

Reducing Agricultural Emissions:

Does NZ need a change of stomach or a change of heart?



Why Exempt Agriculture?

NZs proportion of agricultural emissions are much higher than other developed countries (46%) (v)

The high proportion of ag emissions makes it hard to reduce overall gross emissions due to methane being a large component (?)

NZ has an obligation to feed the world (X)

NZ is one of the most agriculturally productive countries, - hence principle of least cost requires it to produce proportionally more than counterparts. (X)



NZ CONFUSES P and P and P

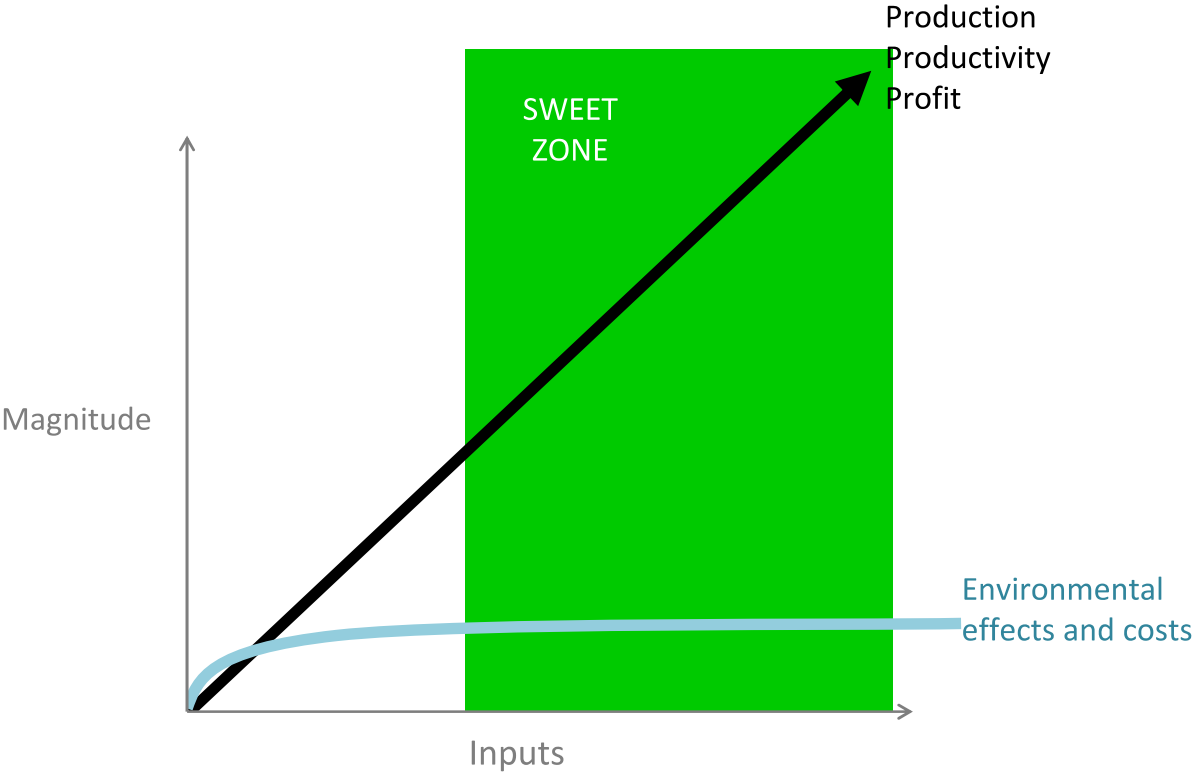
PRODUCTION = getting more OUTPUT = irrigation schemes to increase dairy output + 2 Million Tonnes of PKE imports

PRODUCTIVITY = more OUTPUT from SAME or FEWER inputs.

