The Value of Phosphorus Fertiliser to the New Zealand Economy

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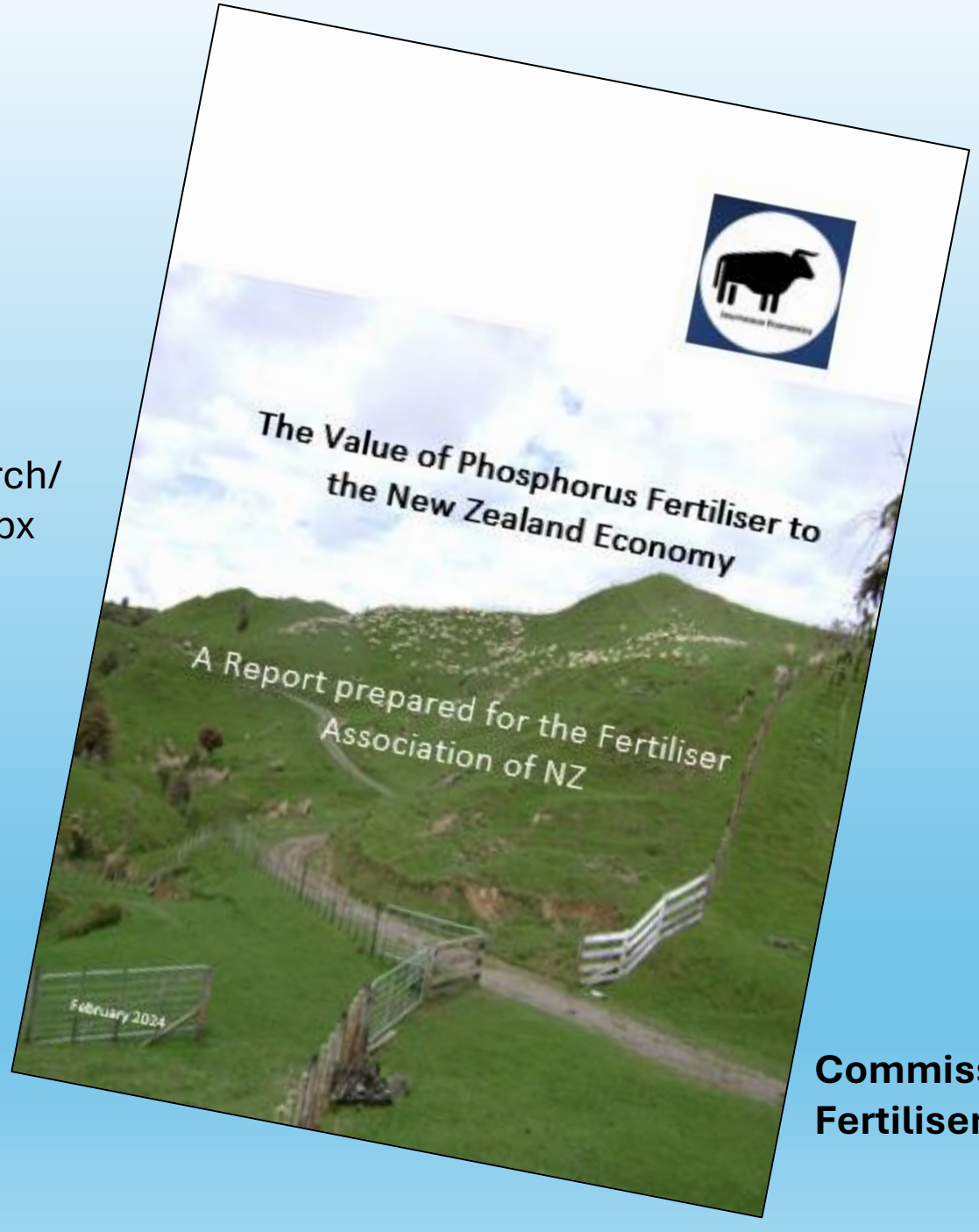
Journeaux Economics

There is a report:

https://www.fertiliser.org.nz/Site/research/projects/value-of-phosphorus-2024.aspx



