

# IS THIS THE BEGINNING OF THE END OR THE END OF THE BEGINNING?

*Finding the future of the New Zealand  
food and beverage industry*

*DISCUSSION DOCUMENT; v1.01; Late 2019*

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DISCUSSION DOCUMENT

Late 2019

V1.01

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## LIMITATIONS

This work is based on secondary market research, analysis of information available (e.g. Statistics NZ), and a range of interviews with industry participants and industry experts. Coriolis have not independently verified this information and make no representation or warranty, express or implied, that such information is accurate or complete. In many cases regional data is incomplete or not available and therefore research includes significant modelling and estimates.

**If at any point you are unclear where a number came from or how a conclusion was derived, please contact the authors directly. We are always happy to discuss our work with interested parties.**

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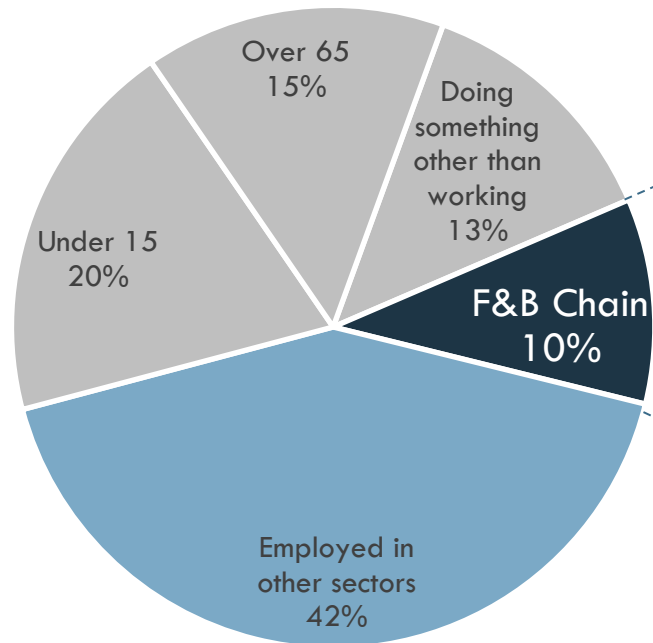
This discussion document exists to not to give you the answer, but to spark thought and discussion on the future of New Zealand's largest industry.

The views expressed are those of the Coriolis team involved and do not represent Government policy, or the views of the Ministry of Primary Industries, the Ministry of Business, Innovation and Employment or New Zealand Trade and Enterprise.

# The wider food chain directly employs one in five working people in New Zealand

## NZ POPULATION BY EMPLOYMENT

People; m; 2017

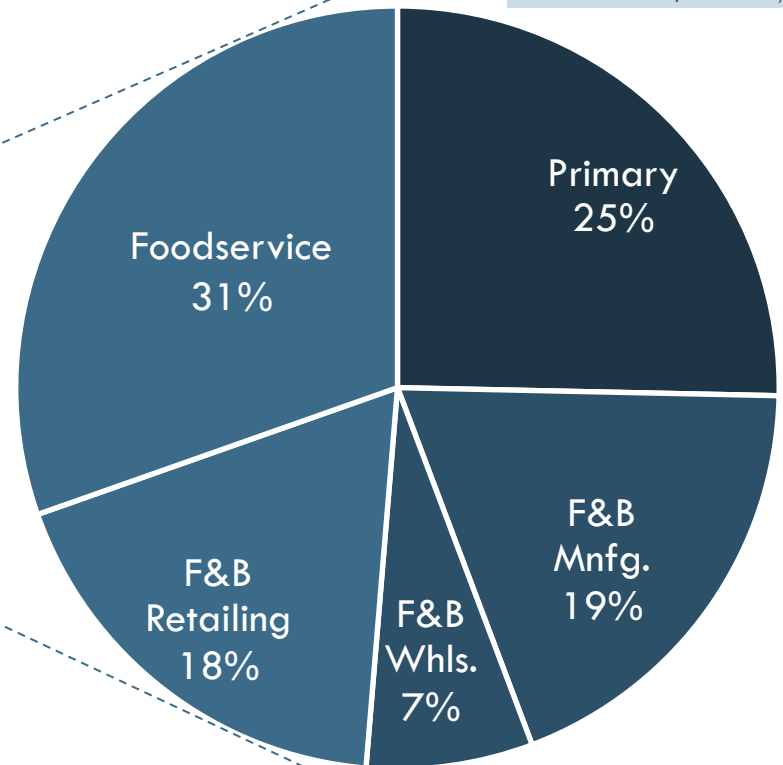


Total = 4.8m

## FOOD CHAIN EMPLOYMENT BY SECTOR

People; %; 2017

NOTE: Tight definition; excludes all inputs and support services; if included likely closer to 1/3



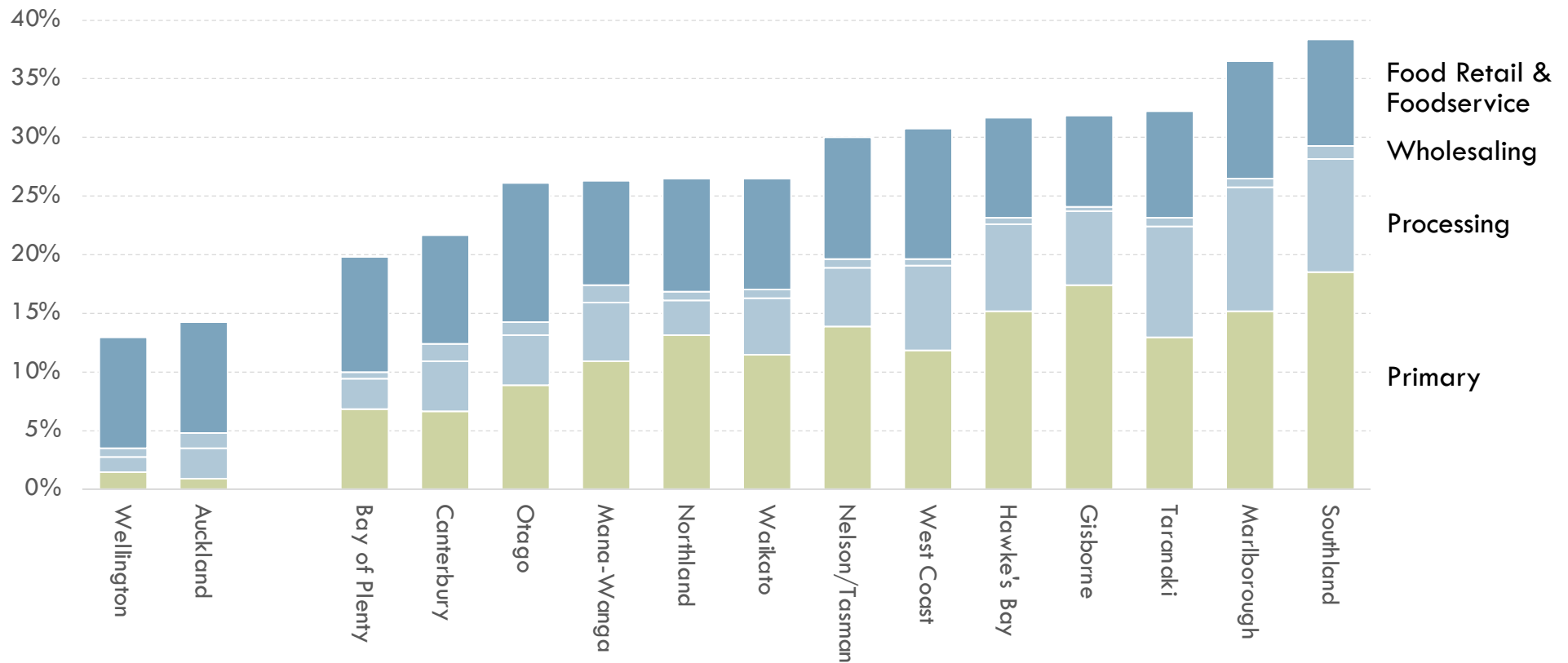
Total = 493,000

... or one in five of working population

# In regions outside of Wellington & Auckland, this wider food chain directly employs 20-40% of the working population

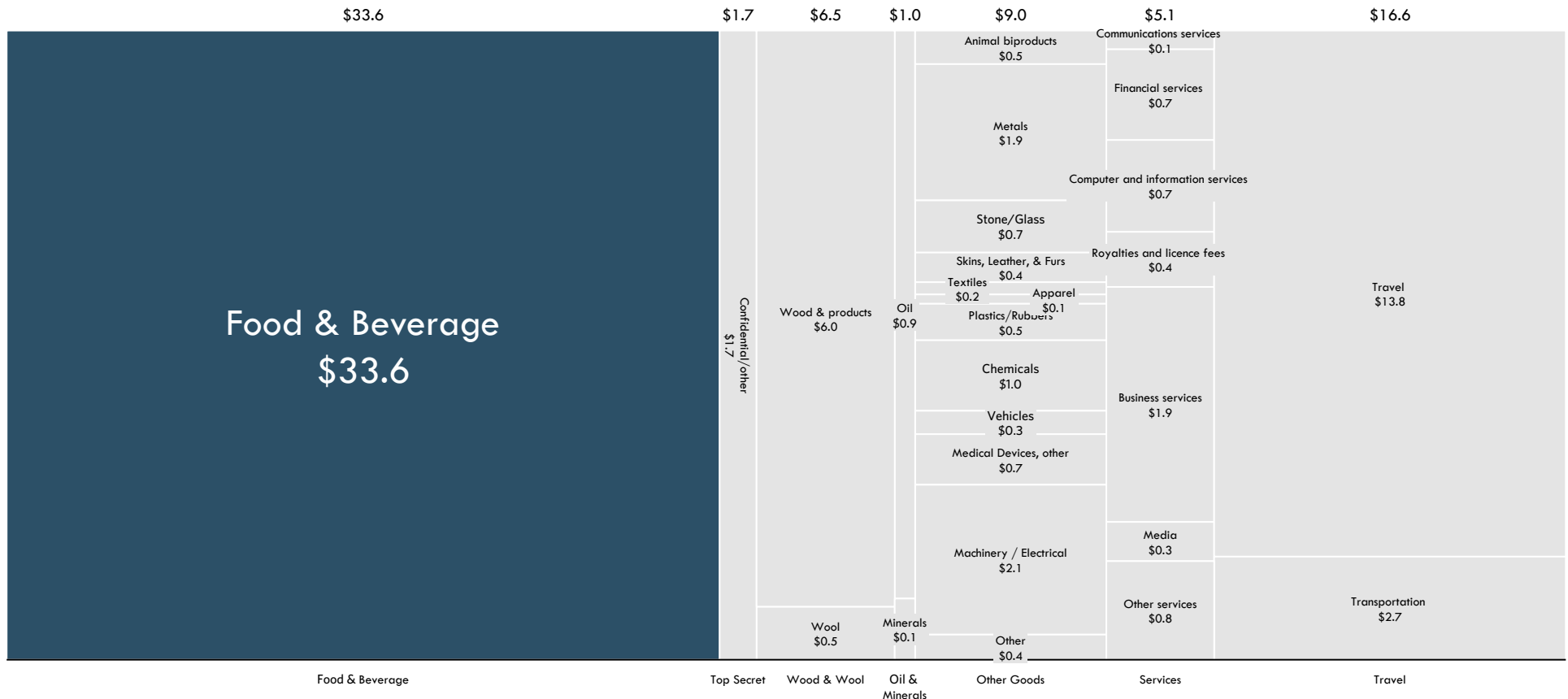
## PERCENT OF REGIONAL EMPLOYMENT IN THE FOOD CHAIN % of employees; 2018

NOTE: Tight definition; excludes all inputs and support services; if included likely closer to 1/3



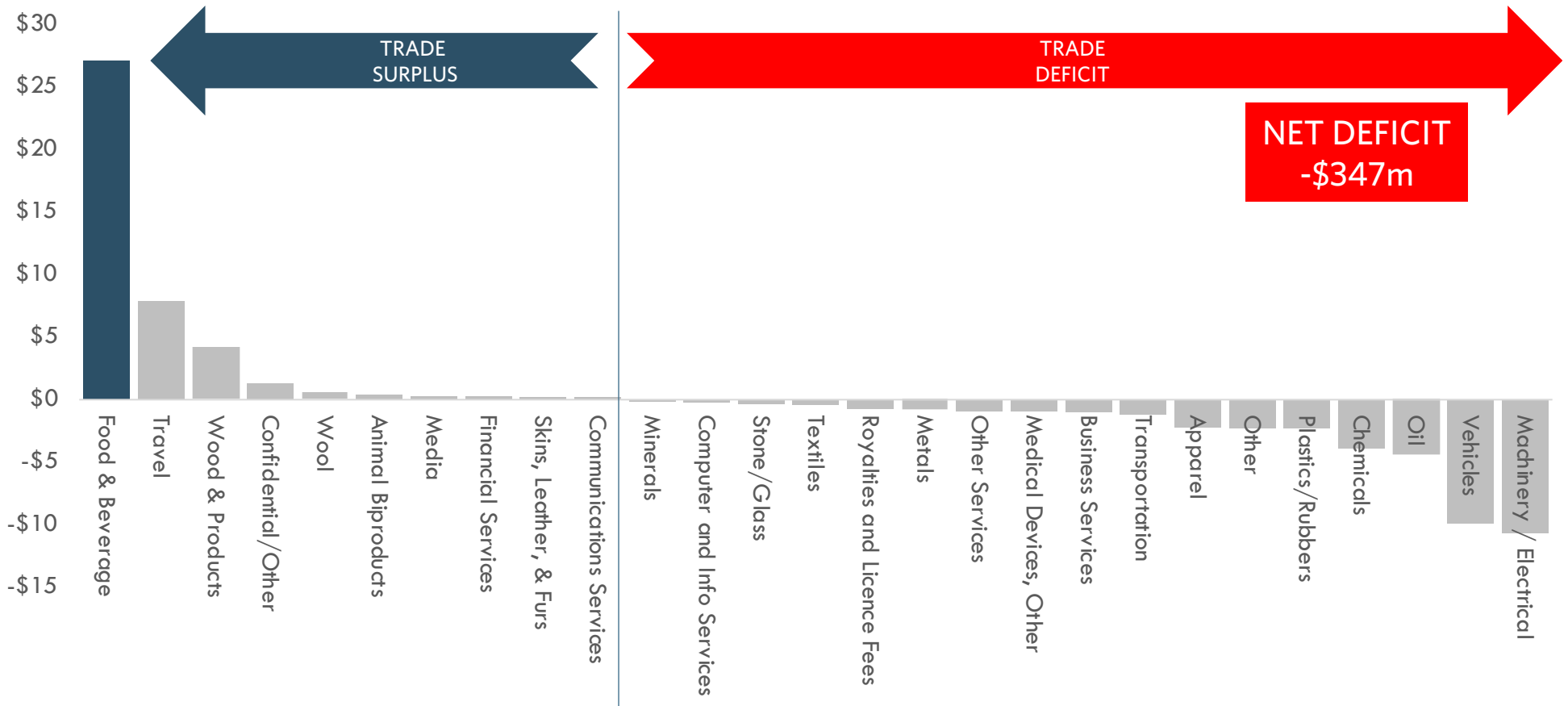
# Food & beverage is the major New Zealand export industry, accounting for almost half of total goods and services exports

## TOTAL NEW ZEALAND EXPORT OF GOODS AND SERVICES BY CATEGORY NZ\$; b; 2017



# The food & beverage industry achieves a large trade surplus, while most other sectors are underperforming or in deficit

NET TRADE POSITION IN TOTAL NEW ZEALAND TRADE (EXPORTS-IMPORTS)  
 NZ\$; b; 2017





# Food & beverage is growing exports strongly, where most other sectors are underperforming or going backwards

## 10 YEAR NET CHANGE IN TOTAL NEW ZEALAND EXPORTS

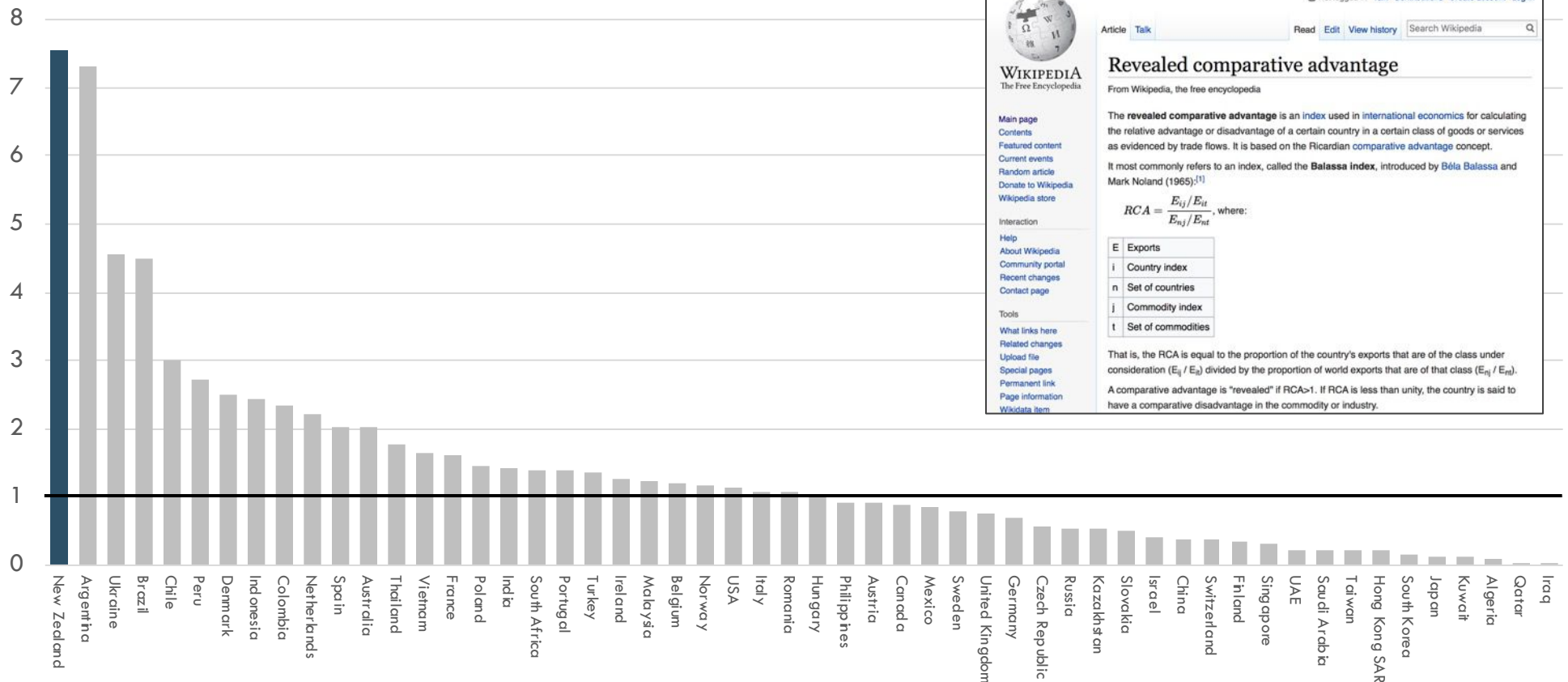
NZ\$; b; 2007-2017



# New Zealand has the highest 'revealed comparative advantage' in food & beverage of any major exporter

## REVEALED COMPARATIVE ADVANTAGE IN FOOD & BEVERAGE

RCA index; top 54 exporting countries; 2016



The screenshot shows the Wikipedia article for 'Revealed comparative advantage'. It includes the title, a brief definition, the formula for RCA, and a table of variables. The formula is  $RCA = \frac{E_{ij} / E_{it}}{E_{nj} / E_{nt}}$ , where  $E_{ij}$  is Exports,  $i$  is Country index,  $n$  is Set of countries,  $j$  is Commodity index, and  $t$  is Set of commodities.