PROFIT = making money after all business costs accounted for & paying tax

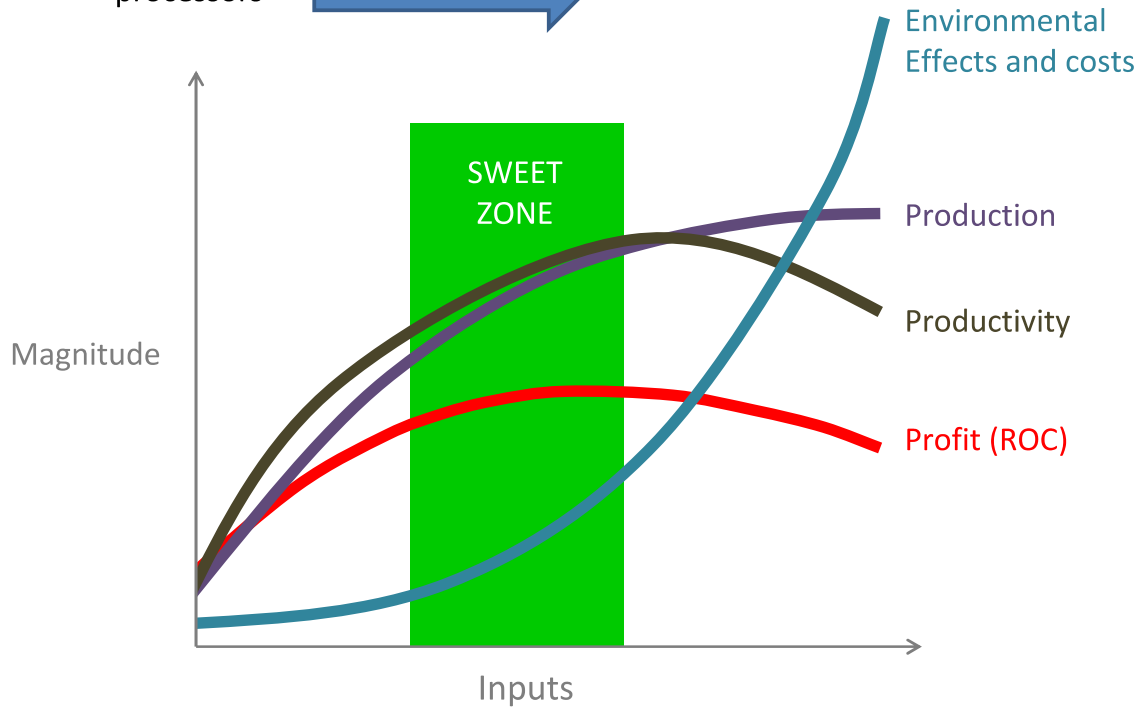


The way central and local government see it



Biological systems have natural limits

Farmers pushed to right by processors



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We haven't counted the cost of growth

Per 25,000 ha of Pine To Pasture

Upper Waikato Conversions

Diffuse Losses to receiving environments	
Carbon to air	8,100,000 kg
N from root zone	1,200,000 kg
P overland flow	1,600 kg
Pathogens	Population of Christchurch + Wellington in Broadlands
Sediment -	See below.....



Things aren't quite right

MOST INDEBTED agricultural land – **highest debt** in world – 80 +% of farmers will have to borrow to stay afloat 2015-17. Debt rising fastest now since 2009

NZ COST OF PRODUCTION not counted externalities

NO LONGER LOW COST down under.. E.g: Land price double SE Aus (pasture \$4400/tDM eaten) vs (\$2400/TDM Vic + Tasmania)

RESOURCE LIMITS TIGHTENING established farmers make room for more growth (ie farms must drop 45% to allow for CPW in Selwyn)

PUBLIC HEALTH CONCERNS.

SOCIAL LICENSE TO OPERATE threatened.



Truth or Myth

“More milk output means more money”

“More cows means more milk and more money”

“More fertiliser nitrogen and grass means more money”

“Growth is limitless and demand is continuous”

“The environment will always adapt to absorb our legacies”

“Science and technology will give us breakthroughs to overcome limits”

“New Zealand’s Clean Green Image will never falter”



An Issue?