Commissioned by the Fertiliser Association of NZ

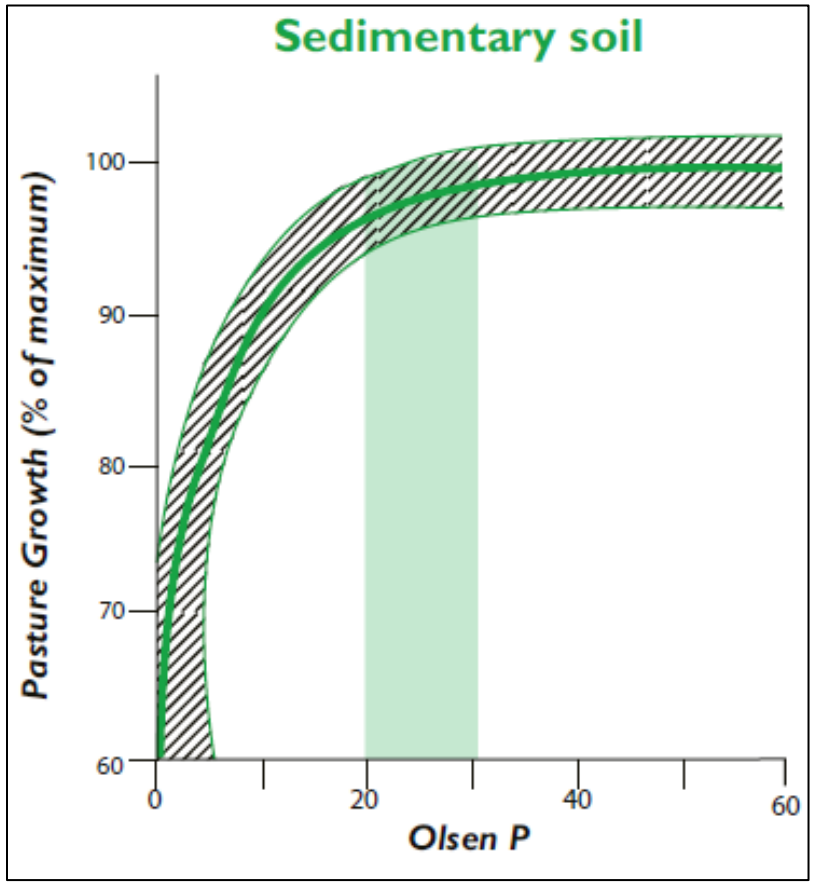
Objective

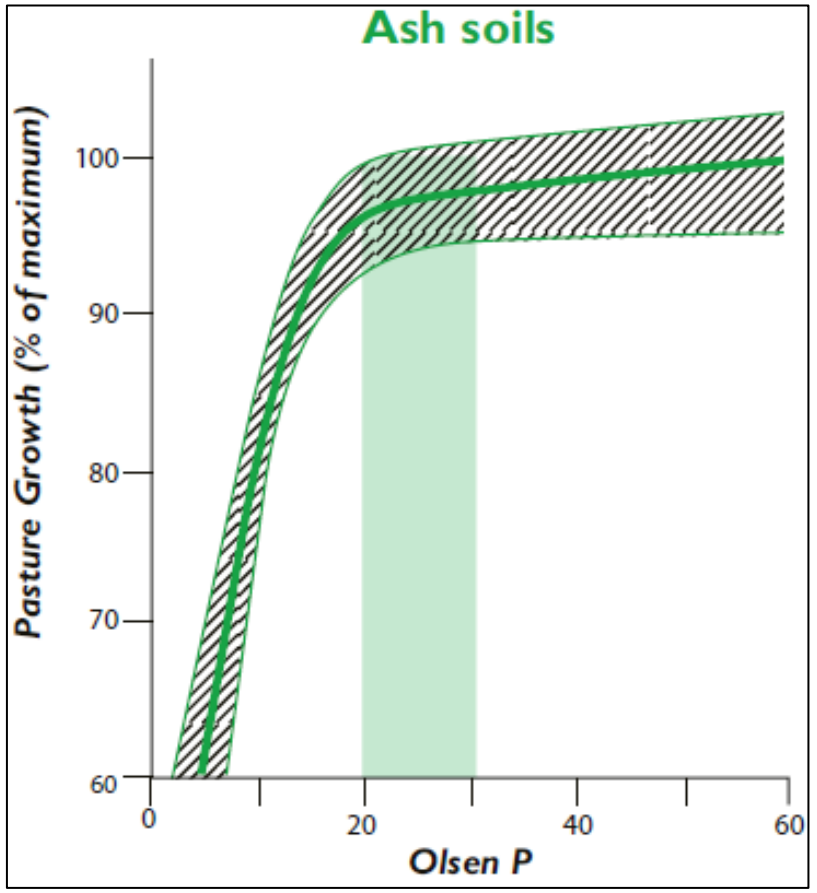
To determine the value of phosphorus fertiliser to the NZ economy, based on a with/without comparison - what is the impact if NZ did not have access to P fertilisers?

