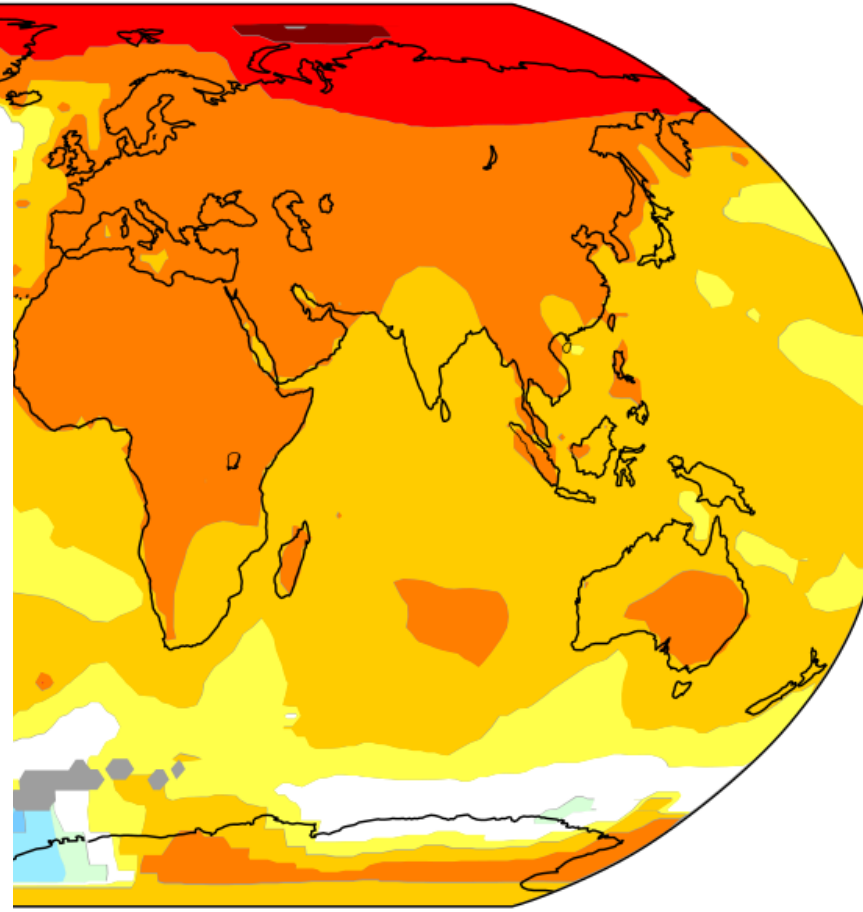


Temperature change in the last 50 years



vs 1956-1976 baseline

2 +0.5 +1.0 +2.0 +4.0 °C

-1.8 -0.9 -0.4 +0.4 +0.9 +1.8 +3.6 +7.2 °F

And rainfall patterns are

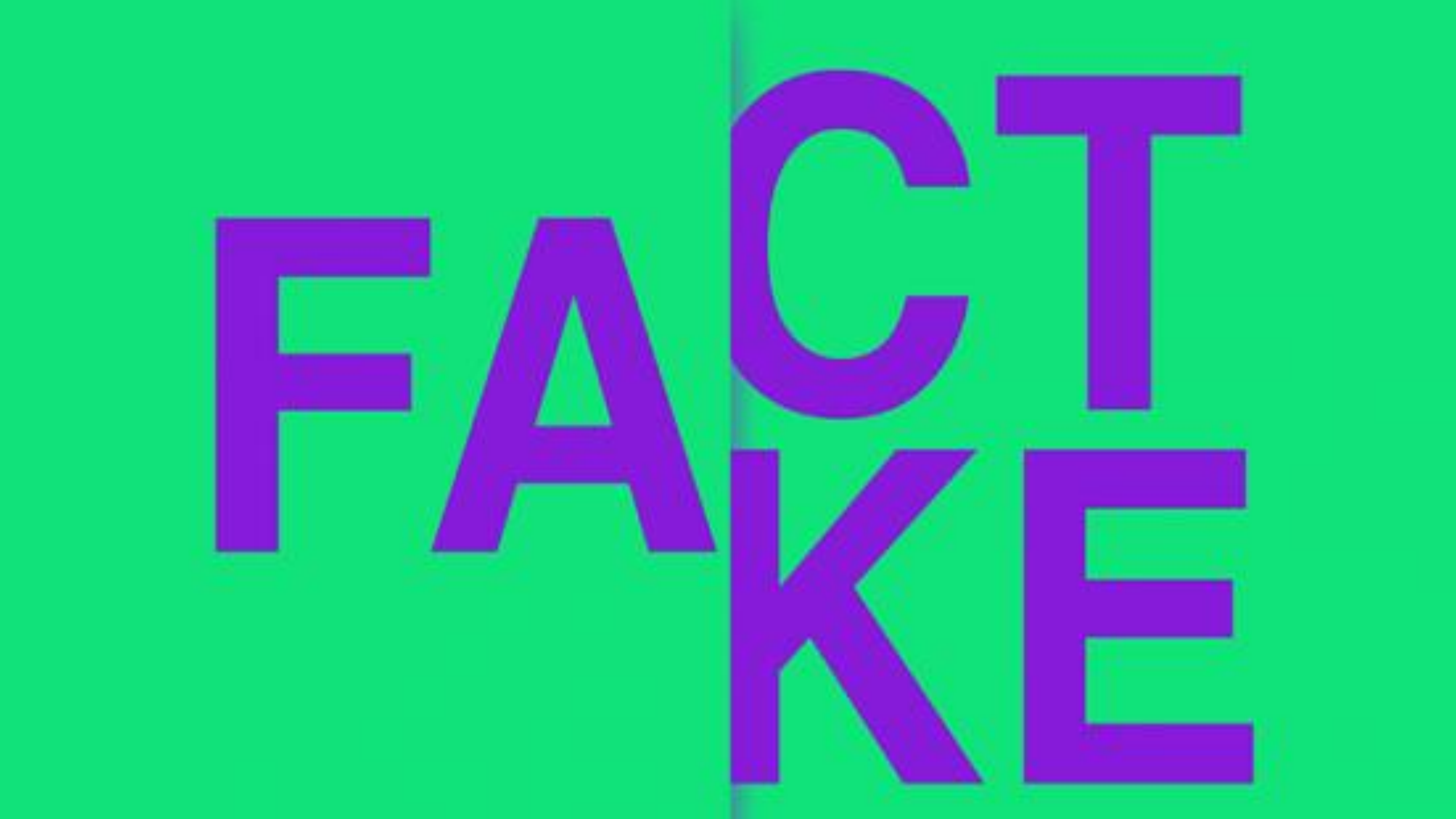
Average annual precipitation nationally over 2