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*Yet, there is a strong consensus in New Zealand that agriculture cannot continue to grow*

“We can only feed 40 million people”

“We need to produce less not more”

“We can’t possibly produce any more”

“Agriculture is a sunset industry”

“We are at the limits of the environment”

“Farmers are already producing too much”

# *This report strongly disagrees with this consensus*

## **THE NEW ZEALAND CONSENSUS INSIDE THE “PASTORAL” BUBBLE THINKING**

New Zealand is a major food producer that leads the world;  
New Zealand agriculture is highly productive

Current New Zealand land use is ideal and optimal as it was  
determined by market forces

The plants and animals produced in New Zealand are highly  
suited to the New Zealand environment (climatic and growing  
conditions) and thus will not change

The government does not have a role to play in new industry  
development; just enforce the rules

New Zealand land use will not change significantly going forward

New Zealand is globally competitive in the products it currently  
produces in large quantities; it is not competitive in the products it  
does not produce or produces in small quantities; therefore New  
Zealand cannot produce new products as it will not be competitive

No one wants to work in agriculture and there is currently a  
shortages of low cost labour; therefore agriculture cannot grow

## **THE HERETICAL PARADIGM OUTSIDE THE BUBBLE THINKING**

New Zealand is a minor food producer that uses a large amount  
of land to produce very little relative output

Land use is a high risk discovery process with no one right answer.  
Current land use is the result of historical activity

New Zealand is a large country without a single monolithic climate.  
Regions vary dramatically in their natural endowment.

The animals and plants currently produced are a result of the  
country or origin of past waves of immigrants

The government has played a massive role in the development of  
all major agricultural products in New Zealand;\* the government  
will need to play a role in the development of new products

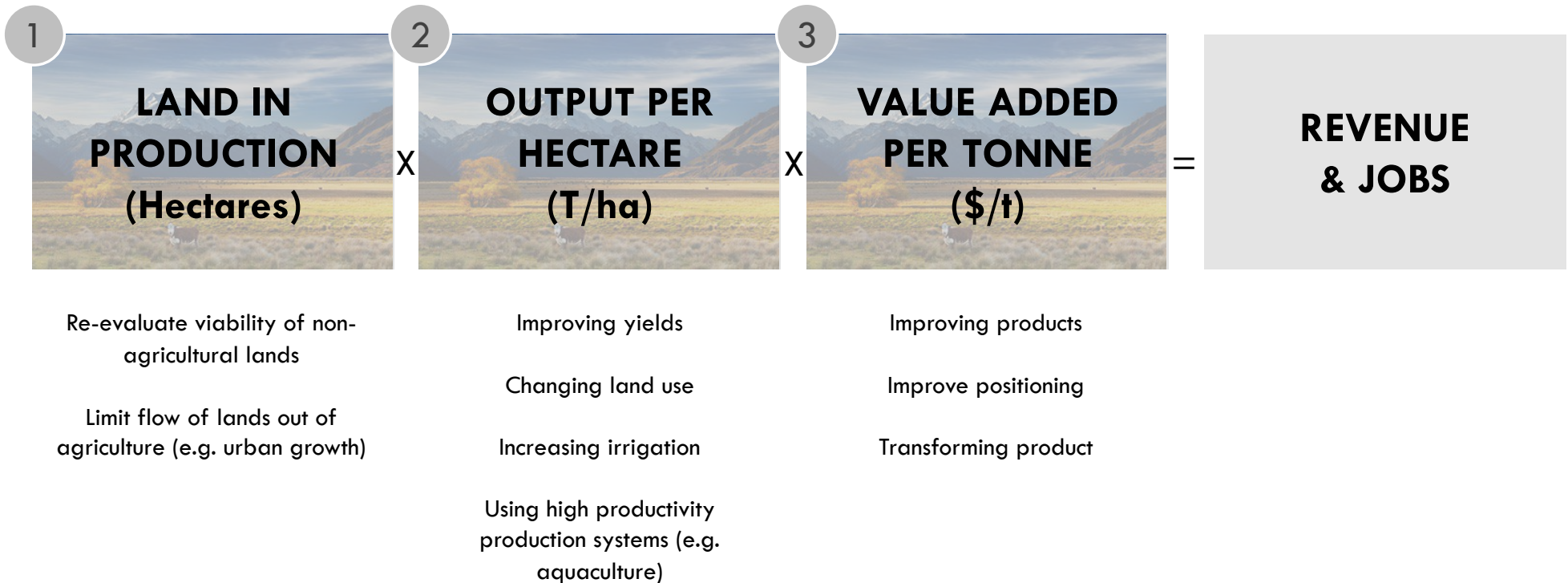
New Zealand land use will continue to change

Agricultural competitiveness is a dynamic system; new producers  
can and do enter markets; new entrants start in smaller niche  
segments and “climb down the cost curve” as volumes grow

Other rich, developed countries similar to New Zealand employ  
significantly larger numbers of people in agriculture; technological  
change is occurring and products vary in their level of automation

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*Broadly speaking, there are three key drivers available to increase revenue and employment in the agrifood chain*

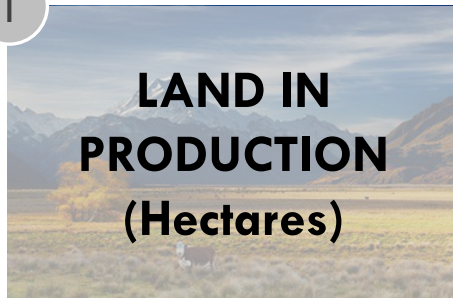


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# 1. MORE FARM LAND

*New Zealand is unlikely to bring new land into agriculture*

1



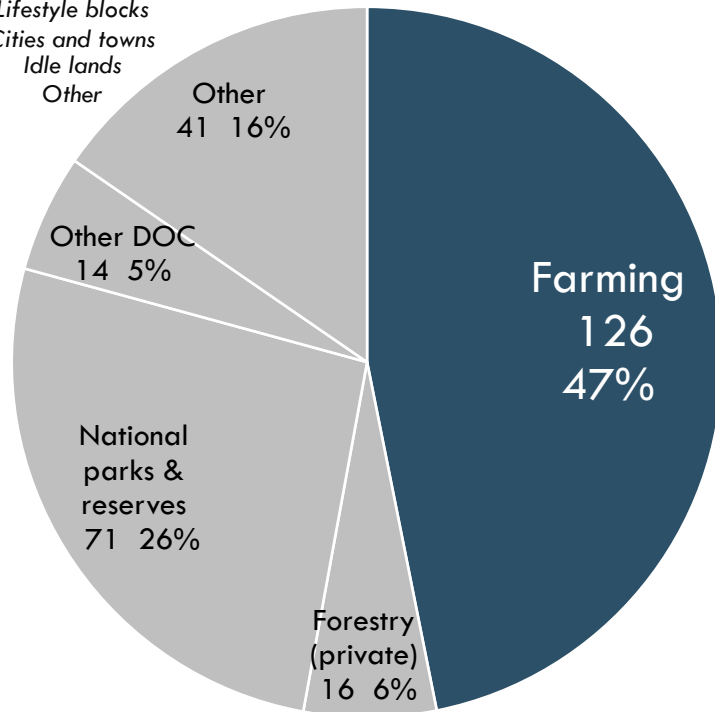
Re-evaluate viability of non-agricultural lands

Limit flow of lands out of agriculture (e.g. urban growth)

# Food production uses almost half of New Zealand's land and much of its oceans

## NEW ZEALAND LAND USE km<sup>2</sup>; 000; 2010

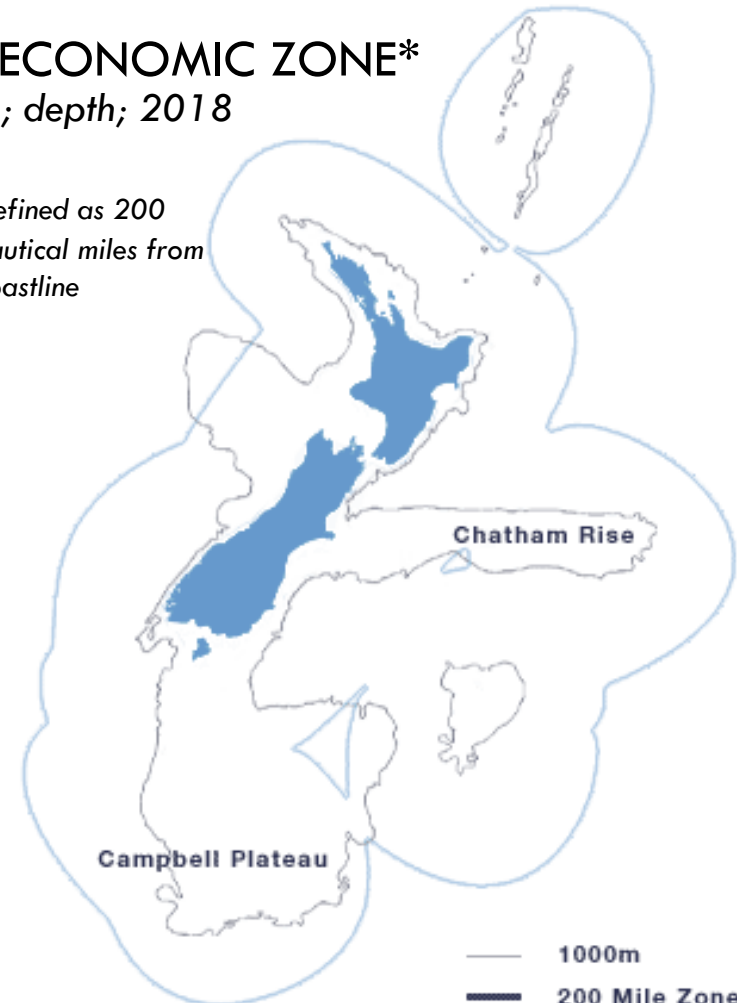
Other government lands  
Non-Ag Tribal Lands  
Lifestyle blocks  
Cities and towns  
Idle lands  
Other



TOTAL = 268,000 km<sup>2</sup>

## NZ ECONOMIC ZONE\* Area; depth; 2018

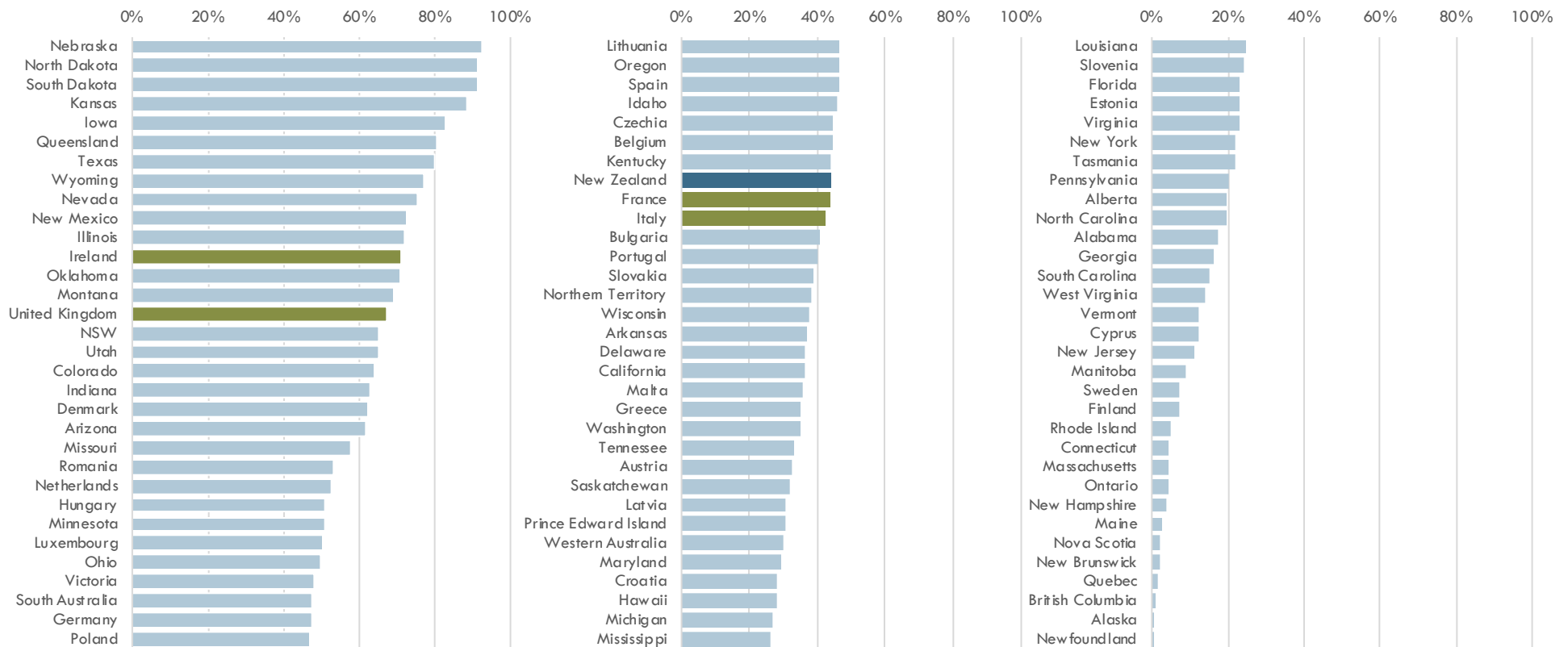
Defined as 200  
nautical miles from  
coastline



\*EEZ; Note: a nautical mile is 1,852 metres; Source: Statistics NZ; Department of Conservation; Sealord; Coriolis analysis

# *New Zealand already farms a reasonable percent of its total land area, similar to France or Italy, but much less than Ireland*

SHARE OF TOTAL LAND AREA USED IN AGRICULTURE INCLUDING PASTURE/RANGE  
% of hectares; 2017 or as available



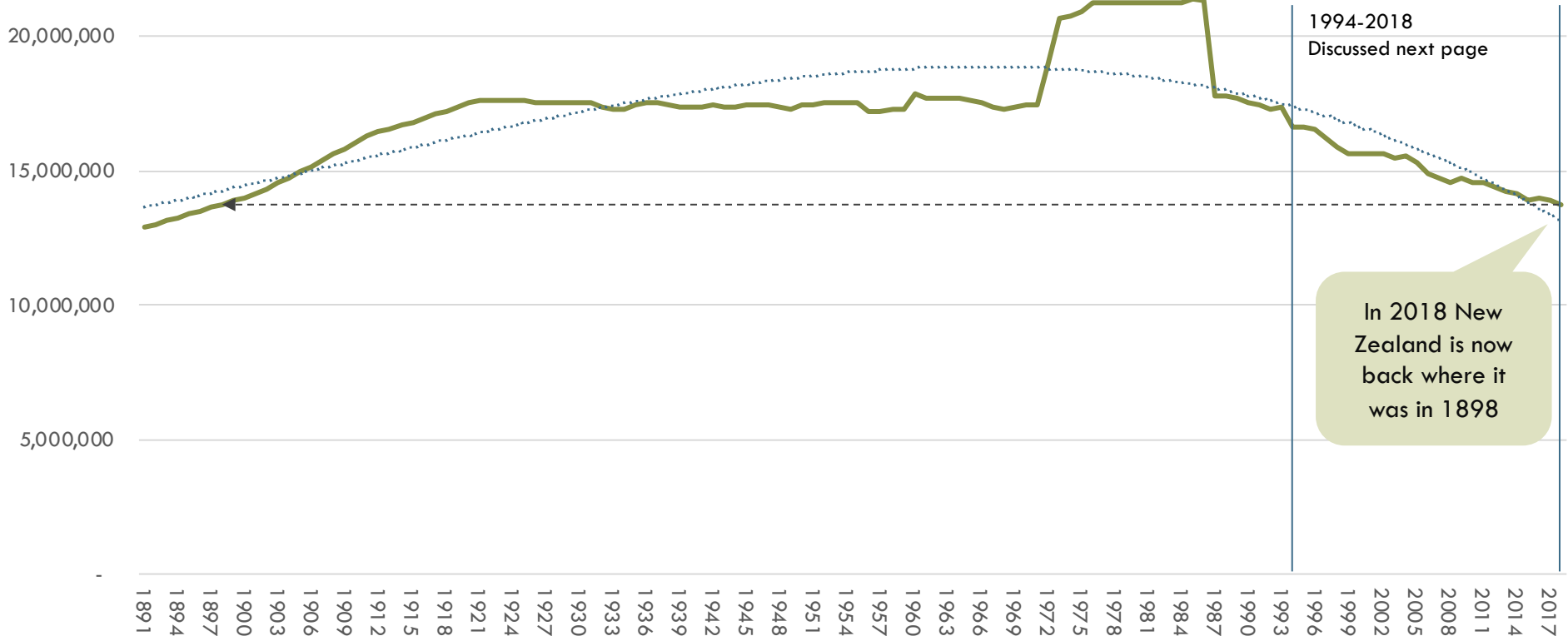
Source: Eurostat; Statistics Canada; USDA Census of Agriculture; ABS; Statistics NZ; Ministry for the Environment (NZ); CIA World Factbook; Coriolis analysis



*The amount of land in agriculture in New Zealand has been trending down since the 80's*