Methodology: - models set up to represent

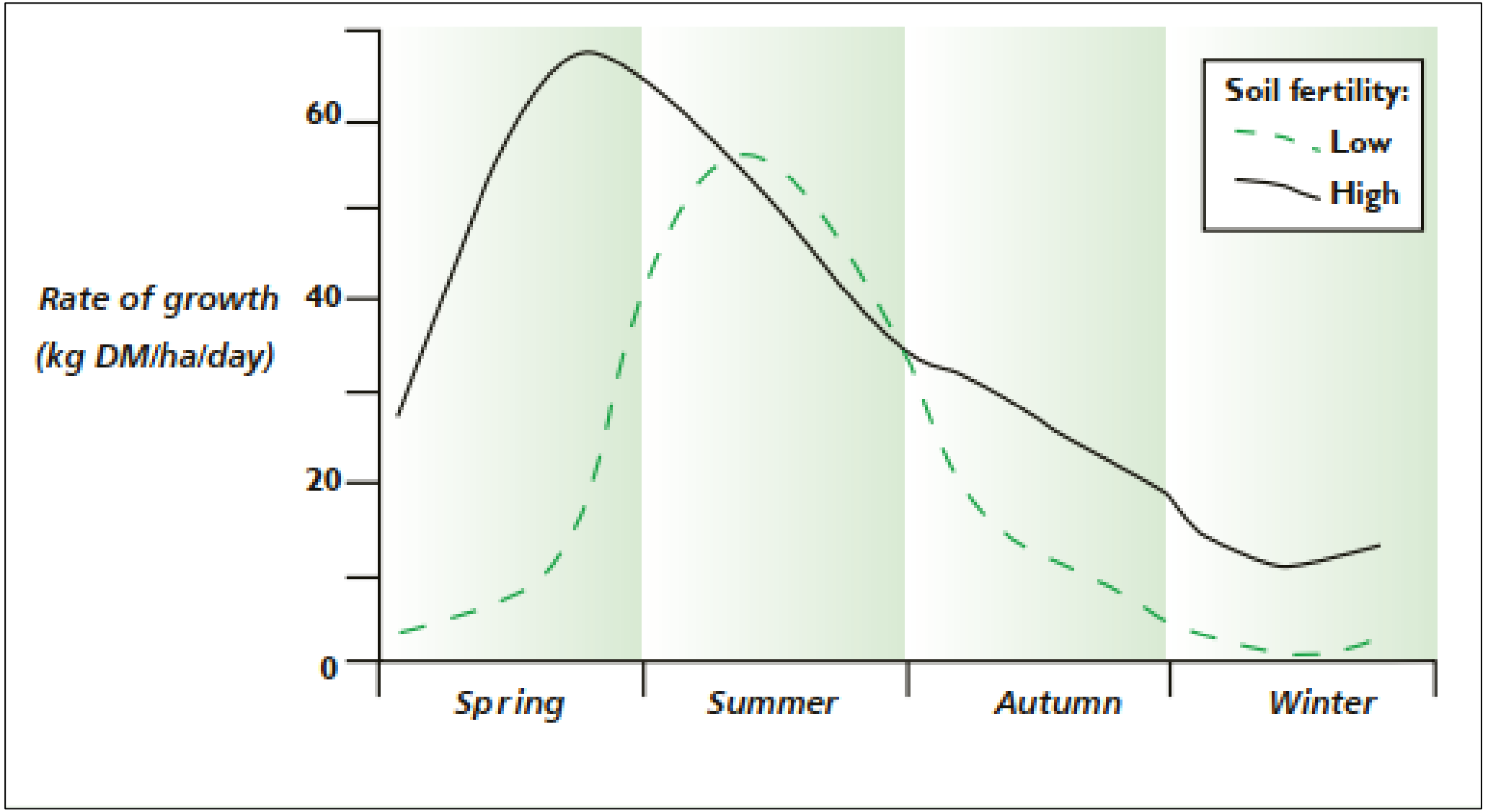
Dairy	Sheep & Beef	Horticulture	Arable/Vegetable
Northland	North Island Hill Country	Kiwifruit	Forage Brassica
Waikato/Bay of Plenty	North Island Intensive	Pipfruit	Cereal Grain
Taranaki	South Island Hill Country	Viticulture	Green Leafy Vegetables
Canterbury	South Island Intensive	Summerfruit	Root Vegetables
Southland			