570,000

-1976 baseline

+1.0 +2.0 +4.0 °C

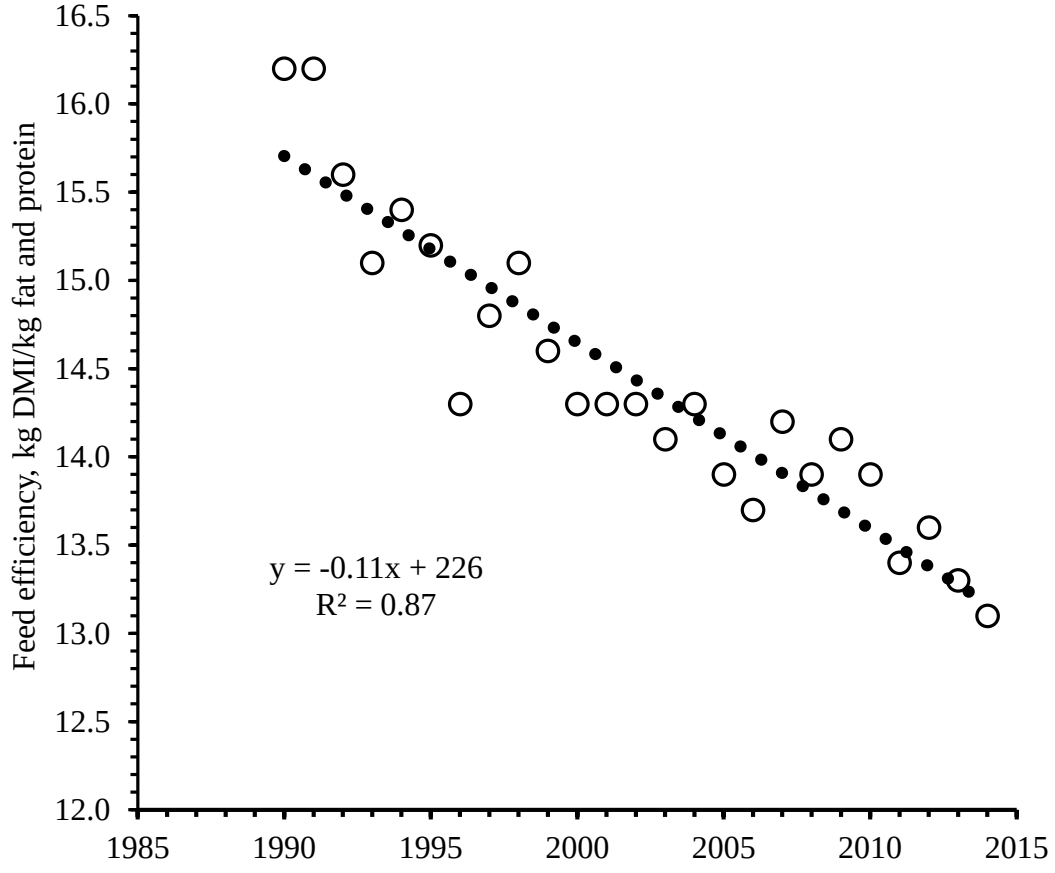
+1.8 +3.6 +7.2 °F

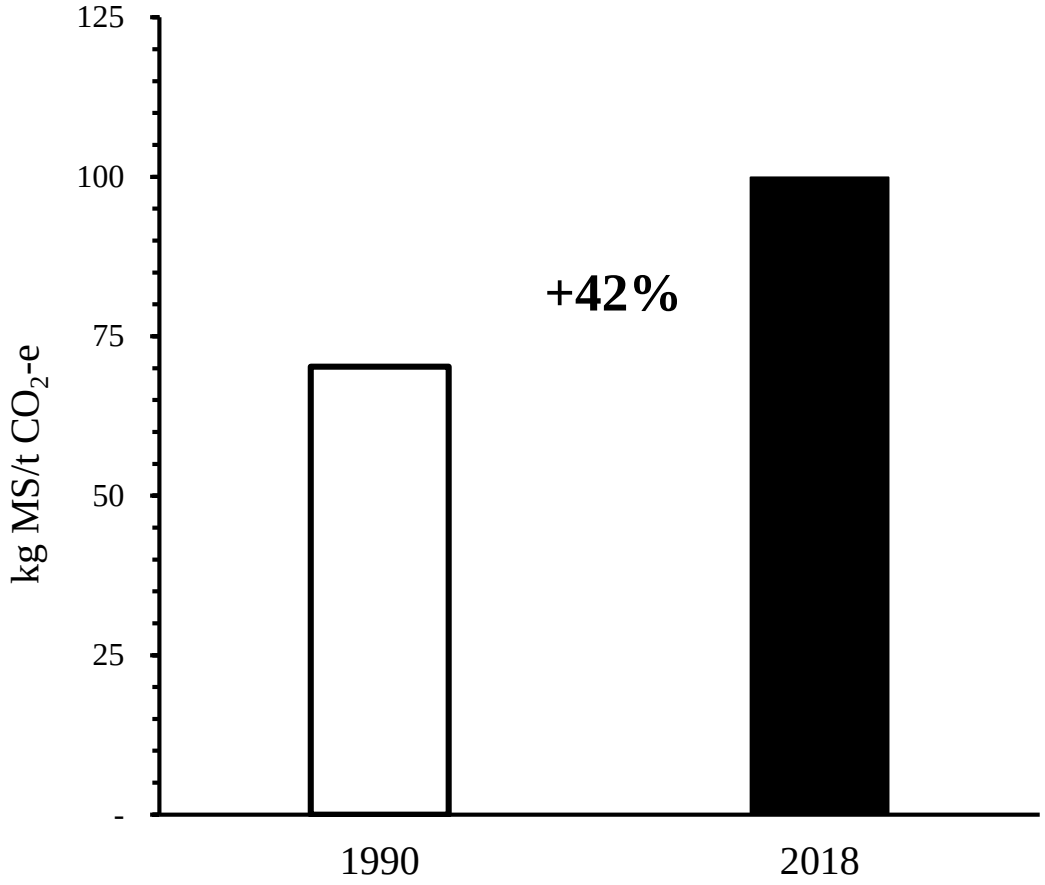

FACT
FAKE

Farming is a job where you work 80 hr/wk for below minimum wage to feed