## TOTAL NEW ZEALAND AREA IN FARMING AND PRIVATE FORESTRY

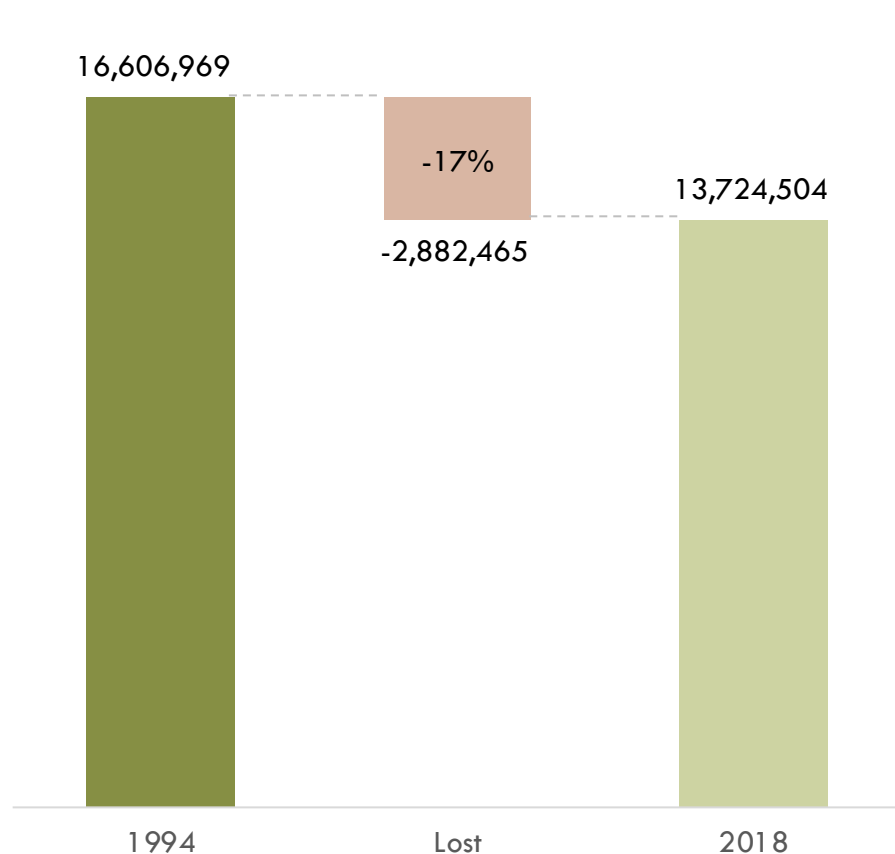
Hectares; 1891-2018



# In the last 25 years alone, a large amount of land (-17%) has left farming

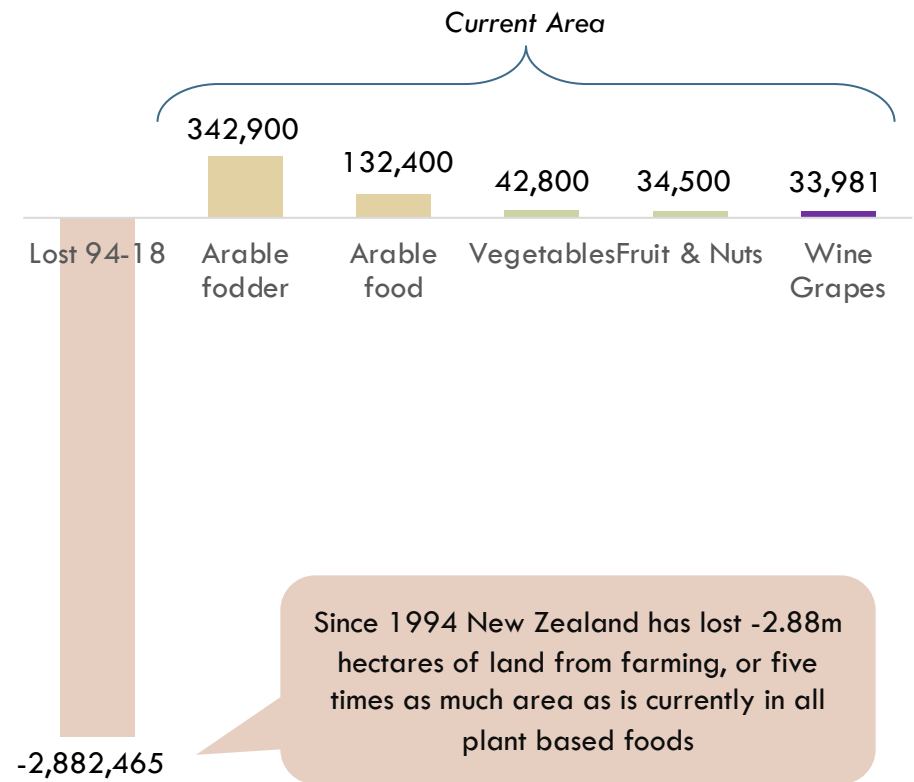
## TOTAL AREA ON FARMS

Hectares; 1994-2018



## AREA LOST RELATIVE TO SOME USES

Hectares; lost 94-18 or 2018

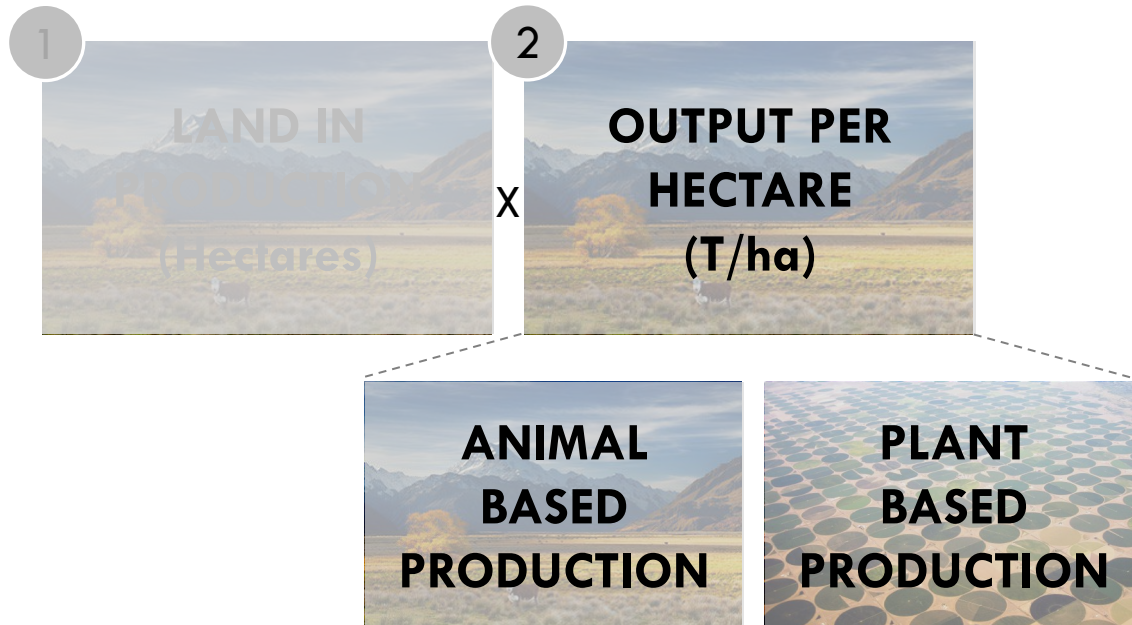


Since 1994 New Zealand has lost -2.88m hectares of land from farming, or five times as much area as is currently in all plant based foods

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## 2. HIGHER PRODUCTIVITY

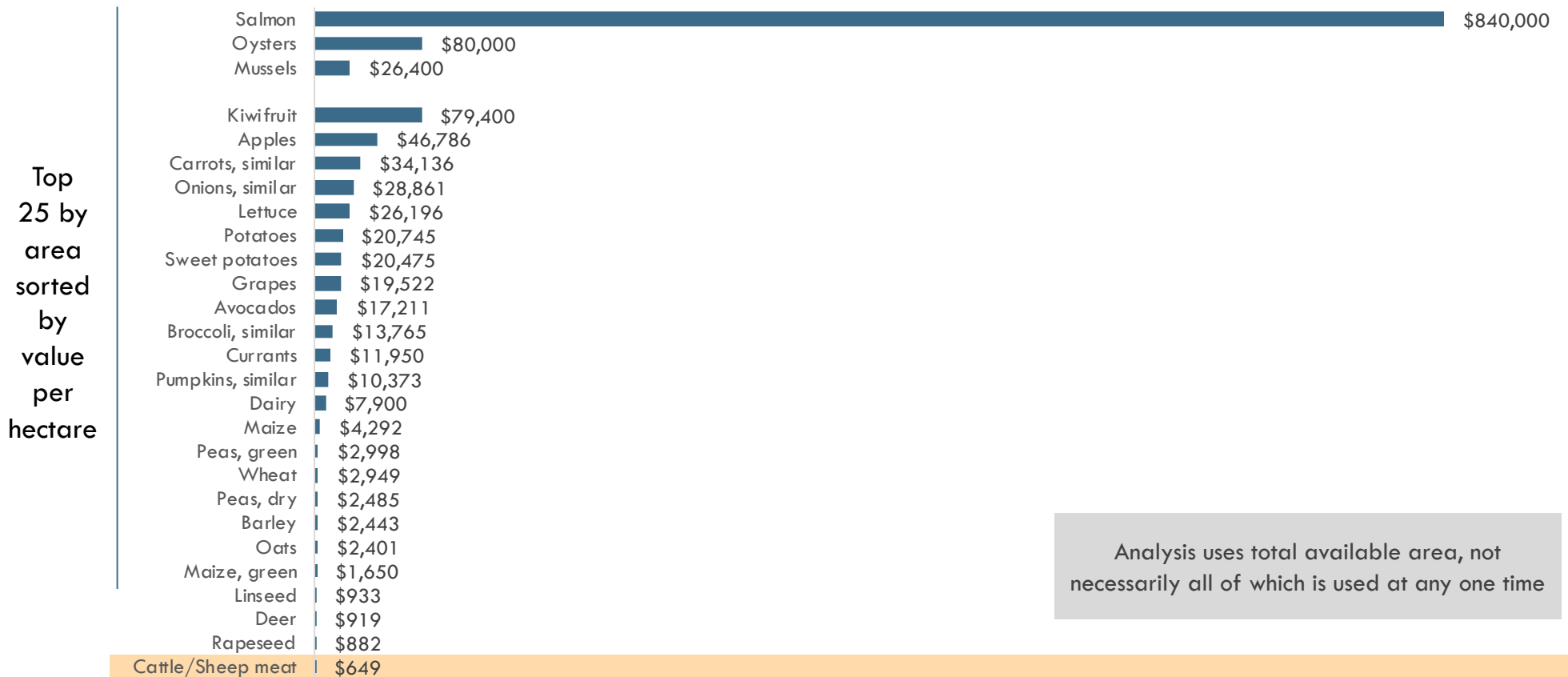
*New Zealand is increasing output of existing land through transitioning to higher productivity animal and plant systems*



# Can we increase productivity (more output from inputs)?; products vary dramatically in terms of value created per hectare

## REALISED NEW ZEALAND “FARMGATE” VALUE PER HECTARE OF TOTAL SPACE

NZ\$/hectare; 2017 or as available

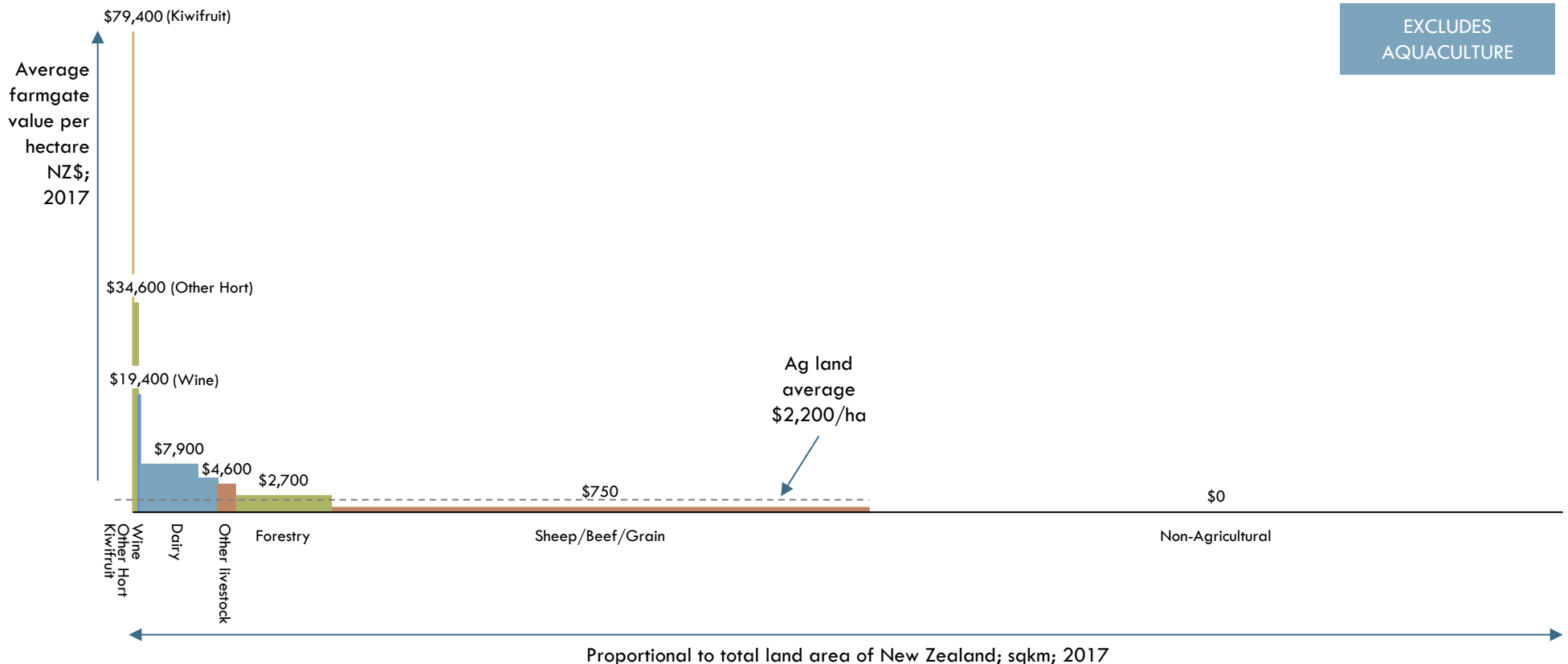


Note: excludes high productivity, but primarily indoor animals (pigs, chickens, milking sheep and milking goats); Source: UN FAO; UN FISHSTAT; Plant & Food Research Fresh Facts; Statistics NZ; DairyNZ; Beef&Lamb NZ; Zespri; NZKS; Coriolis analysis

# Only a small amount of New Zealand's land is currently used at high productivity to create significant value per hectare

## NEW ZEALAND AGRICULTURAL LAND USE: AREA VS AG VALUE PER HECTARE

NZ\$; actual; hectares; 2017 or as available

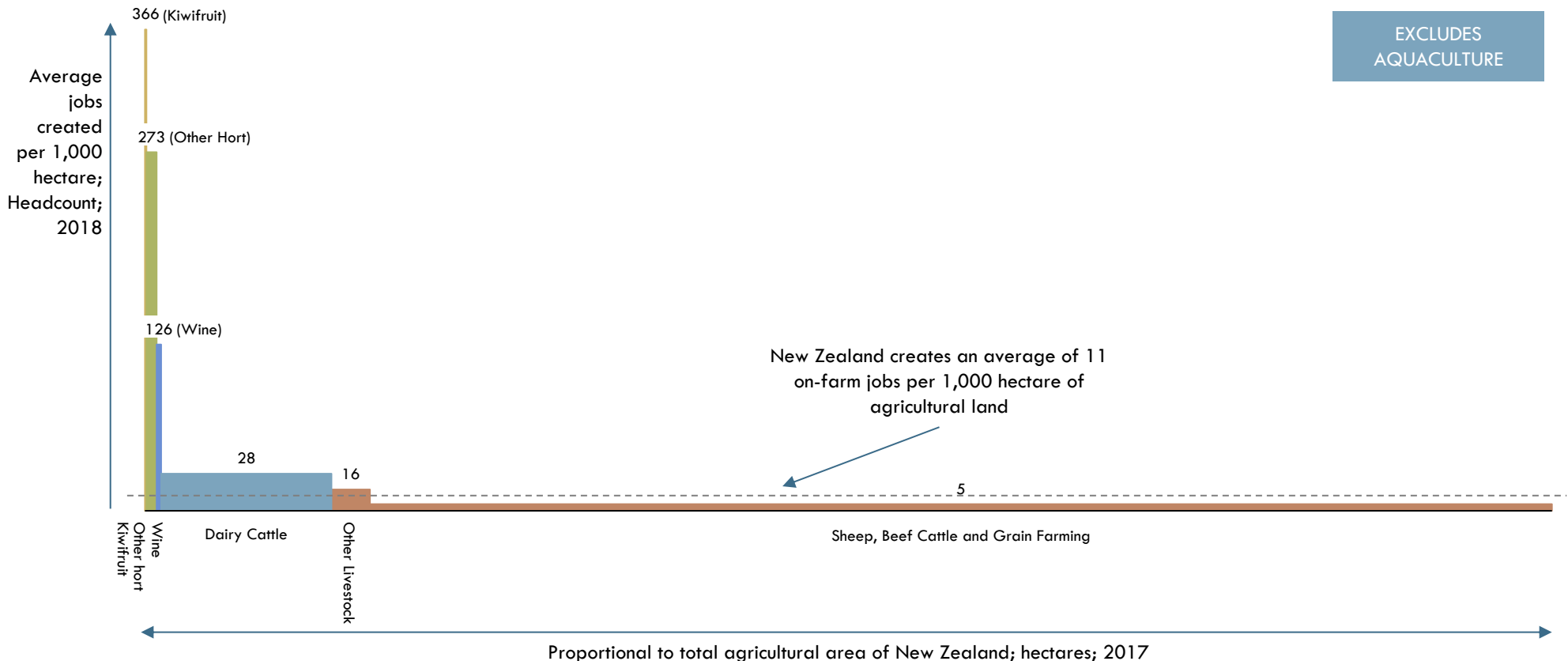


Note: Other Hort here also includes nursery and floriculture unable to remove due to limitations of available data; Source: UN FAO database (populated by MPI); PFR Fresh Facts; Zespri Annual Report; NZW annual report; Ministry for the Environment; Statistics NZ; CIA World Factbook; Coriolis analysis

*As a result, New Zealand currently produces an average of 11 on-farm jobs per 1,000 hectares of agricultural land*

## NEW ZEALAND AGRICULTURAL LAND AREA VS ON-FARM JOBS PER 1,000 HECTARES

Headcount/1,000 ha of farmland; actual; hectares; 2017 or as available



Note: Other Hort here also includes nursery and floriculture unable to remove due to limitations of available data; Source: UN FAO database (populated by MPI); PFR Fresh Facts; Zespri Annual Report; NZW annual report; Ministry for the Environment; Statistics NZ; CIA World Factbook; Coriolis analysis

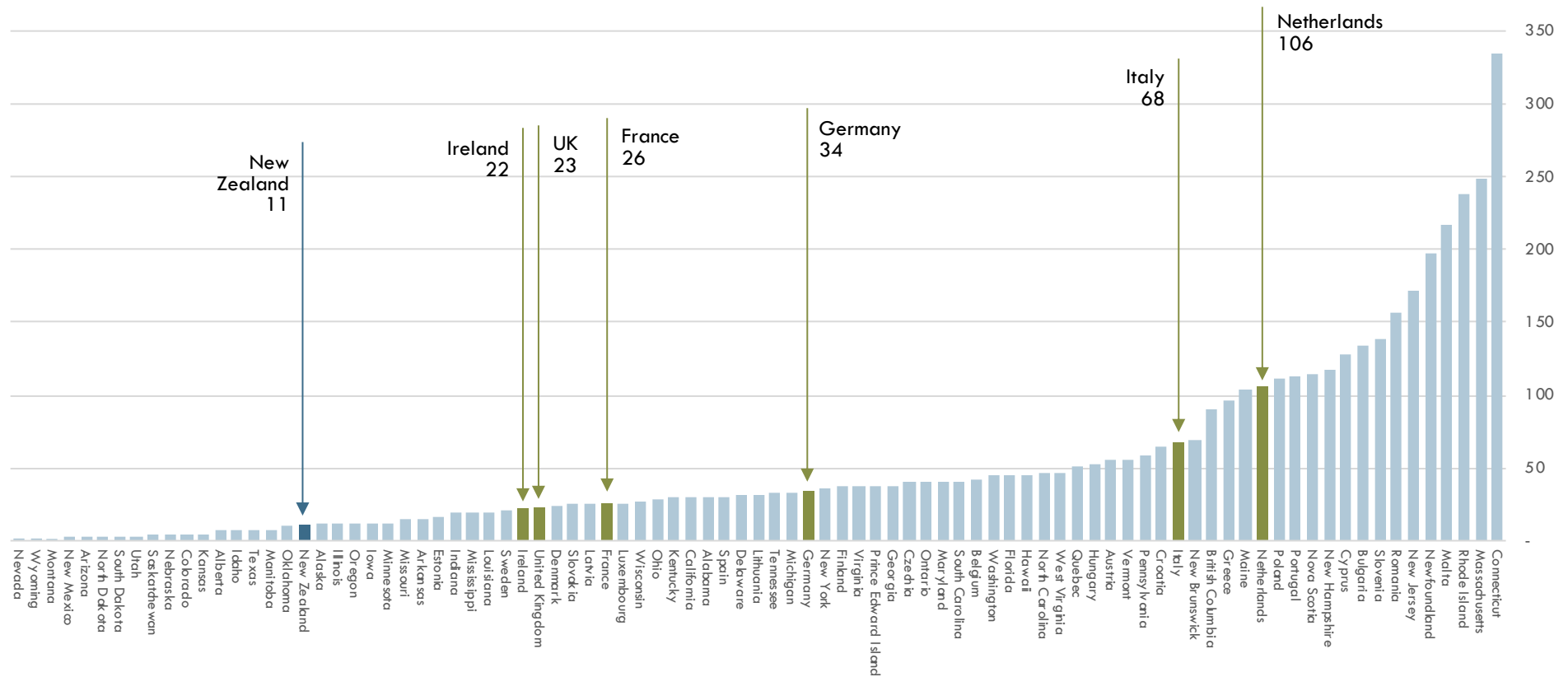
*At 11 jobs per hectare, New Zealand is performing like a desert region, rather than a temperate climate foodbowl*