Olsen P


Sedimentary soil
Pasture Growth (% of maximum)
100
90
80
70
60
0
20
40
60
Olsen P


Ash soils
Pasture Growth (% of maximum)
100
90
80
70
60
0
20
40
60
Olsen P

Pasture growth under high and low fertility levels



Results – Pastoral Agriculture

	Reduction in Production	Reduction in Farmgate EBITDA Per farm	National Impact ($ billion)
Dairy	63%	$463,000 (92%)	$5.00
Sheep & Beef	46%	$99,183 (32%)	$0.90
Total			$5.90

All the individual farm models were uneconomic – so would get restructured into larger more extensive farms

Results – Pastoral Agriculture#2

	Reduction in Nitrate Leaching	Reduction in Phosphorus Loss	Reduction in GHG Emissions
Dairy	56%	36%	59%
Sheep & Beef	42%	26%	44%

Results - Horticulture

	Pipfruit	Kiwifruit	Viticulture	Summerfruit	Other Hort
Production reduction	25%	25%	5%	15%	10%
Reduction in GM ($/ha)	$13,927	$24,807	$1,786	$9,753	$8,774
Extrapolated to a national level	$155,800,000	$359,700,000	$74,700,000	$23,500,000	$92,300,000

Total reduction in Orchard gate profit is $706 million

Results – Arable/Vegetable

Land use	Area of crop grown.	Net loss in EBITDA	Loss in EBITDA
	(ha)	($/ha)	($m)
Leafy Green Vegetables	27,466	14,112	388
Root Vegetables	15,459	6,659	103
Cereal Grain	180,000	2,705	487
Forage Brassica	239,875	1,909	458
Total			1,436

Results – Farmgate Summary

	$ Billion
Pastoral	5.9
Horticulture	0.7
Arable/Vegetable	1.4
Total	8.0

Macro Analysis

Used Input/output - Gross Output, Value Add (GDP), and Employment

- **Gross Output reduces by $44 billion (5.5% of NZ total)**
- **Value Add (GDP) reduces by $14.2 billion (6.3% NZ total)**
- **Employment reduces by 161,210 MECs (6.7% NZ total)**

Impact on exports:

(i) Farm-level extrapolation – reduction = $24.8 billion (54%)

(ii) I/O analysis – reduction = $25.8 billion

Time for Olsen P levels in soil to revert to “natural” level

Limited data available on pastoral situation, basically none for horticulture and arable.

Estimate for decline of current Olsen P levels down to ~5 are:

- **Pastoral: 20-30 years**
- **Arable: 7-8 years**
- **Horticulture: 7-8 years**

Alternatives for P Fertiliser

Potentially:

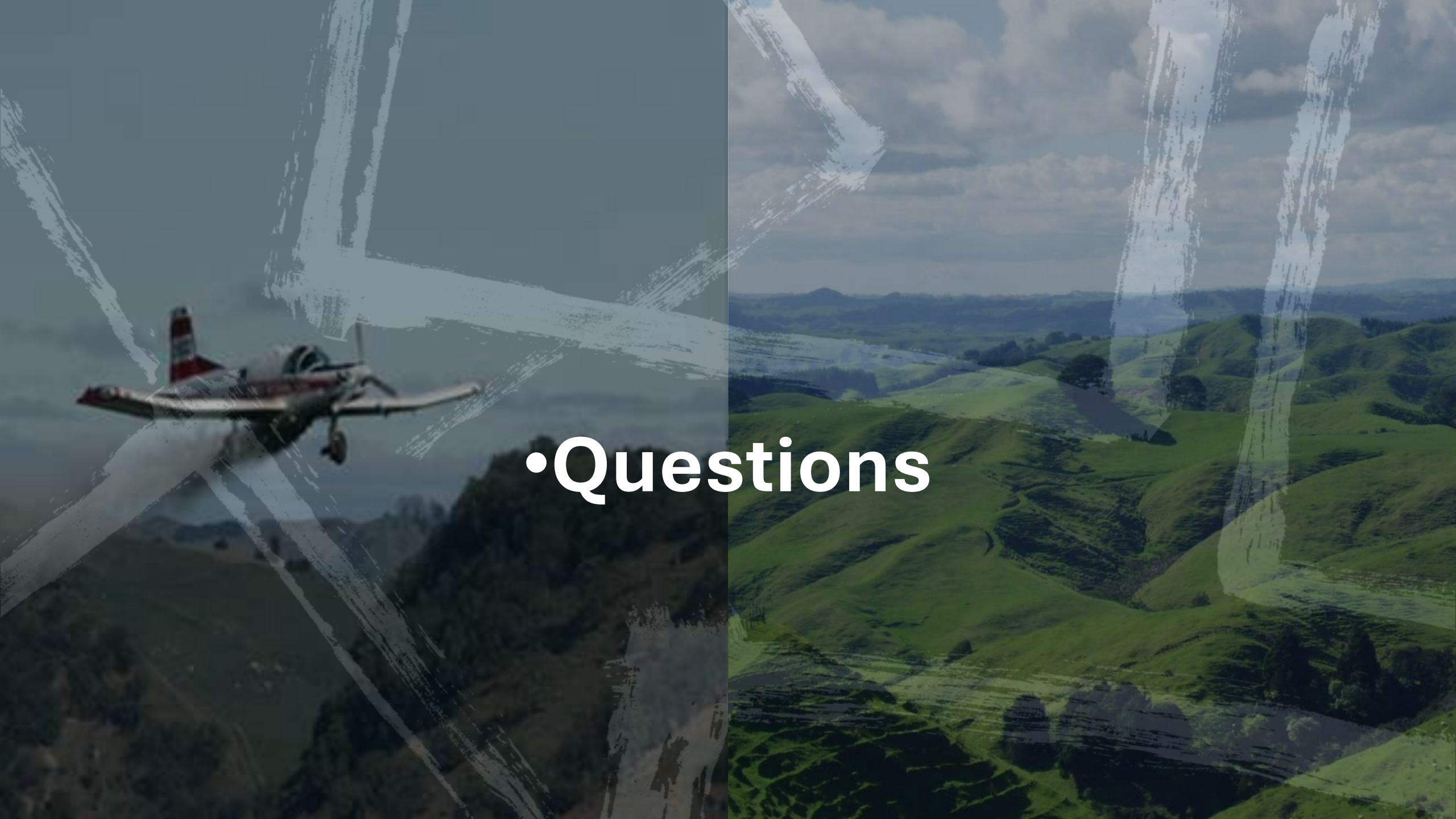
- **Animal manures – pig (170,000 tonnes), poultry (346,000 tonnes)**
- **Composts (amount n/a)**

kg of P supplied/ha	20	30	40	50
Superphosphate (kg/ha)	222	333	444	556
Pig Slurry (kg/ha)	10,000	15,000	20,000	25,000
Poultry Litter (kg/ha)	1,111	1,667	2,222	2,778
Commercial Compost (Fresh) (kg/ha)	6,667	10,000	13,333	16,667

Alternatives - Cost

kg of P supplied/ha	20	30	40	50
Superphosphate	$100	$150	$200	$250
Pig Slurry	$635	$953	$1,270	$1,588
Poultry Litter (South Island)	$88	$132	$176	$219
Poultry Litter (North Island)	$167	$250	$333	$417
Commercial Compost	$567	$850	$1,133	$1,417

Certainly potential to use alternatives in horticulture & arable – which is already happening


•Questions