someone who thinks you're trying to poison them!


We produce affordable
wholesome, natural foods
for better nutrition outcomes

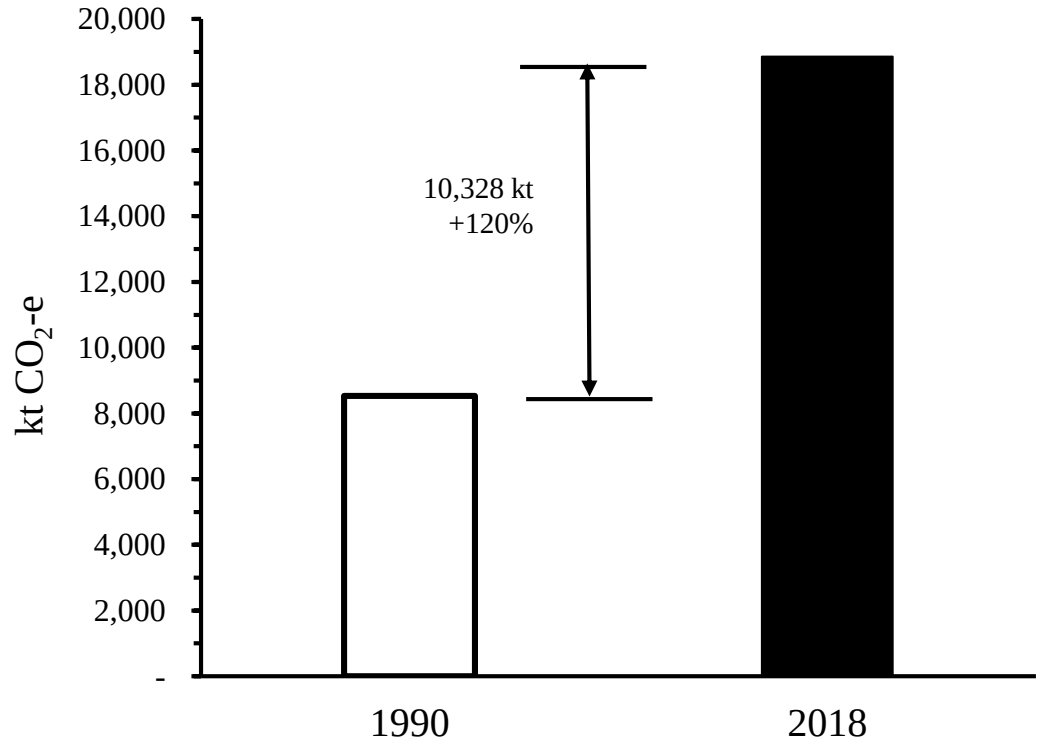
Increased efficiency – more milk/kg DMI or CO_2-e