# There is a strong high level case that New Zealand can create more on-farm jobs

## ON-FARM JOBS PER 1,000 HECTARES: NZ VS. PEERS

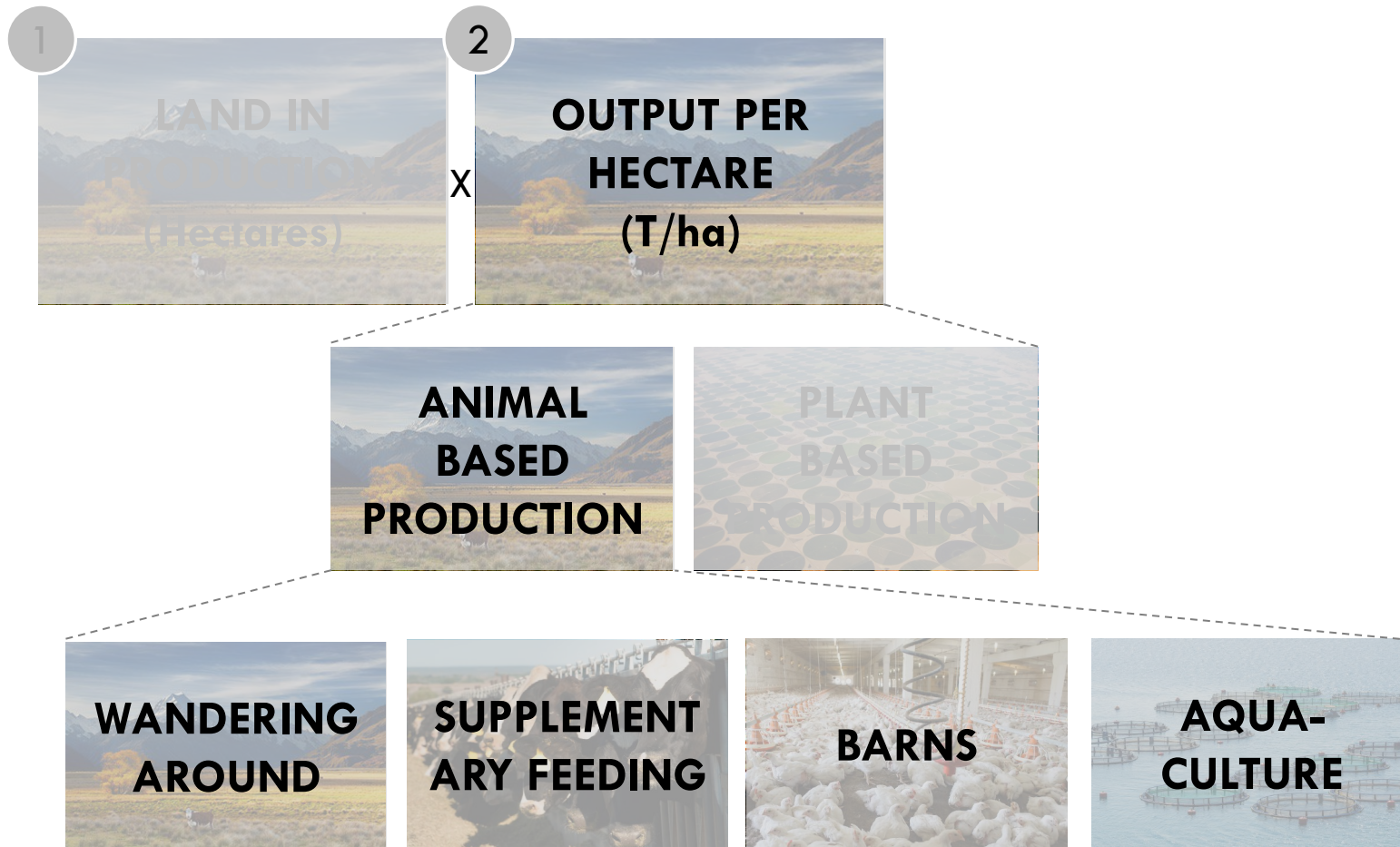
Headcount/1,000 ha of farmland; 2017 or as available



Source: Eurostat; CIA World Fact Book; StatisticsNZ; USDA NASS; USDA Census of Agriculture; UN FAO AgStat; MPI; LCDB database; Coriolis analysis and estimates



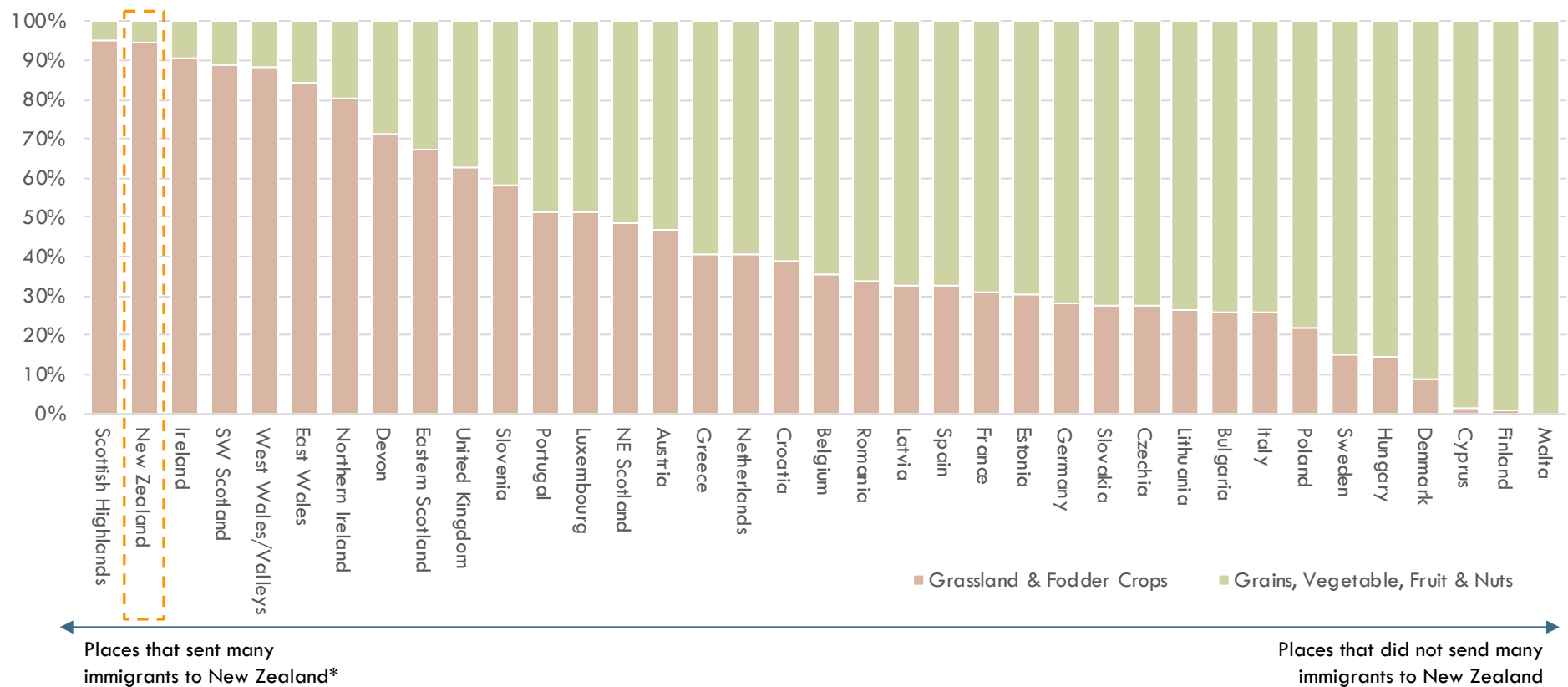
# *New Zealand is moving to higher productivity animal production systems*



# Unlike other countries, New Zealand still uses most of its agricultural land for “low density/ extensive” animal systems

## SHARE OF AGRICULTURAL FARMLAND IN GRASSLAND/PASTURE: NZ VS. EU

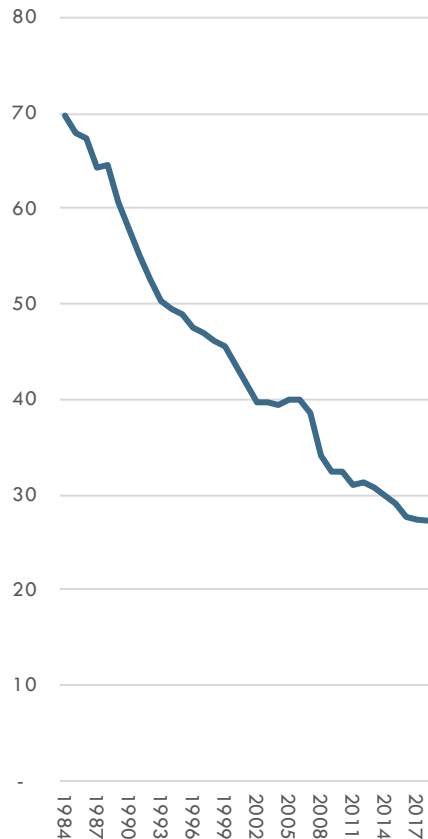
% of agricultural area; 2018 or as available



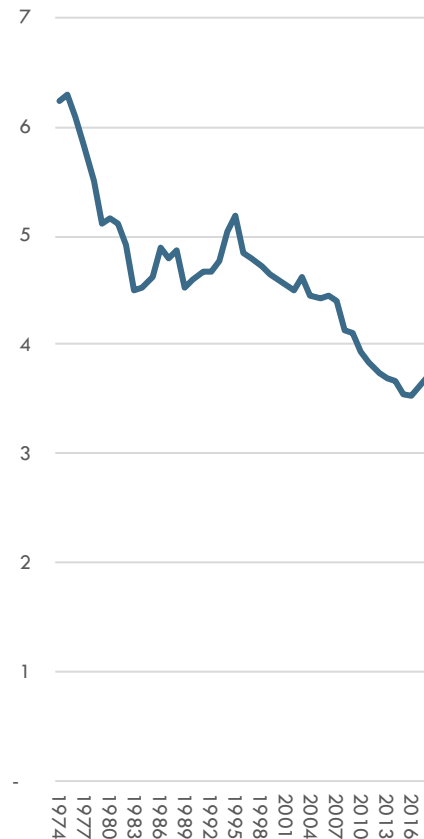
\*New Zealand agriculture follows the 'idealised' British Isles pastoralist world view; Source: Eurostat; CIA World Fact Book; StatisticsNZ; UN FAO AgStat; MPI; LCDB database; Coriolis analysis and estimates

# Production of New Zealand's "low density/extensive" animal systems is falling

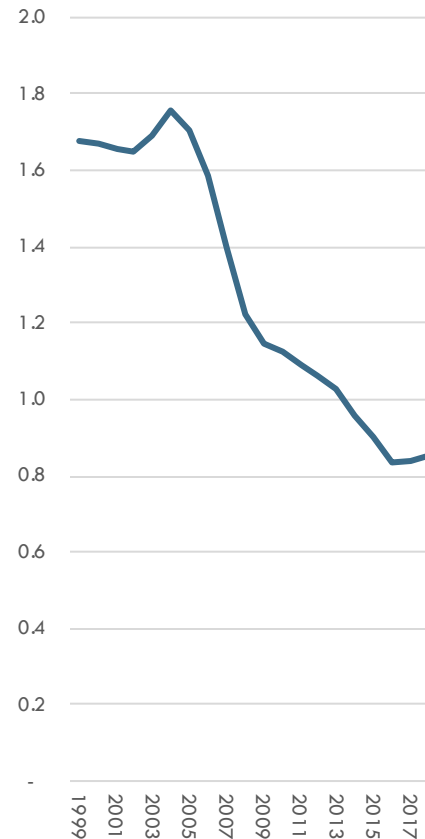
**# OF SHEEP**  
Head; m; 1984-2018



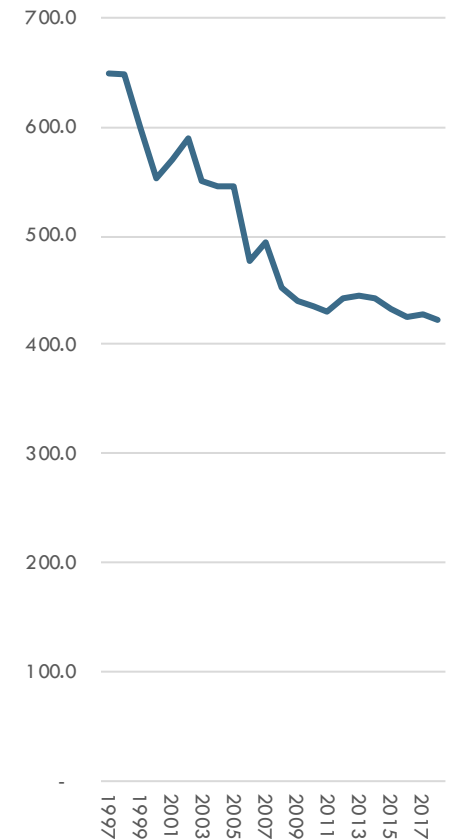
**# OF BEEF CATTLE**  
Head; m; 1974-2018



**# OF DEER**  
Head; m; 1999-2018



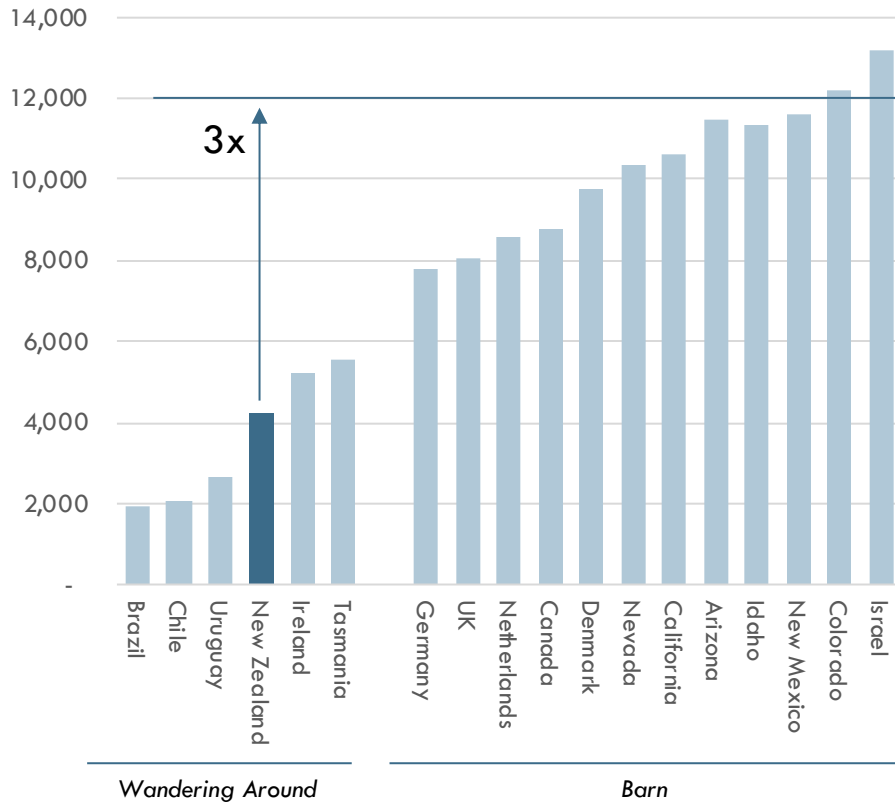
**FISH CAPTURE**  
Tonnes; 000; 1997-2017



# New Zealand “low density/extensive” animals are low yield relative to other developed countries and regions

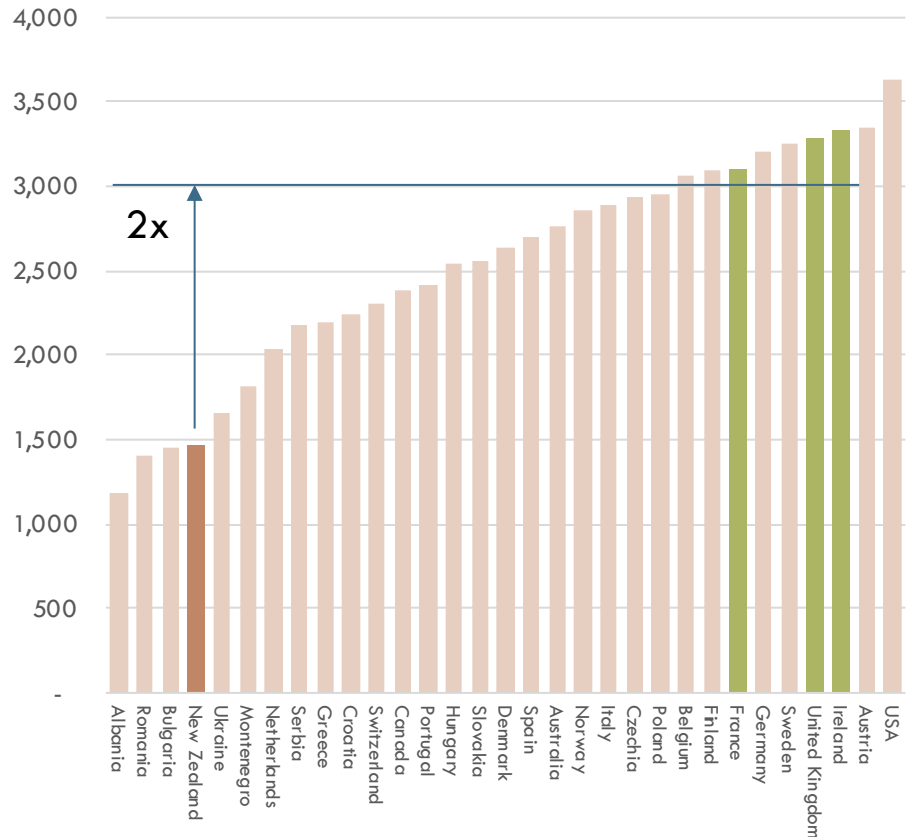
## MILK PER COW PER YEAR

Litres; 2018 or as available



## MEAT PER CATTLE ANIMAL KILLED

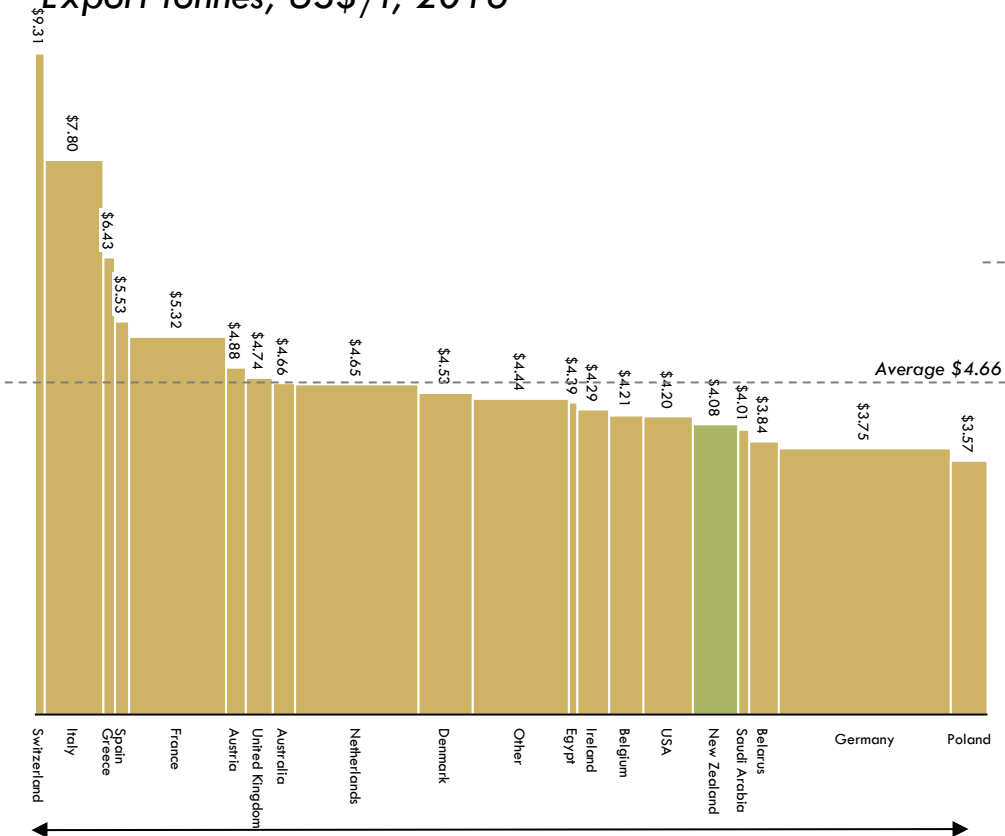
KG; 2018 or as available



# New Zealand's "low density/extensive" animal products often sell at a discount, not a premium to world prices

## GLOBAL CHEESE TRADE: VOL VS. VAL

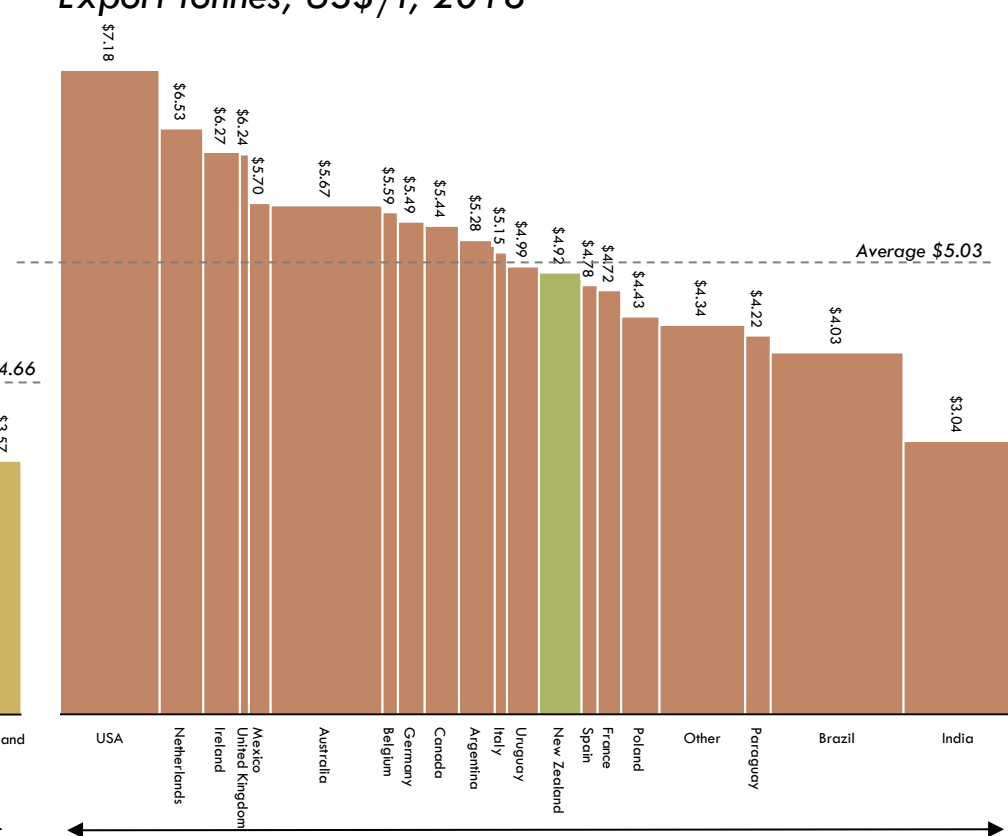
Export tonnes; US\$/t; 2016



Proportional to 2018 global export volume; US\$ / kg FOB

## GLOBAL BEEF TRADE: VOL VS. VAL

Export tonnes; US\$/t; 2018



Proportional to 2018 global export volume; US\$ / kg FOB

*Being a stable, picturesque country with functioning environmental regulation in the temperate zone (Clean & Green) is not a “moat”*

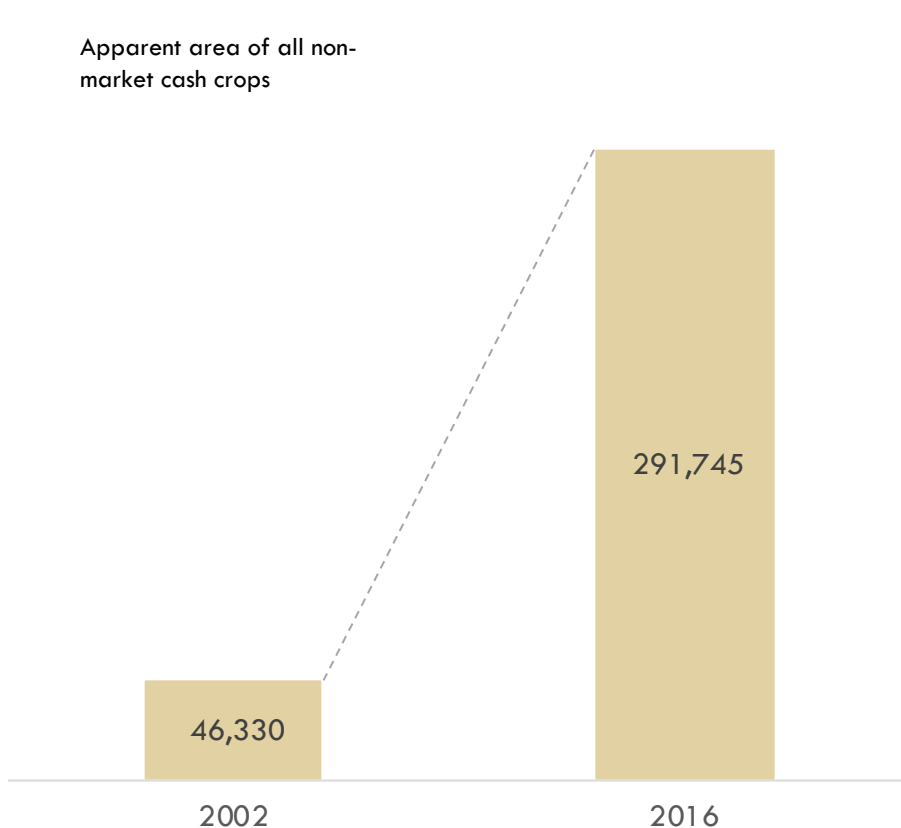


# New Zealand is increasing supplementary feeding, through both (1) feed grain production and (2) animal feed imports

## AREA IN FODDER GRAINS

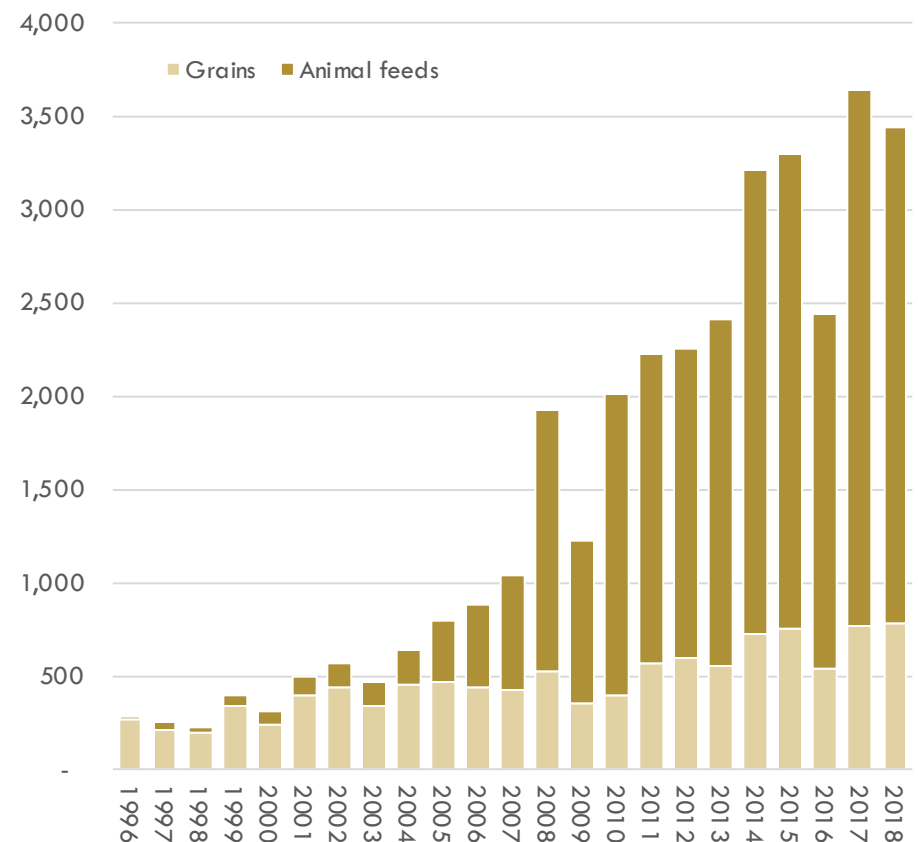
Hectares; 2002 vs. 2016

Apparent area of all non-market cash crops



## IMPORTS OF ANIMAL FEEDS/PKE\*/ETC.

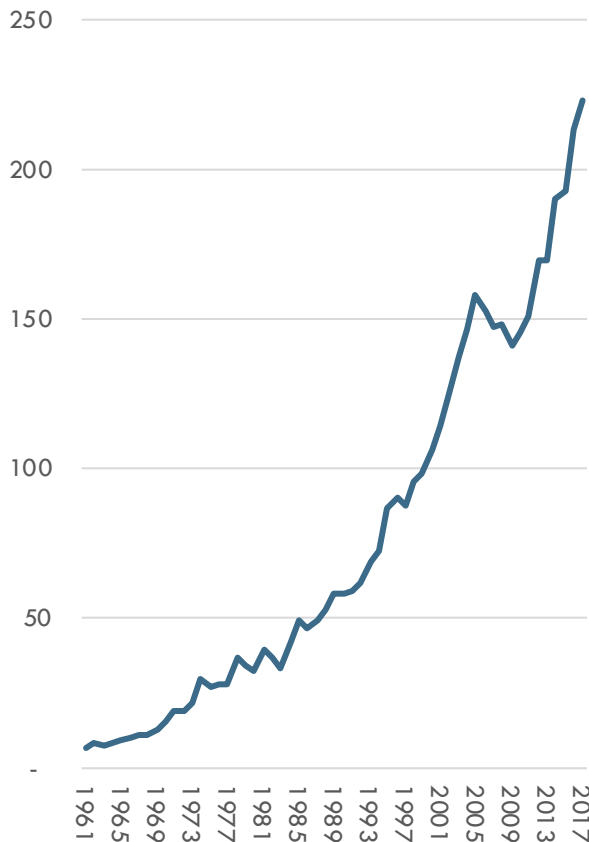
Tonnes; 000; 1996-2018



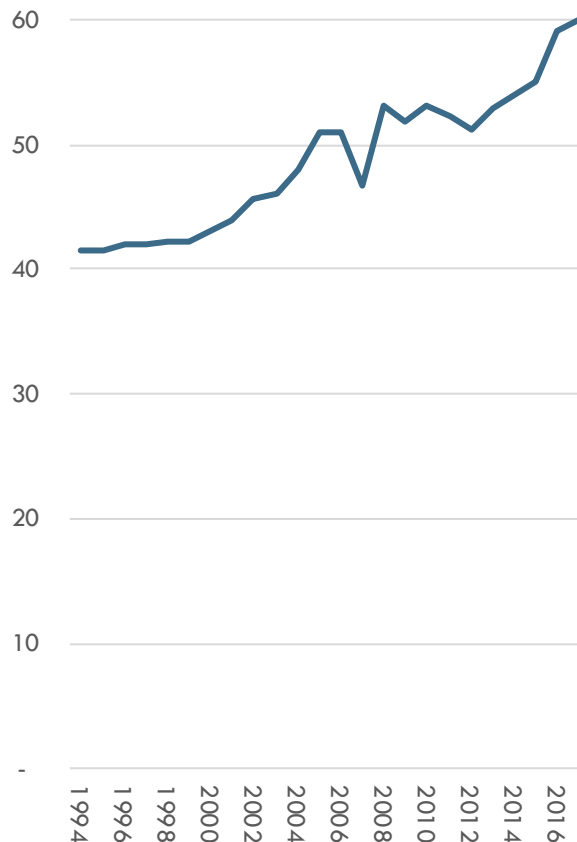
\*PKE = Palm Kernel Expeller; Source: StatisticsNZ; UN Comtrade database; LCDB database; Coriolis classifications and analysis

# New Zealand production of barn raised animal protein is growing

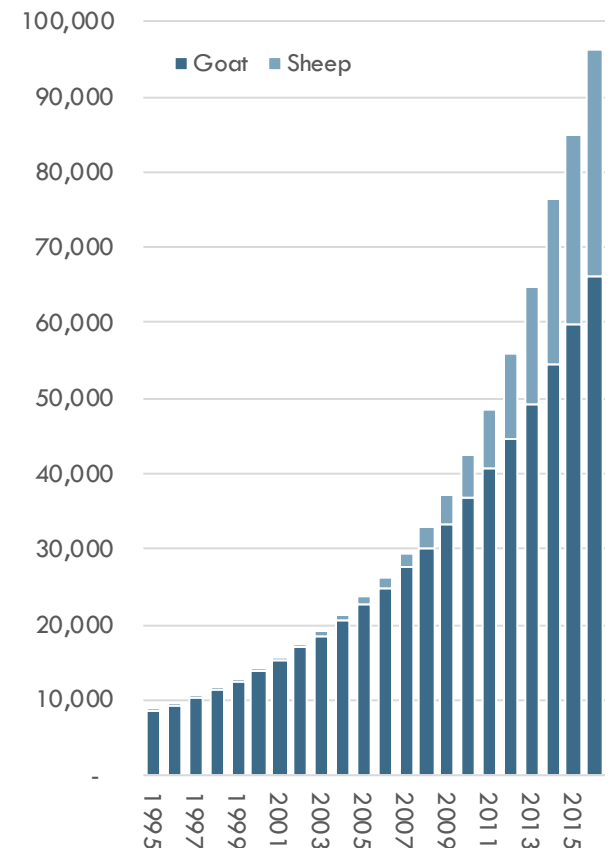
**POULTRY MEAT**  
Tonnes; 000; 1961-2017



**EGGS**  
Tonnes; 000; 1994-2017



**MILKING SHEEP/GOATS\***  
Headcount; 1995-2016



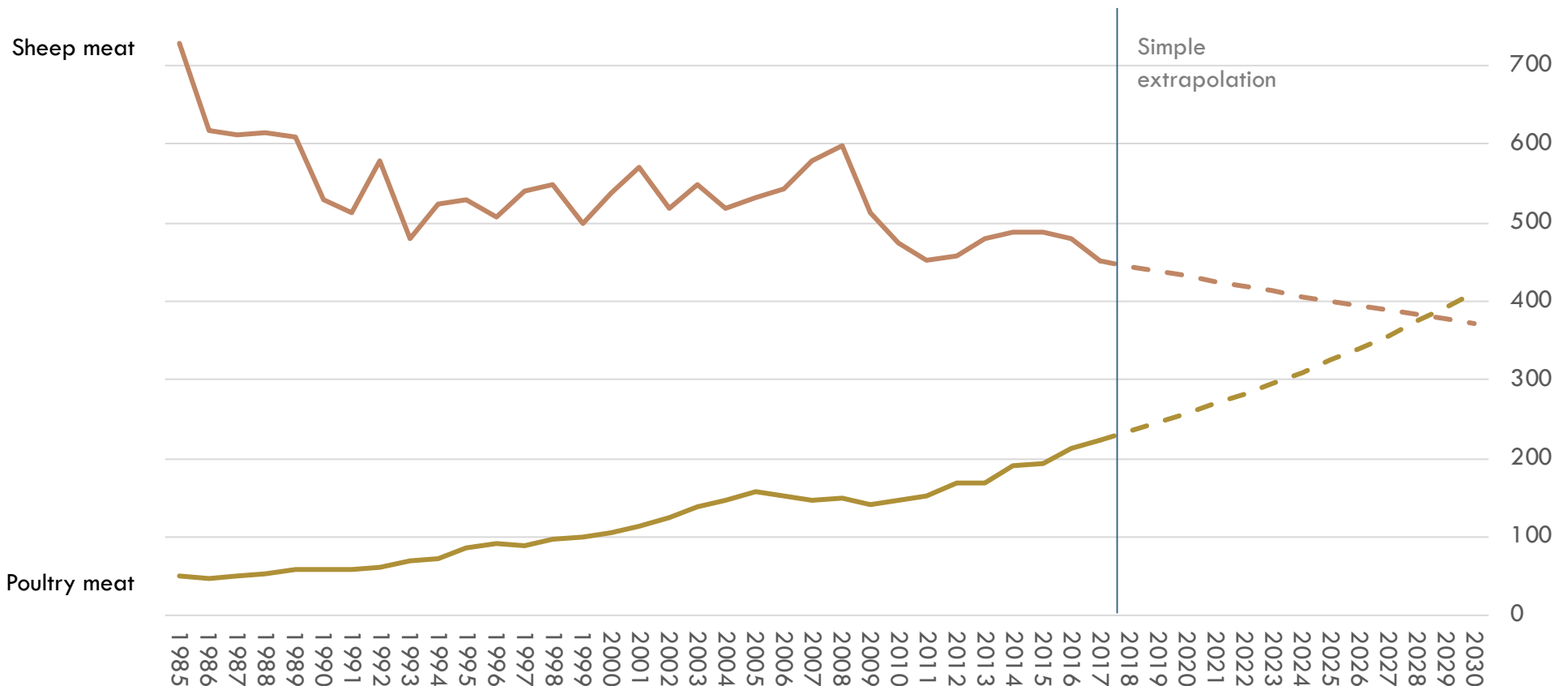
\*Mix of barn and grazing; Source: Statistics NZ; UN FAO AgStat; Coriolis analysis and estimates



# *Poultry meat has been a long term growth platform for NZ; a simple model suggests production will exceed lamb by 2028*