Externalities – climate change and water

Climate change – GHG footprint



Water quality – 1990-2015

- Total N ↑ 42%
- Oxidised N ↑ 35%
- Conductivity ↑ 67%

- Primarily lowland waterways;
- Intensively managed grassland;
- R^2 = 62% with dairy cattle.


Fit for a
Better
World

Fit for a Better World

This roadmap is designed to achieve, within a decade, ambitious targets for a more productive, sustainable and inclusive economy

Our primary sectors can lead across the three pillars of New Zealand's economic recovery to achieve these ambitious targets:

Productivity:

Add **$44 billion** in export earnings over the next decade via a focus on creating value and building off the strong position of our core sectors.

Sustainability:

Play our part in New Zealand's journey to a low emissions economy, by reducing biogenic methane to **24–47 percent below** 2017 levels by 2050, including to 10 percent below 2017 levels by 2030, and by restoring New Zealand's freshwater to a healthy state within a generation.

Inclusiveness:

Employ **10 percent more** Kiwis from **all** walks of life in the primary sector by 2030 and 10,000 more New Zealanders in the primary sector workforce over the next four years.

NZ key Sustainability initiatives

- Greenhouse gases;
  - Target biogenic methane emissions: 24-47% reduction by 2050 (10% by 2030);
  - N_2O and CO_2 to net zero by 2050.
- Freshwater;
  - Stopping further degradation;
  - Making material improvements within 5 years;
  - Restoring waterways to a healthy state within a generation.
- Conservation of Biodiversity;
  - Proposed National Policy Statement for Indigenous Biodiversity (under development).

Research & Development

8 Accelerators

- Open Ocean Aquaculture
- Biological Emissions Reduction
- New Horticulture
- Emerging Protein
- Dairy-Beef Integration
- Net Zero Carbon Primary Sector
- Landscape-scale Decision-making
- Social Science for change