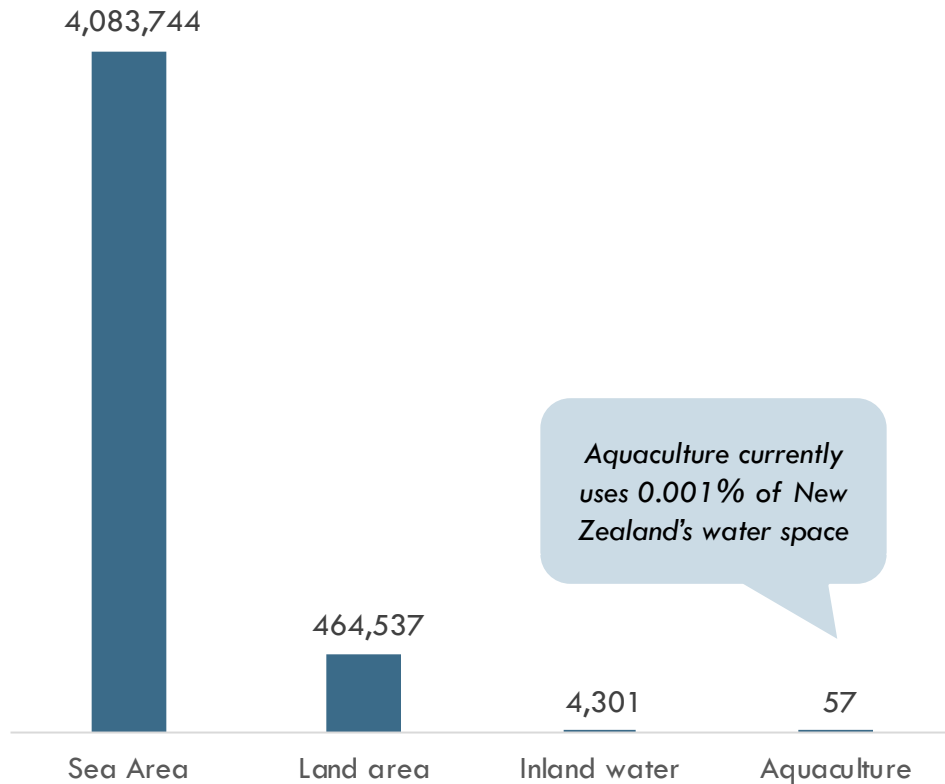
## NEW ZEALAND MEAT PRODUCTION VOLUME: LAMB VS POULTRY

T; 000; 1985-2017; 2017-2030f

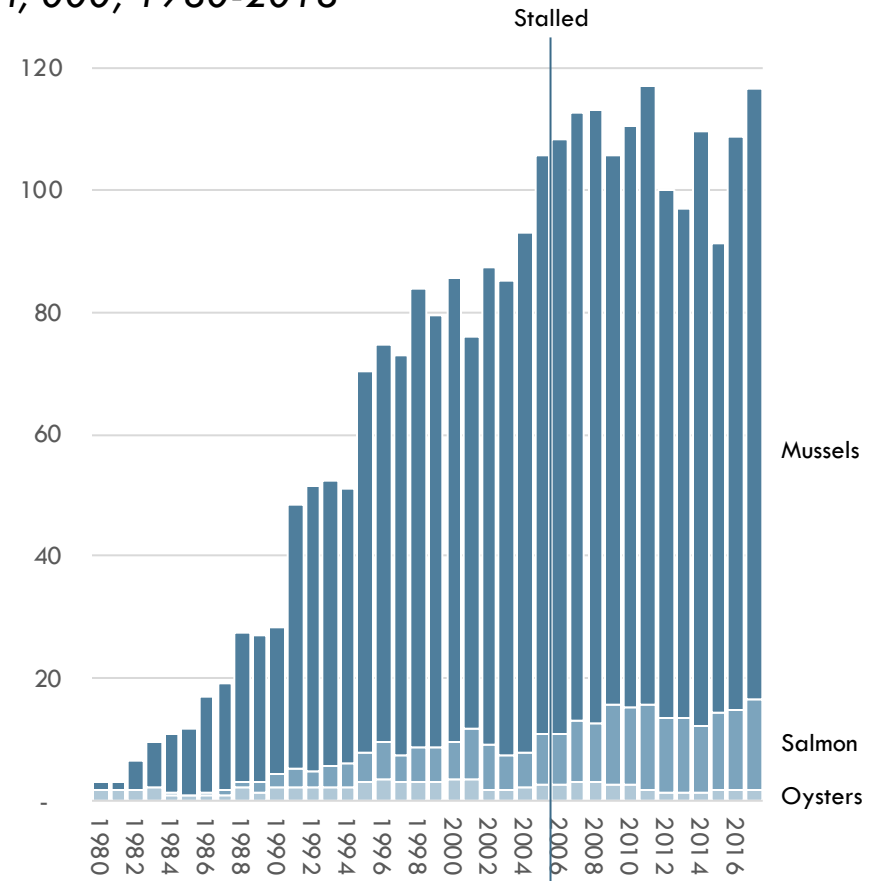


# New Zealand aquaculture production was growing until it was stalled by “non-market action”

AVAILABLE AREA VS. AQUACULTURE  
km<sup>2</sup>; 2018

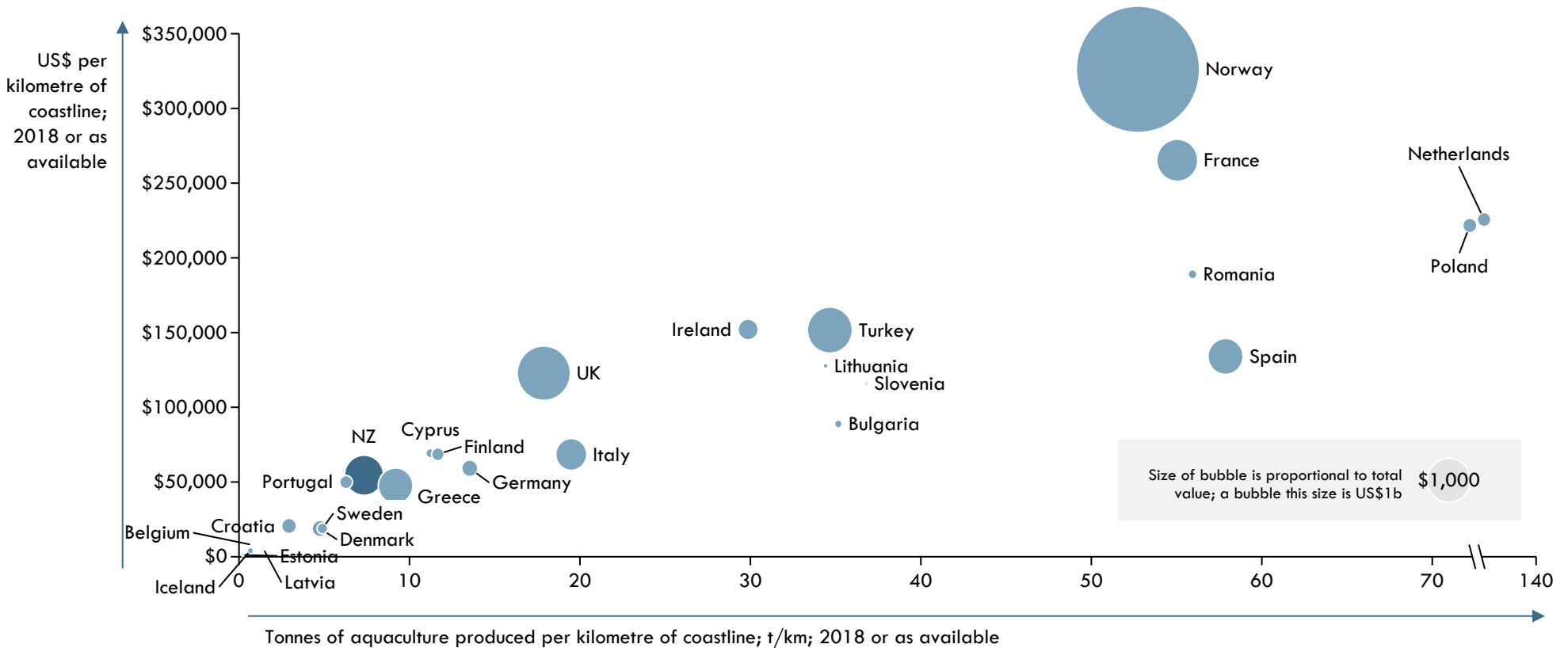


TONNES AQUACULTURE  
T; 000; 1980-2018

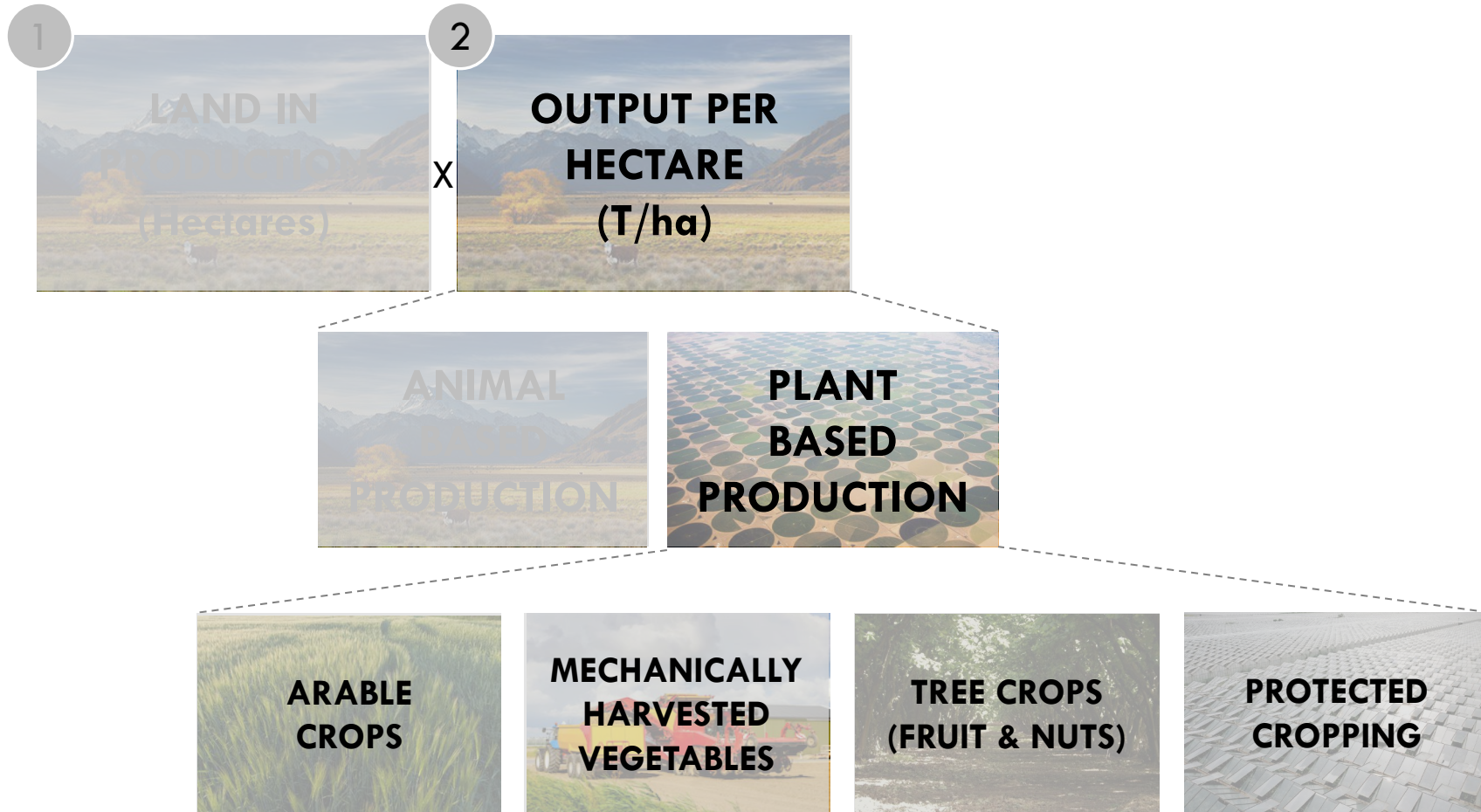


# New Zealand has clear potential to produce more aquaculture

**MATRIX: TONNES/KILOMETRE VS DOLLARS/KILOMETRE VS TOTAL INDUSTRY VALUE**  
*T/km (actual); US\$/km (actual); total US\$m; 2018 or as available*



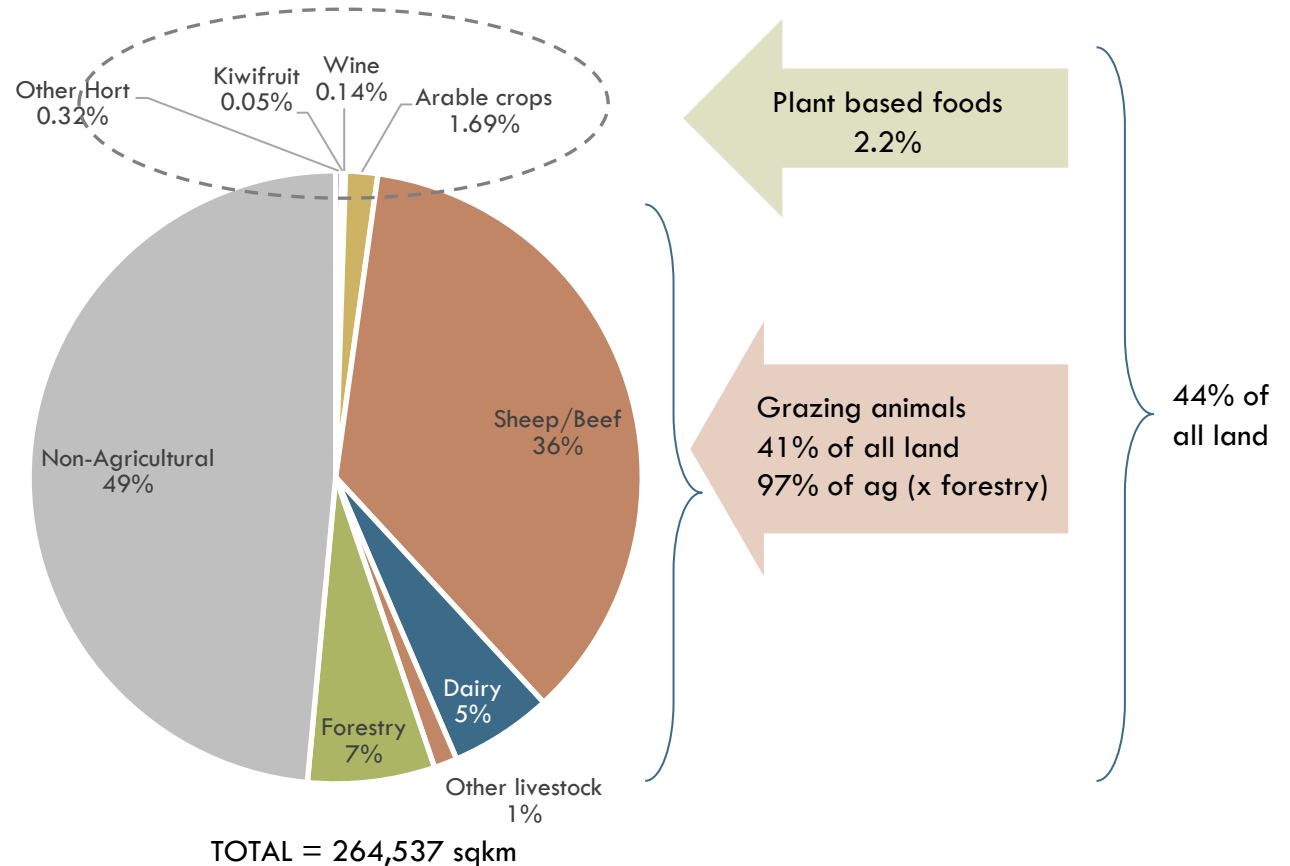
# *New Zealand is increasing production higher productivity plant production systems*



# Most New Zealand farm land is currently used to graze animals; only 2.2% of all land is used for plant based foods

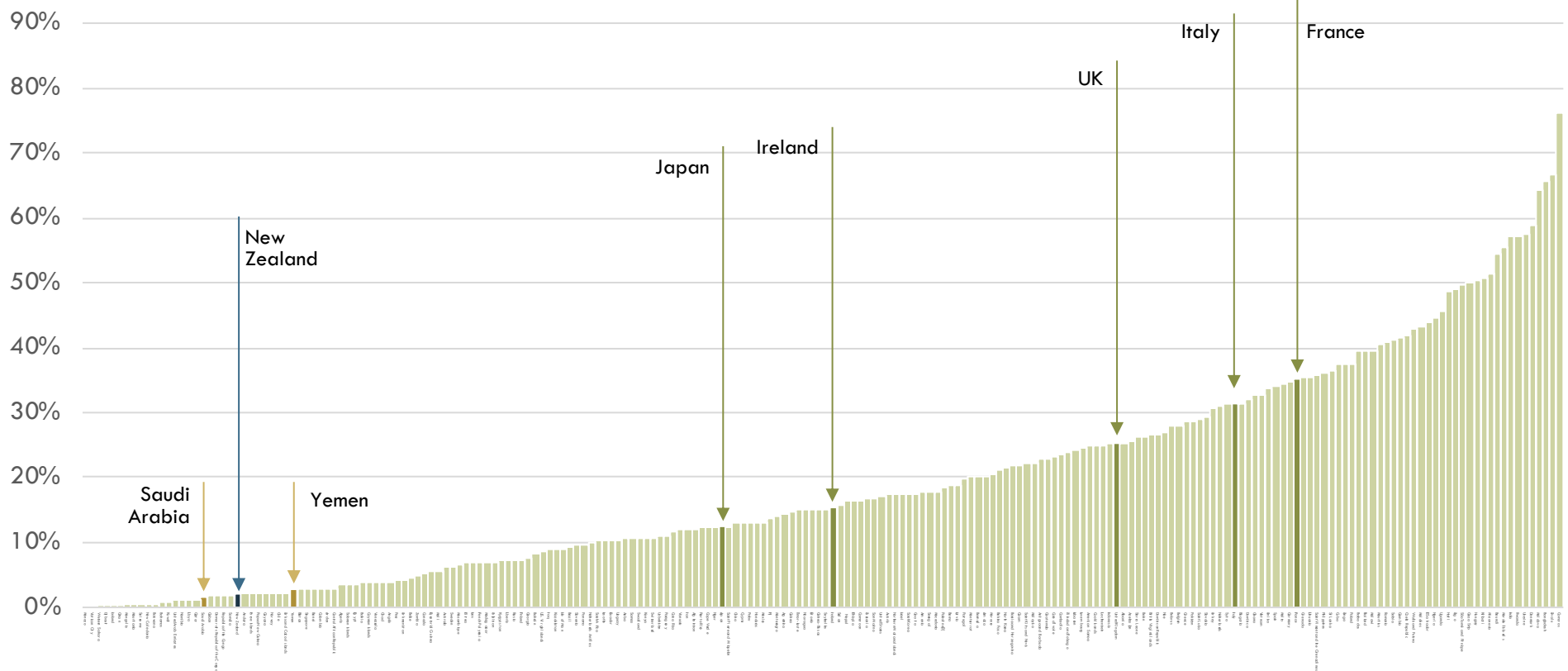
## NEW ZEALAND AGRICULTURAL LAND USE

Area; % of area; 2017



# New Zealand currently performs like a desert country in share of land in plant based foods (grains, vegetables, fruit & nuts)

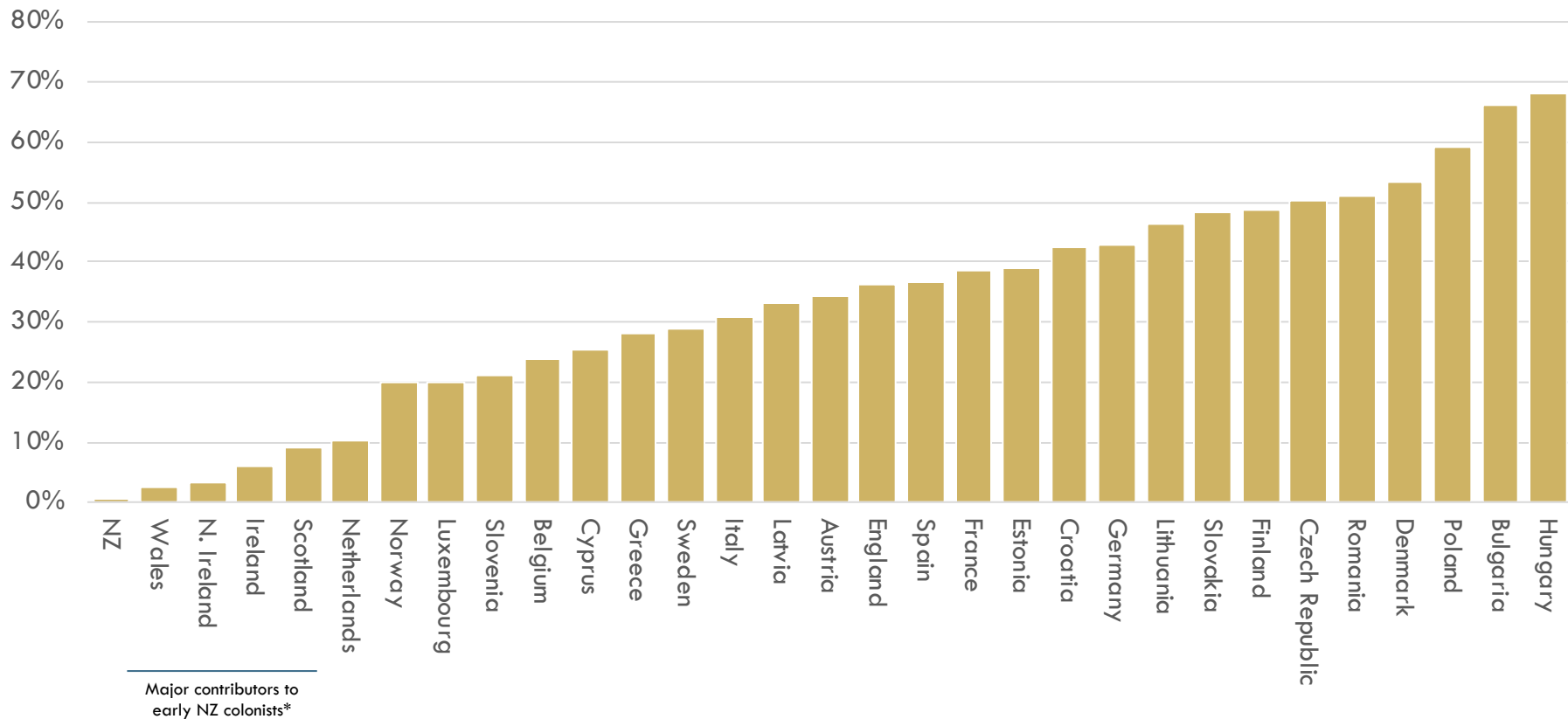
SHARE OF TOTAL COUNTRY AREA IN GRAINS, VEGETABLES, FRUIT & NUTS  
% of total area; N=Earth; 2015 or as available



# New Zealand currently uses an almost negligible amount of total land in arable crops

## SHARE OF TOTAL COUNTRY AREA IN ARABLE GRAINS & PULSES\*\*

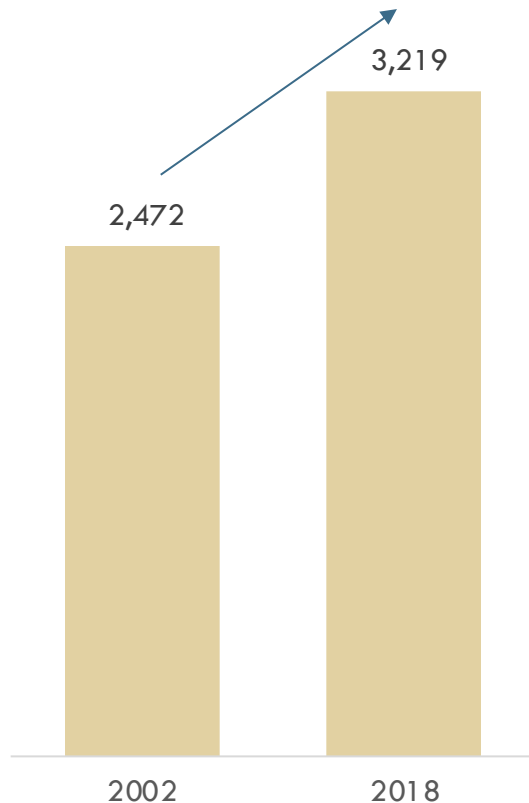
% of area; ha; 2018 or as available



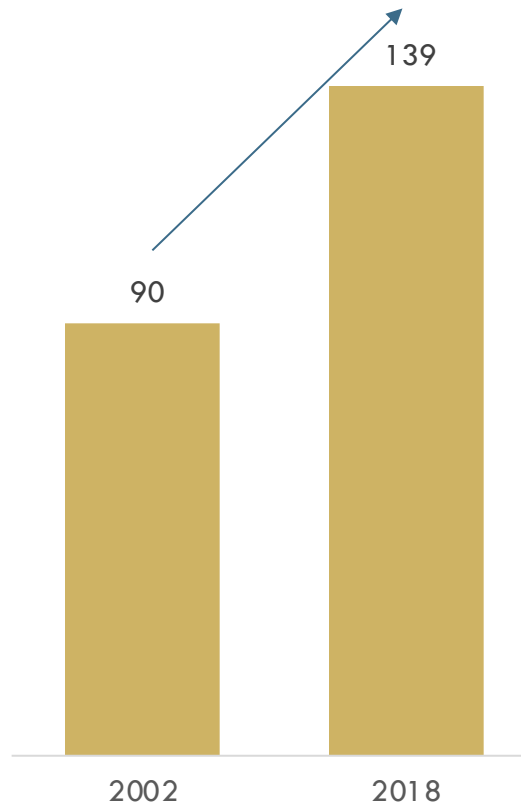
\*New Zealand agriculture appears to be overweighed to the 'idealised' British Isles pastoralist world view; \*\* excludes fodder crops; Source: Eurostat; CIA World Fact Book; StatisticsNZ; UN FAO AgStat; MPI; LCDB database; Coriolis analysis and estimates

# New Zealand is moving to more crop farms with more area per farm and more overall area in arable crops

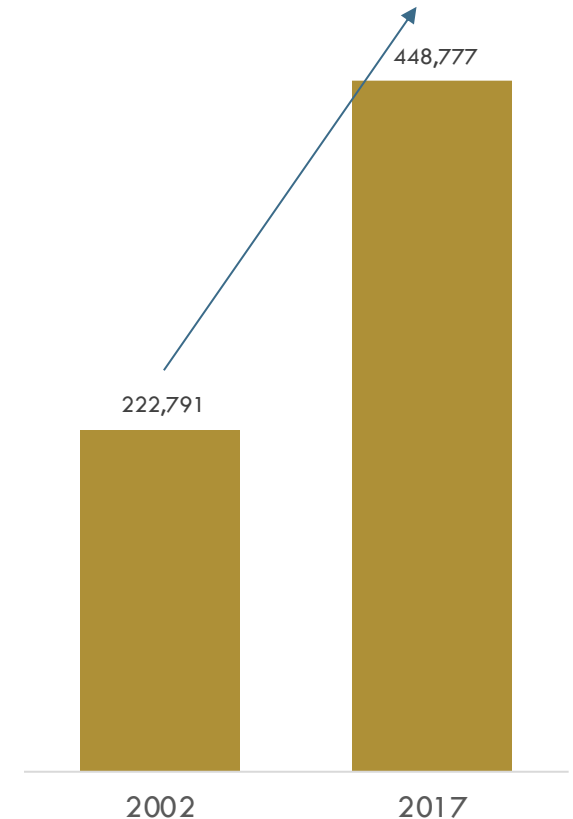
**CROP FARM UNITS**  
#; 02vs18



**AVERAGE AREA/UNIT**  
 $m^2$ ; 02vs17/18\*



**TOTAL AREA IN CROPS\*\***  
 $m^2$ ; 02vs17



\*Uses 2017 area over 2018 units (no 2018 area available); \*\* Includes fodder; Source: Statistics NZ; UN FAO; MAF/MPI; Ministry for the Environment; Coriolis analysis

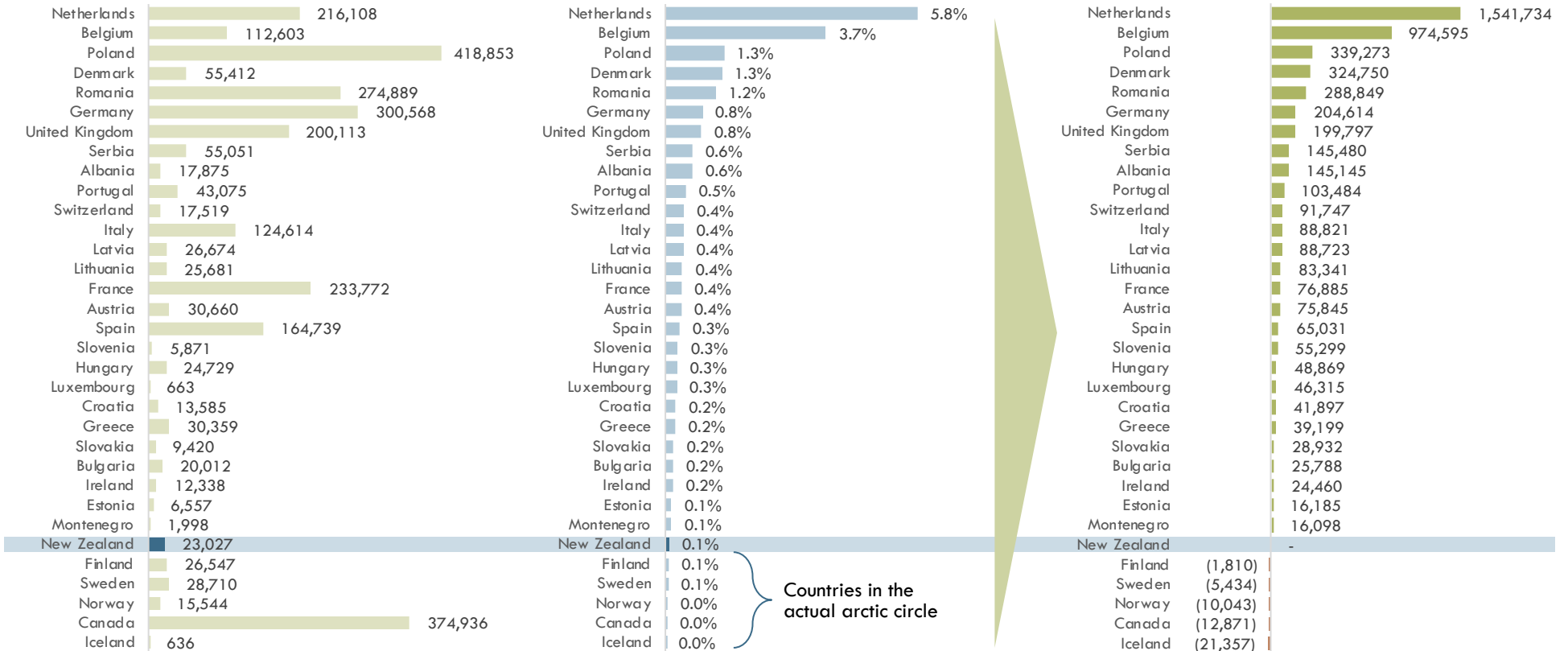


# New Zealand can produce more mechanically harvestable vegetables

AREA IN MHV\*  
Hectares; 2017

% OF TOTAL AREA  
% of country; km<sup>2</sup>; 2017

HOW MUCH ADDITIONAL  
LAND WOULD COME ONLINE  
IF NZ MATCHED THIS PEER?  
Model; New NZ ha in MHV; 2020+



\* MHV = Mechanically Harvestable Vegetables (defined as potatoes, sweet potatoes, other root crops, onions, carrots, cabbages, cauliflower and similar); Source: UN FAO; CIA World Factbook; Coriolis analysis

# New Zealand can produce more fruit, nuts and wine grapes

## AREA IN F, N & WG

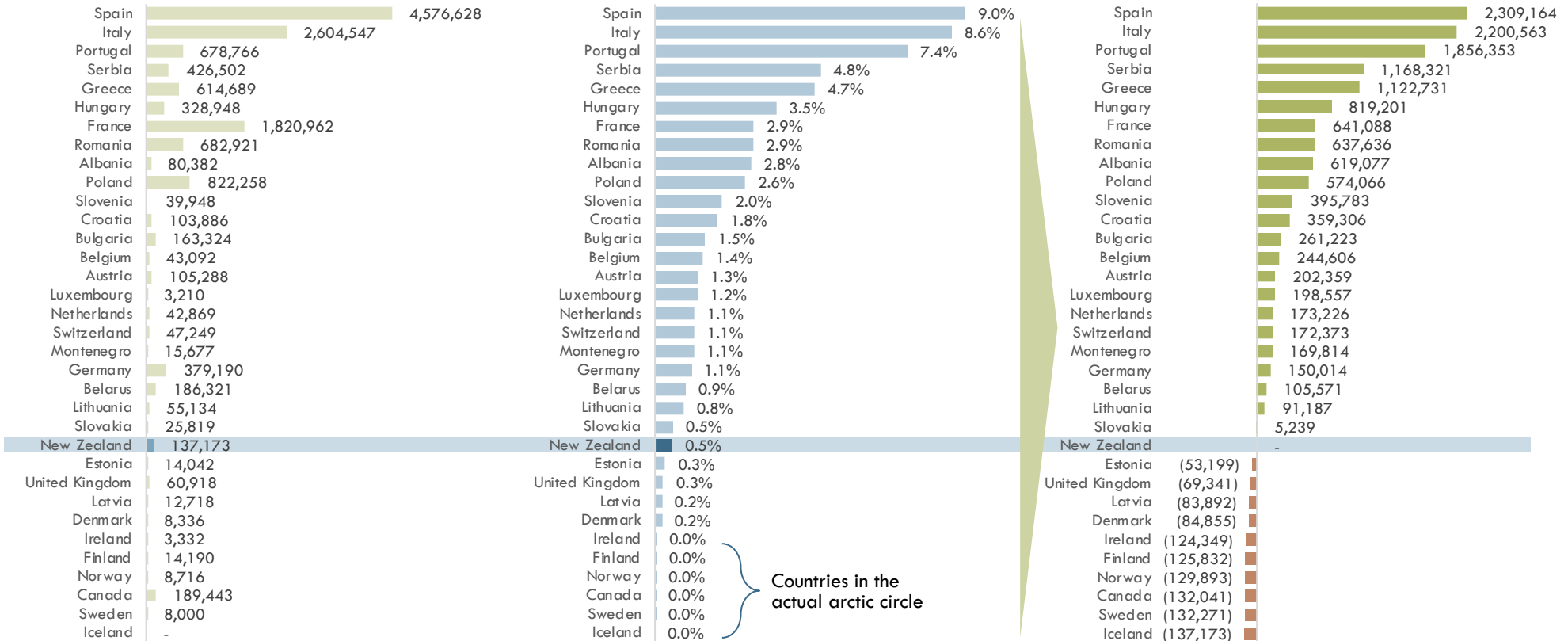
Hectares; 2018 or as available

## % OF TOTAL AREA

% of country SQKM; 2018 or as

## IF NZ MATCHED THIS PEERS %?

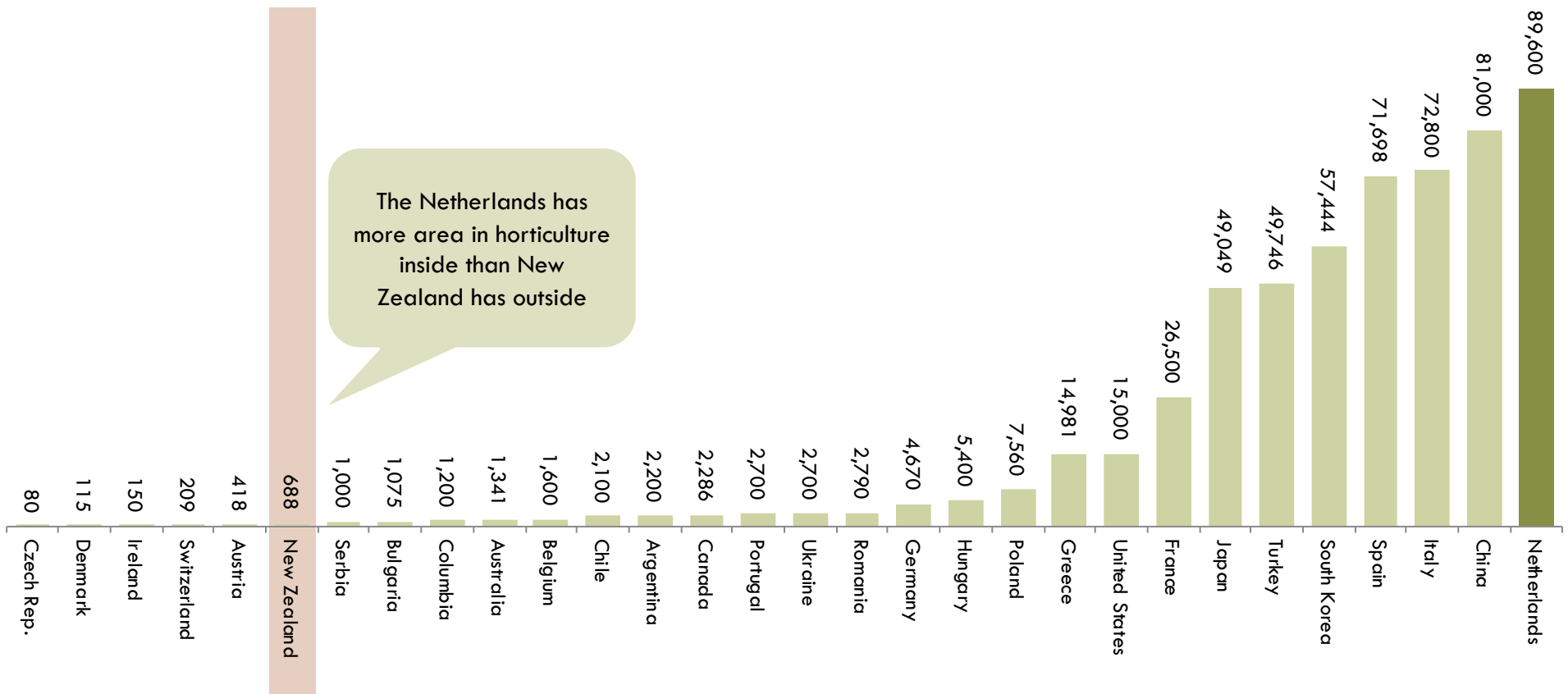
New NZ ha in FNWG; 2020+



# Peers suggest there are opportunities to increase the amount of crop produced in greenhouses

## AREA IN GREENHOUSE/UNDER COVER: NEW ZEALAND VS. SELECT PEERS

Hectare; 2014 or as available



NOTE: Data is from a wide range of sources and may not be perfectly comparable; many countries include glasshouse, greenhouse/PE tunnel & low tunnel; range of estimates for China (up to 2,760,000ha); Source: Cuesta Roble Consulting; "Greenhouse production systems in Mediterranean area" Leonardi/De Pascale May 2010; "Greenhouse Technology Globally: The future of food"; Coriolis analysis

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### 3. ADDING VALUE

*The third potential driver is to add more value to existing output*



Improving products

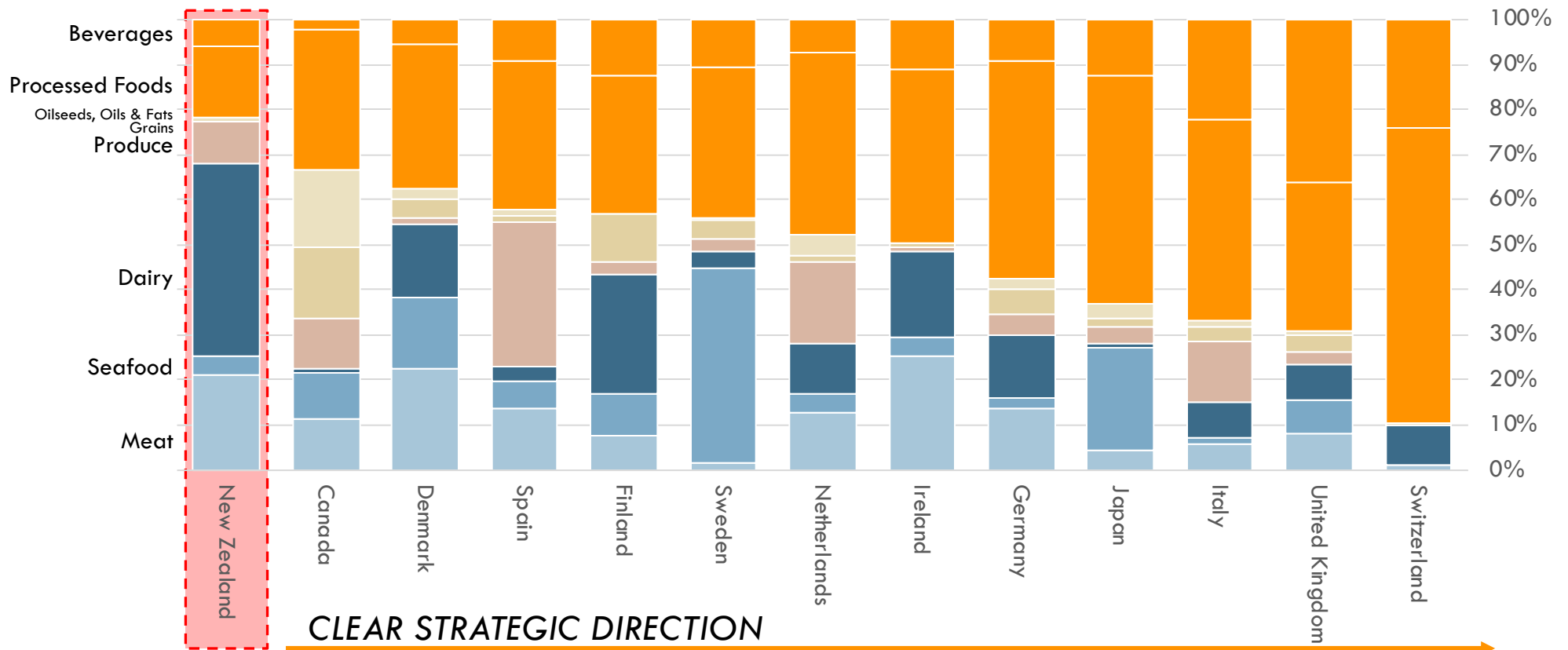
Improve positioning

Transforming product

# New Zealand's food & beverage exports are currently still overweighted to low value-added, unprocessed ingredients

## AGRIFOOD EXPORTS VALUE SHARE BY SEGMENT: NZ VS OTHER RICH COUNTRIES

% of value; 2017



# New Zealand predominantly sells ingredients to others; as a result, it is currently missing out on food manufacturing jobs

FIGURE 1: FLOW OF NEW ZEALAND MILK POWDER FROM THE FARMER TO CONSUMER  
Simplified model