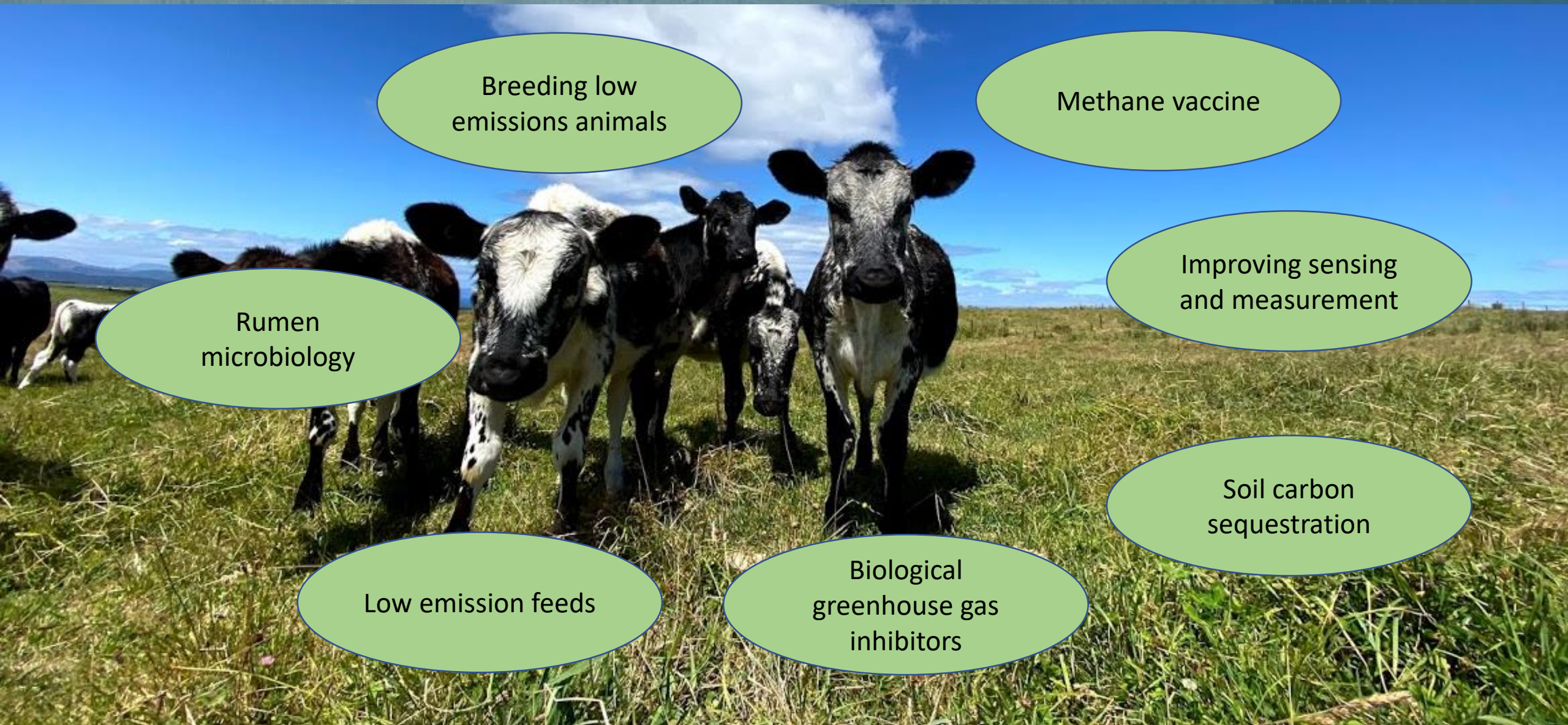
New money for R&D

- Budget 2022 allocated $339m over 4 years to increase research and adoption to reduce agricultural GHG emissions.
  - A new ‘Centre for Climate Action on Agricultural Emissions’
  - Developed by government in partnership with Māori, industry and the science sector to accelerate priorities for climate change mitigation.
  - A mix of a new public-private joint venture with industry and an enhanced New Zealand Agricultural Greenhouse Gas Research Centre.

Where to from here?

Ministry for Primary Industries
Manatū Ahu Matua

GLOBAL RESEARCH ALLIANCE
ON AGRICULTURAL GREENHOUSE GASES



He Waka Eke Noa

- He Waka Eke Noa is a partnership between government, Māori, and industry to reduce NZ's agricultural greenhouse gas emissions.

- The goal is to develop an emissions pricing scheme for agriculture by the end 2022, which will go live by 1 January 2025.

Ministry for the Environment
Manatū Mō Te Taiao

Ministry for Primary Industries
Manatū Ahu Matua

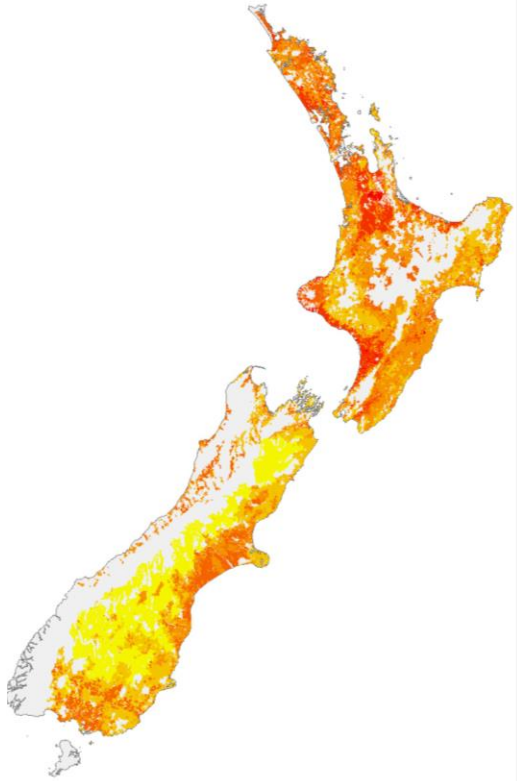
Improving water quality

What could be achieved in the next 20 years?

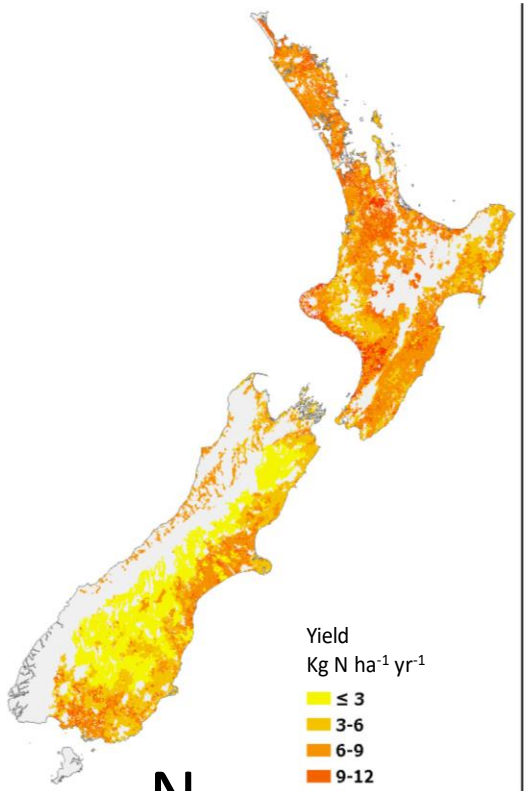
20 established + 26 developing mitigation measures applied in order of most effective, least cost.

What could we achieve by 2035?

Current



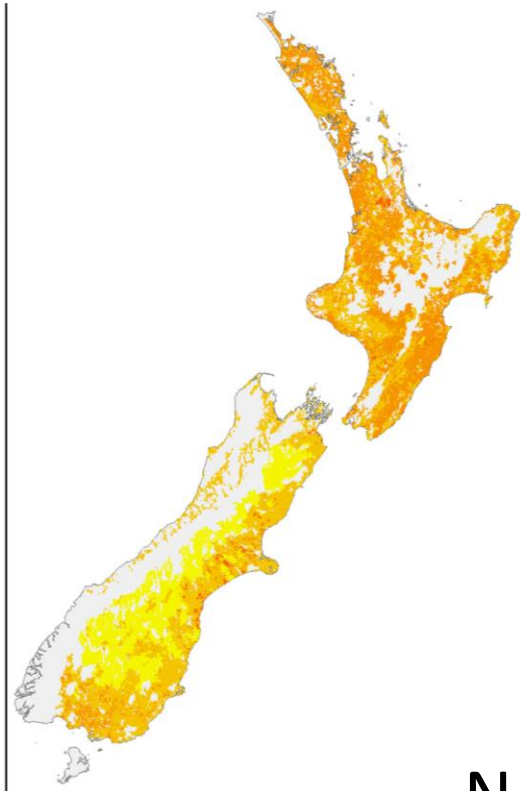
Established measures



N

19%

Established + developing

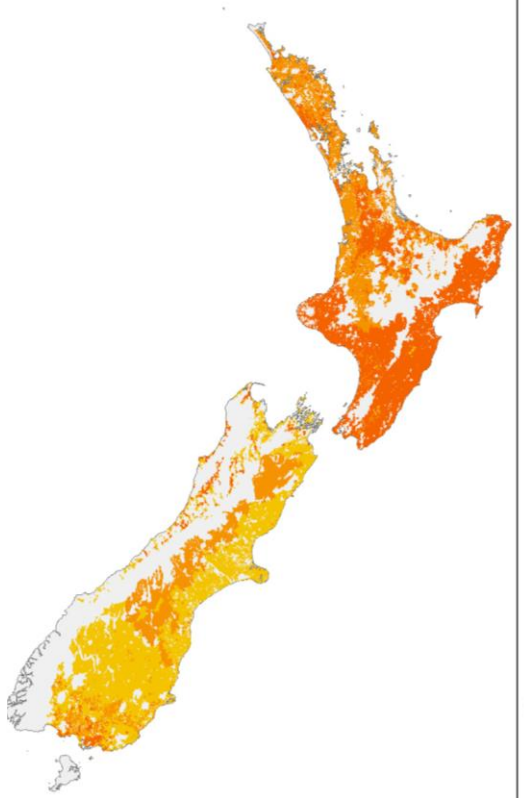


N

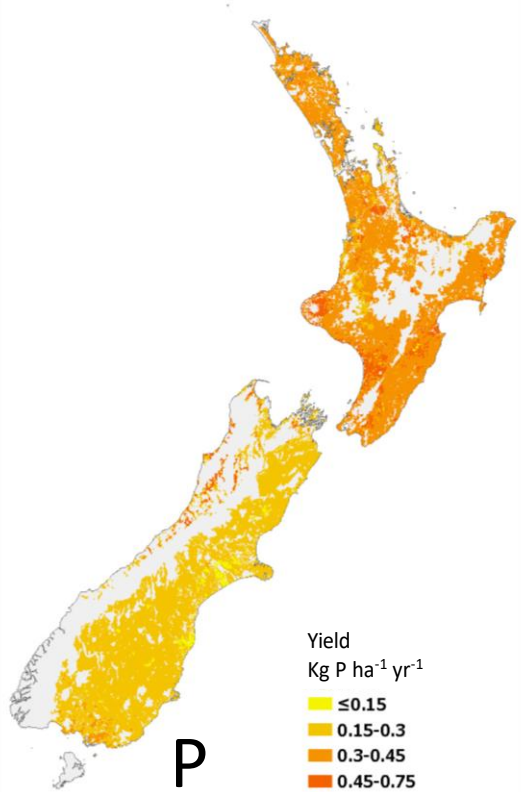
34%

What could we achieve by 2035?