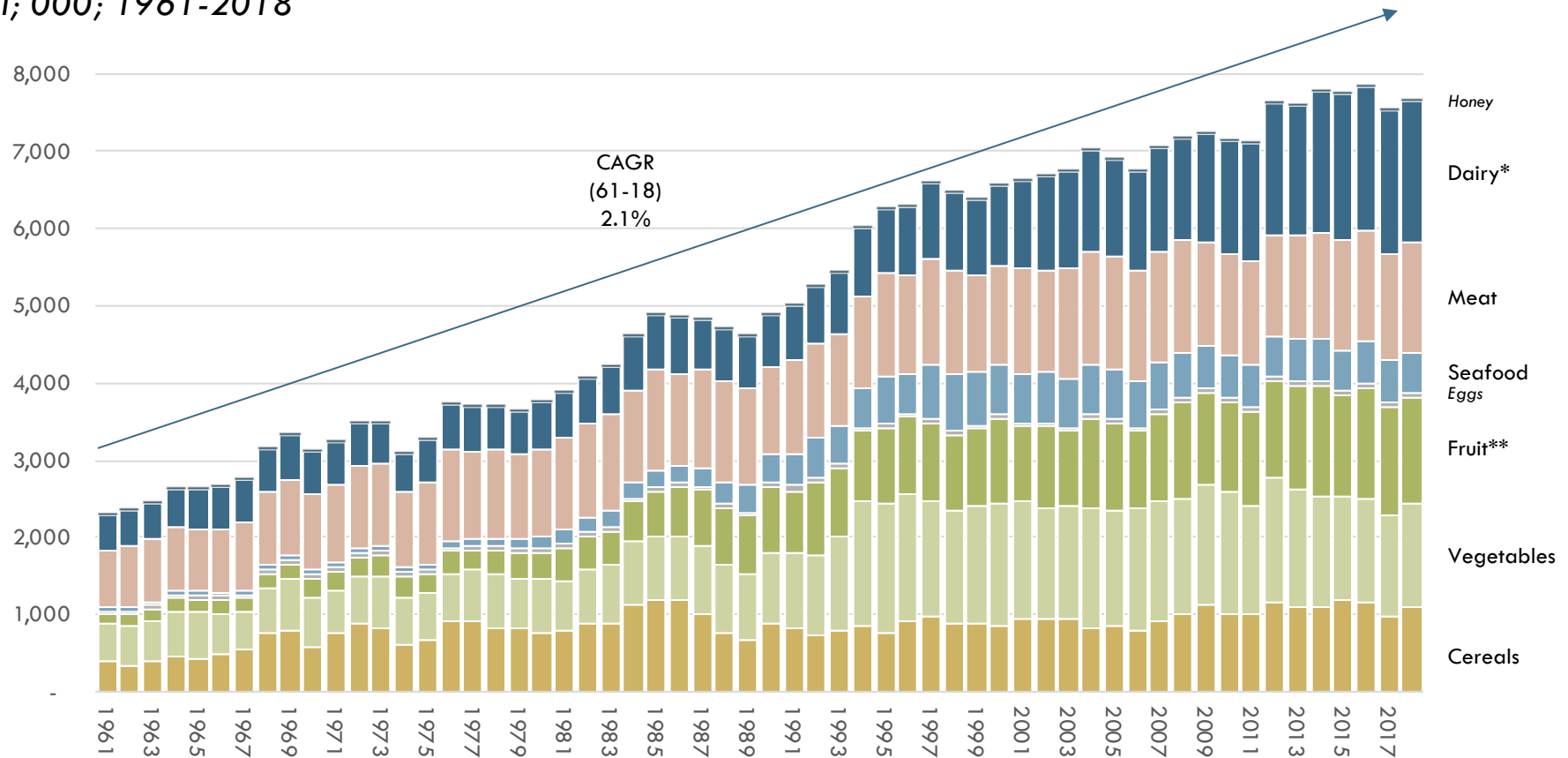
# The New Zealand food industry has a clear strategic direction towards greater product complexity



Source: The Investor's Guide to the New Zealand Processed Foods Industry 2017; Photo credit: various firms or fair use; low resolution; complete product/brand for illustrative purposes

# New Zealand has large and growing volumes of raw materials suitable for making more complex, consumer-ready products

TOTAL NEW ZEALAND FOOD PRODUCTION VOLUME AT FARM GATE<sup>1</sup>  
T; 000; 1961-2018



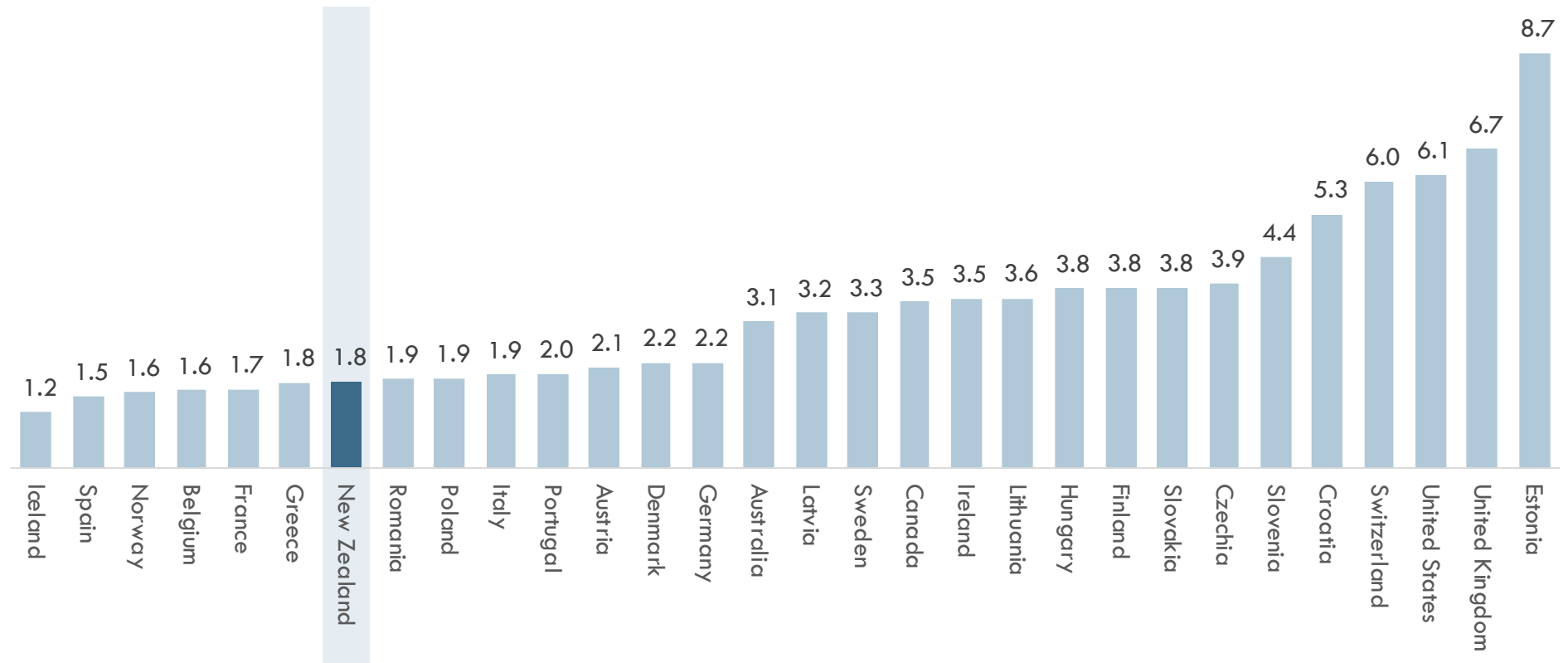
1. Dockside for seafood production; \*Milk is milk solids; meat is dressed but bone-in; seafood is green weight as reported; \*\*Fruit includes wine grapes; honey line is thickened to make it visible;  
Source: United Nations FAOStat & FishStat; MAF/MPI; Coriolis analysis



# Peers suggest New Zealand can create more processed foods jobs from its abundant raw materials

## PROCESSED FOODS JOBS PER 1,000 TONNE RAW MATERIALS\*

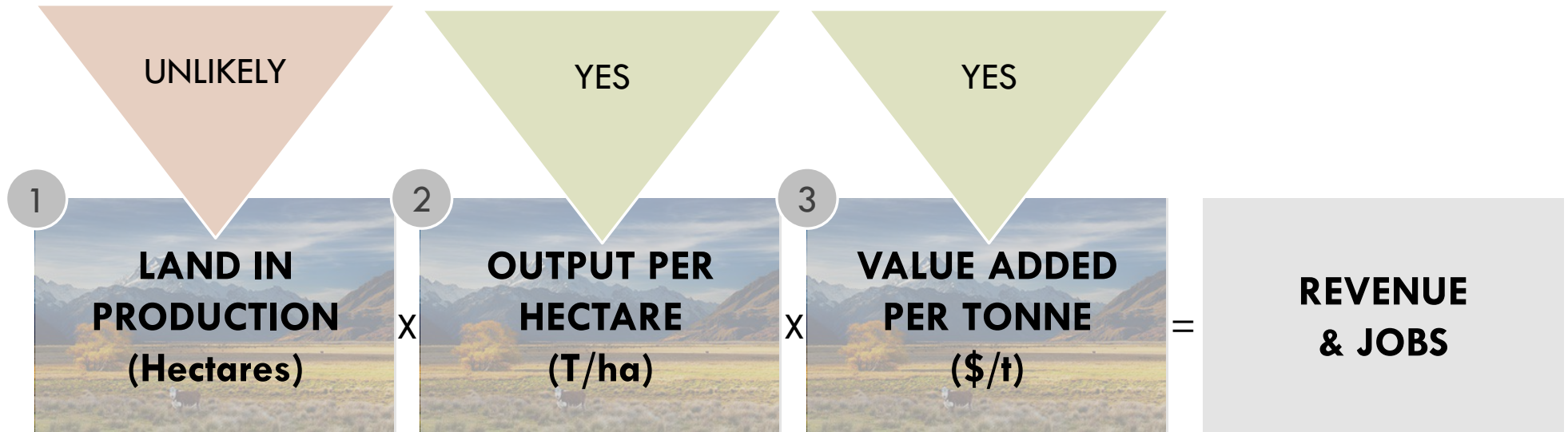
Headcount/1,000t; 2018 or as available



\*Non-grain based; Source: UN FAO AgStat; UN FAO FishStat; Eurostat; Statistics Canada; US DOL; USDA NASS; Statistics NZ; Australian Bureau of Statistics; Coriolis classification and analysis

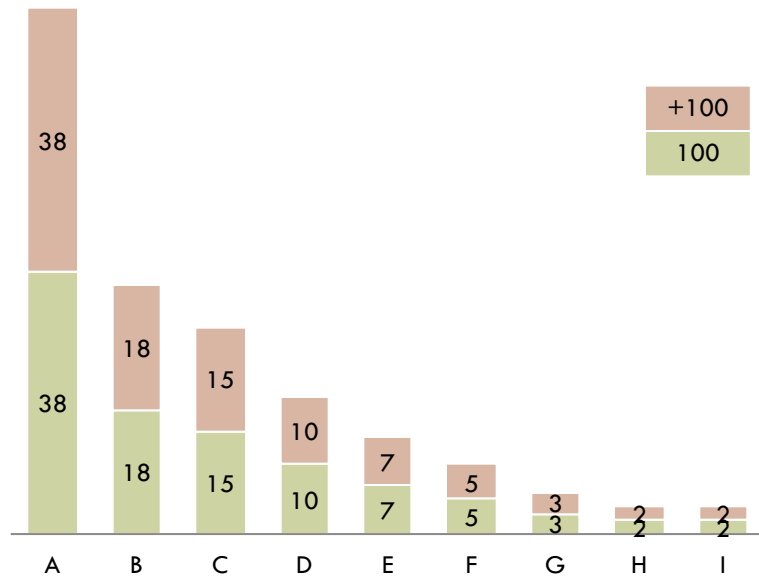
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*Going forward, growth will come from creating more output from less land and selling it as complex products at a higher prices*



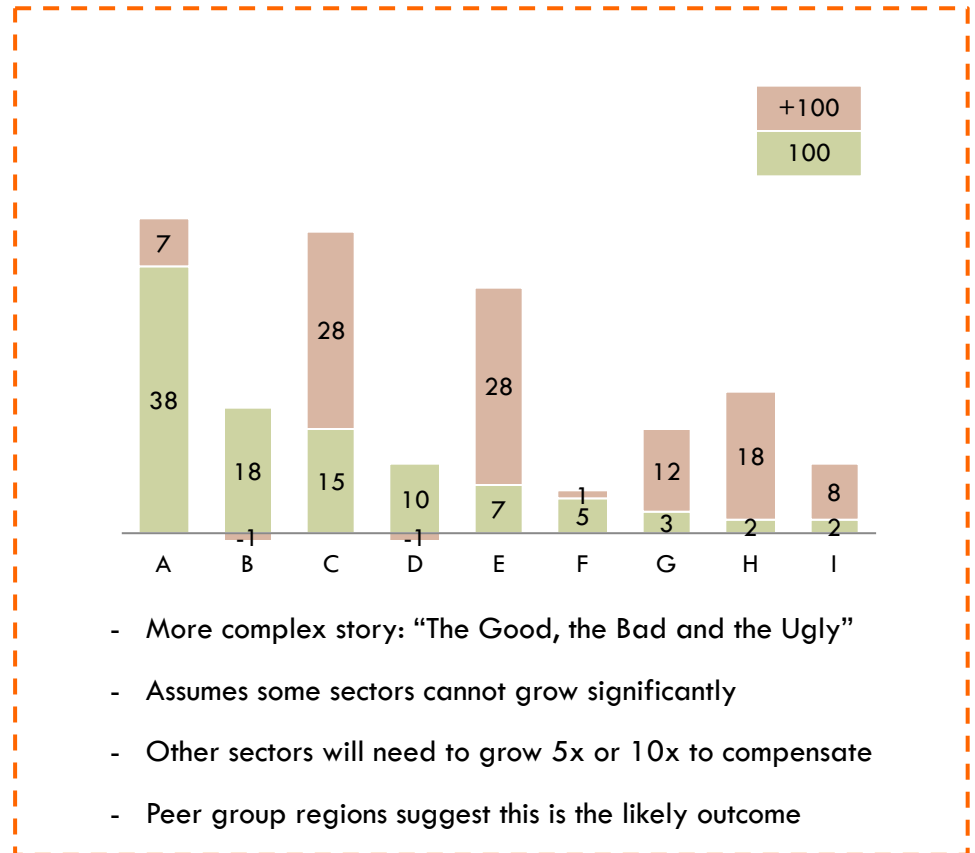
*In practice, growth will require some sectors to grow much larger, as other sectors have growth constraints*

### MODEL 1: EVERYTHING DOUBLES



- Simple story: “Rising tide lifts all ships”
- Assumes all sectors can double in the timeframe
- Often how it is “spun” politically
- Unlikely in reality

### MODEL 2: SOME GROW/OTHER NO GROWTH

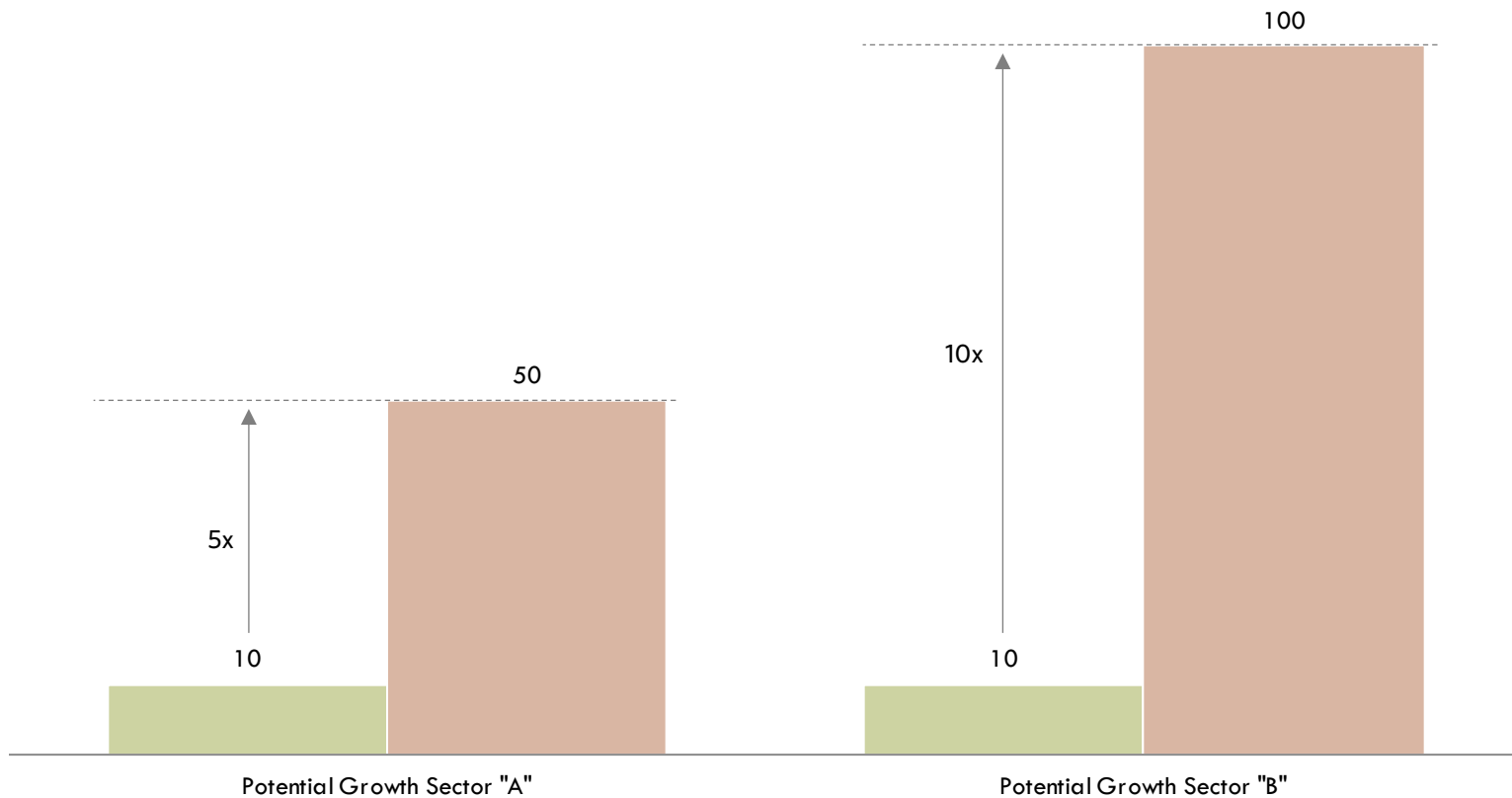


- More complex story: “The Good, the Bad and the Ugly”
- Assumes some sectors cannot grow significantly
- Other sectors will need to grow 5x or 10x to compensate
- Peer group regions suggest this is the likely outcome

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*Therefore there is a need to focus efforts in sectors with the potential to grow five or ten times larger*

SIMPLE GROWTH MODEL SHOWING 5X OR 10X GROWTH



# Numerous product categories have been identified that can contribute to this growth

## IDENTIFIED PRODUCT CATEGORIES THAT CAN CONTRIBUTE TO GROWTH

Model; 2019

DAIRY	RED MEAT	POULTRY	SEAFOOD	F&V
Advanced/Medical Infant Formula	Meat-Based Snacks	Further Domestic Consumption	Atlantic Salmon	Under Cover/Glasshouse
Dairy-Based Nutritionals		Target Key Export Markets		Region Suitable Aquaculture
Non-Cow Dairy	Branded, Packaged Consumer Case Ready		Develop Value Added Products	
Specialty Cheese		Consumer-Ready Convenience Meals	Alternative Poultry Species	Apples
				Kiwifruit
				Avocados
				Emerging Fruit
ARABLE/GRAIN	OTHER FOODS	PROCESSED FOODS	WINE	OTHER BEVERAGES
High Dairy Baked Products	Honey	Nutraceuticals	Sparkling Wine	Alcoholic Spirits
Oat 'Milk'		Eggs	Pet Food	'Cognac'
Seeds	Hemp (F&B usage)		Confectionery/Snacking	Non-Marlborough Reds
		New & Innovative Foods	Premium Non-Alcoholic	

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# Realising this growth opportunity requires three specific sets of potential investors

## EXISTING LARGE FIRMS AT SCALE

### REINVESTMENT

- Remove barriers to investment
- Ensure available capital is reinvested in New Zealand (not elsewhere)
- Sell New Zealand; make the case for investment in F&B here

## NEW LARGE INVESTORS WITH SCALE AND SKILLS

### ATTRACTION

- Identify the right investors (rather than 'waiting for the phone to ring')
- Focus on firms able to add value to New Zealand volume
- Sell New Zealand; make the case for investment in F&B here

## NEW AND EMERGING FIRMS

### NURTURING

- Encourage both existing small firms and new start-ups
- Focus effort on scaling small and medium firms into large, globally competitive firms at scale (currently falling over here)



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