Current



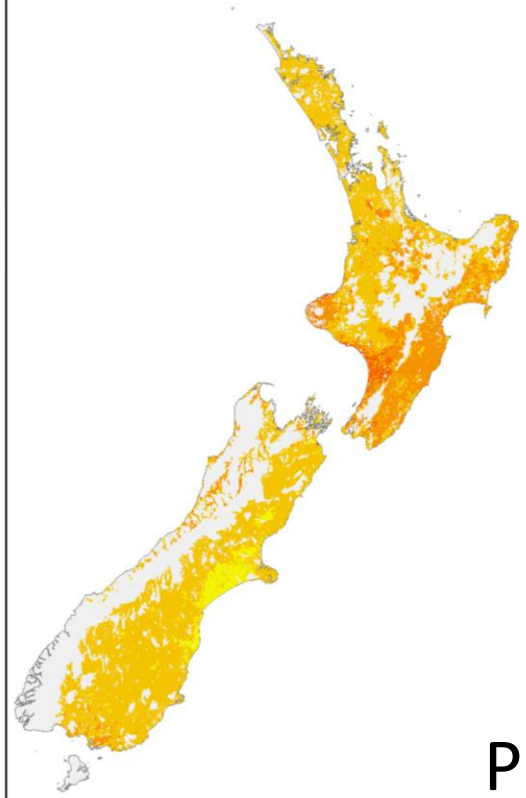
Established measures



P

24%

Established + developing



P

36%

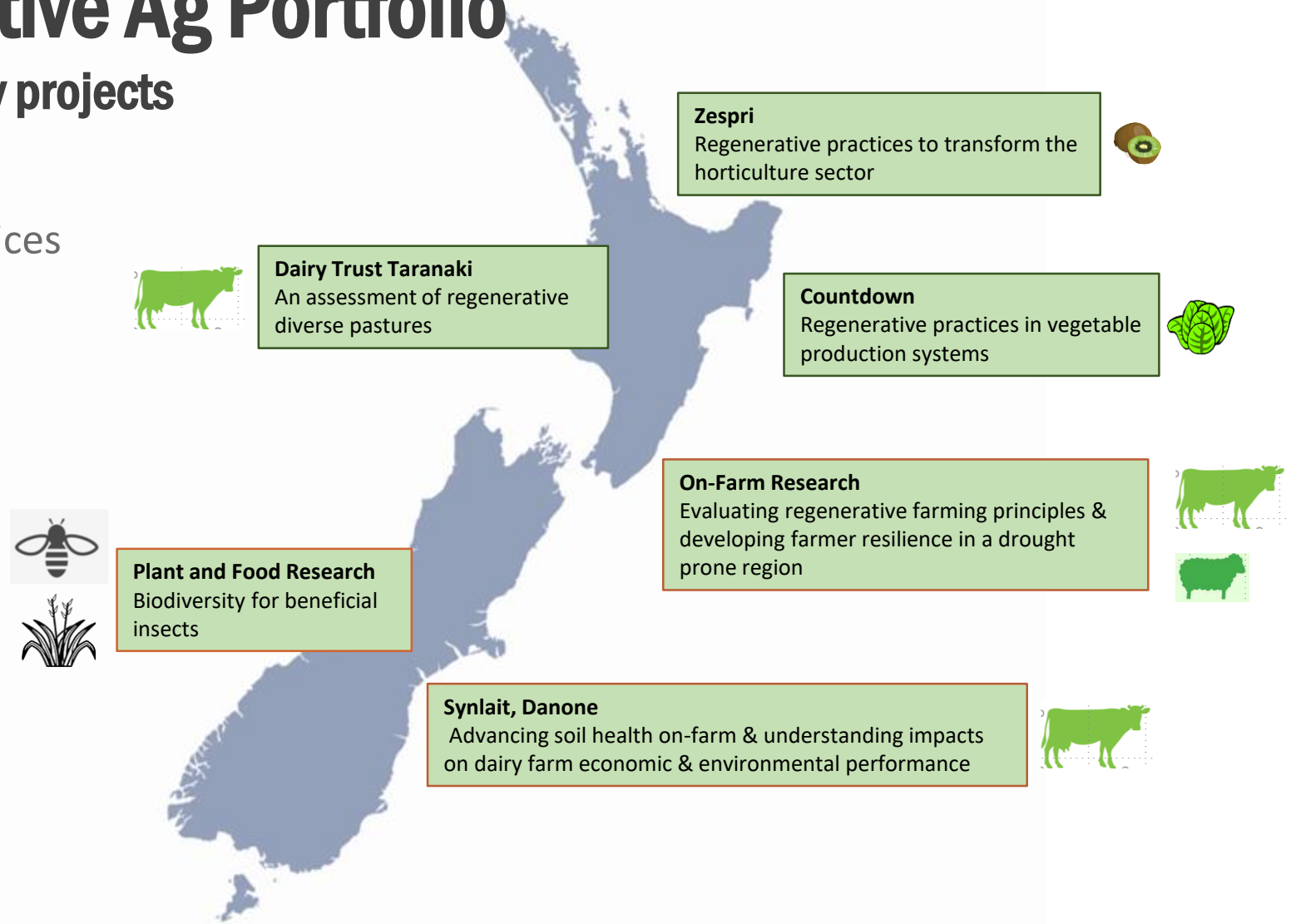
Regenerating Aotearoa

‘Practices that, in isolation or collectively, can achieve improved outcomes for our productive landscapes, rivers, coastal and marine environments, biodiversity and natural ecosystems, improve animal welfare, have potential to increase profitability and add value, promote health and wellbeing for humans, whilst ensuring we can grow and consume our food and fibre products sustainably, and meet goals of taiao, whenua ora, mauri ora, and te ao tūroa’

SFF Futures: Regenerative Ag Portfolio

Building a portfolio of complementary projects

- Establishing an evidence base, and materials for farmers, for regen ag practices applied in NZ – what works in our soils, climates, and farming systems
- MPI has committed $34 million to a portfolio of projects
- Cross sector - dairy, sheep, beef, horticulture and arable
- National coverage
- Scientists, industry and farmers working together
- A range of regen practices being tested
- Integration with mātauranga māori



Gilbert Enoka

Elíte athletes

- Preserve the Core;
- Disrupt the edges;


We produce affordable
wholesome, natural foods
for better nutrition outcomes

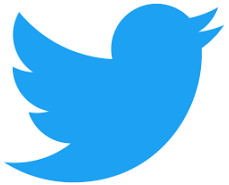
Contact me:

john.roche@mpi.govt.nz

Follow me:

Down to Earth Advice Ltd

Thought for the Day



@down2earth_john

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

- Frederick Douglas

Frontiers in Nutrition

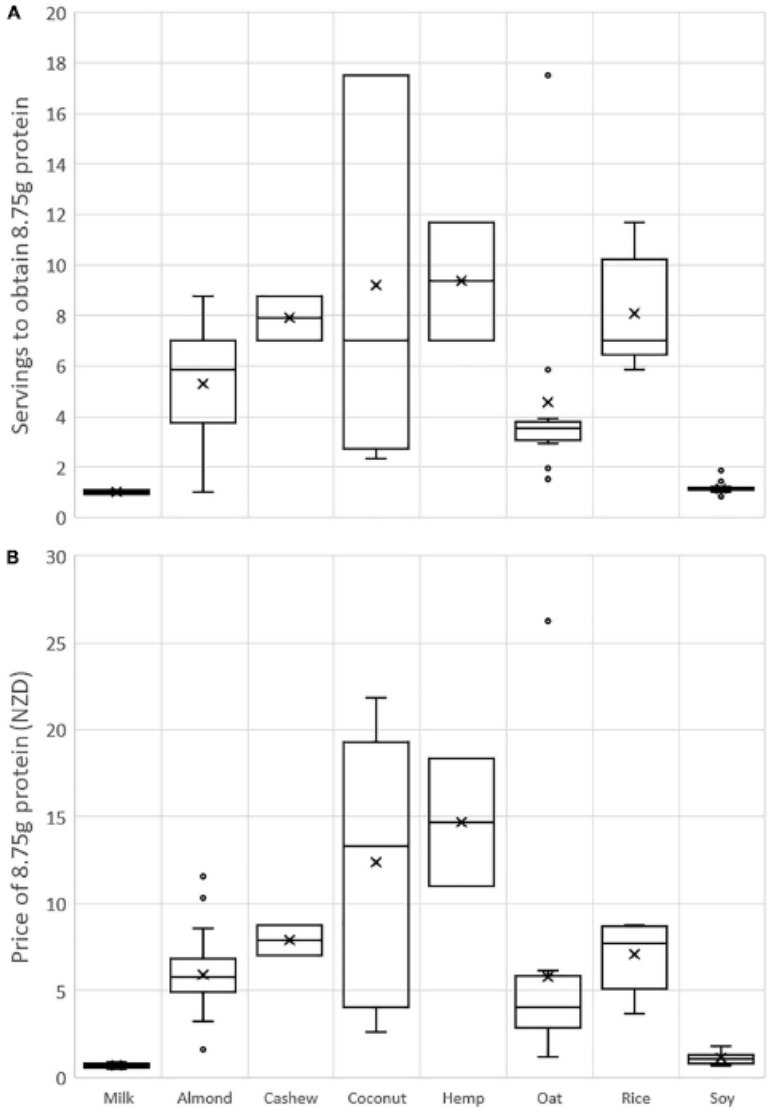
Nutritional assessment of plant-based beverages in comparison to bovine milk

Nick W. Smith[1]*, Anant C. Dave[1,2], Jeremy P. Hill[1,2] and Warren C. McNabb[1]

[1]Sustainable Nutrition Initiative, Riddet Institute, Massey University, Palmerston North, New Zealand,
[2]Fonterra Research and Development Centre, Palmerston North, New Zealand

TABLE 4 Mean percentage of an adult woman's recommended daily intakes for amino acids supplied by one 250 ml serving of each product type.

	Cow's milk (fresh)	Cow's milk (UHT)	Almond	Coconut	Oat	Rice	Soy
Histidine	29%	33%	6%	5%	5%	2%	29%
Isoleucine	33%	36%	5%	5%	5%	1%	27%
Leucine	32%	34%	5%	4%	5%	1%	24%
Lysine	36%	38%	2%	4%	3%	1%	25%
SAA	33%	37%	4%	5%	9%	4%	23%
AAA	54%	61%	10%	8%	11%	5%	44%
Threonine	38%	42%	5%	5%	6%	2%	31%
Tryptophan	41%	43%	6%	8%	9%	0%	37%
Valine	34%	40%	4%	5%	6%	2%	23%
Reactive lysine (as a % of total lysine)	95 ± 2	94 ± 2	73 ± 3	69 ± 13	49 ± 9	40 ± 21	99 ± 1
Reactive lysine (as a % of lysine recommended daily intake)*	34%	36%	1%	3%	1%	<1%	25%



of the number of servings **(A)** and the price **(B)** to obtain 8.75 g protein (equivalent to one serving of milk) from PBB. A serving size s assumed for all products. Products with no protein content were omitted. The × symbol denotes the mean value; boxes show the interquartile range; range bars show the minimum and maximum values, excluding outliers (circles) that are more than 1.5 times the range below or above the first or third quartile, respectively.