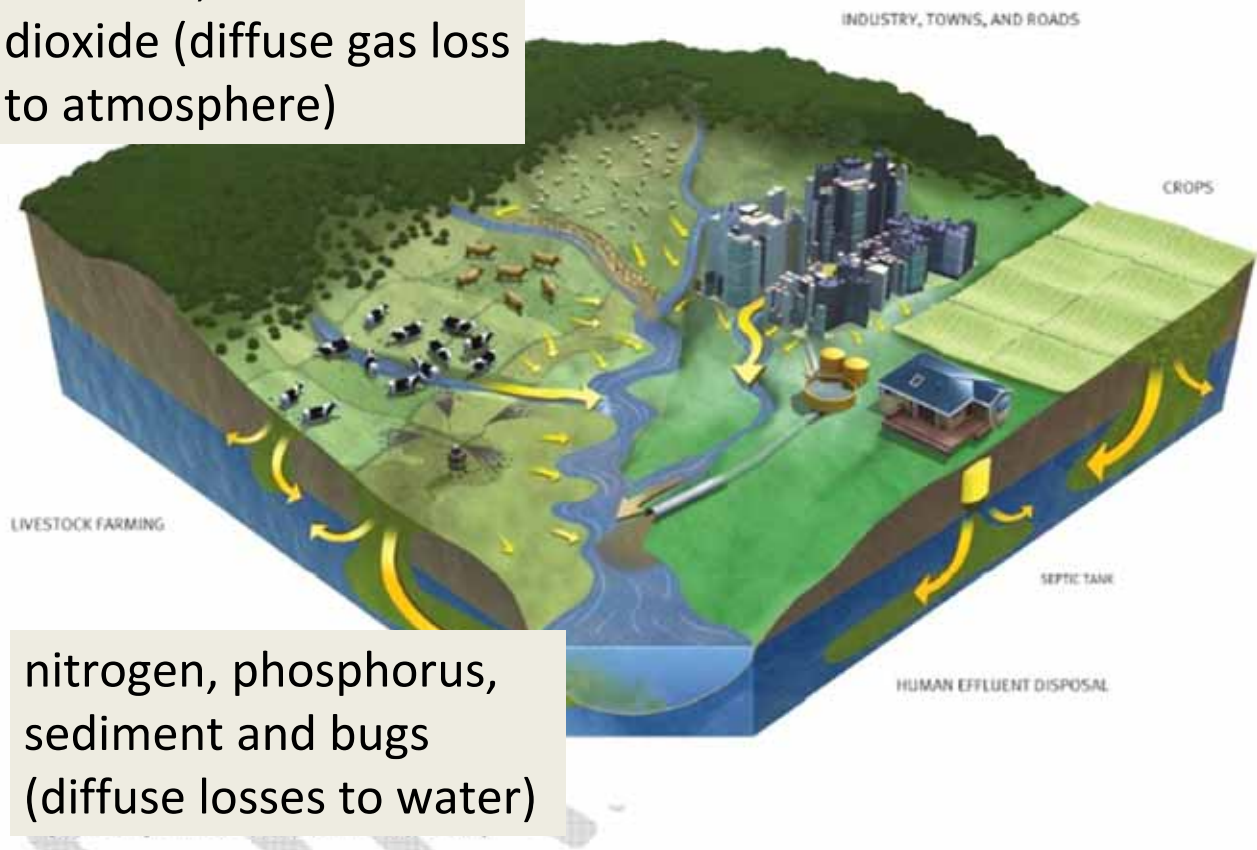
- Dairy (gut) Emissions have increased 122% in (1990-2014)
- Sheep - beef (gut) emissions decreased 34%.
- NZ has seen significant land use change last 20 years.



- 329% ↑ Nitrous Oxide from Synthetic fertilisers
- 43% ↑ from crop residue
- 27% ↑ from leaching/run off.

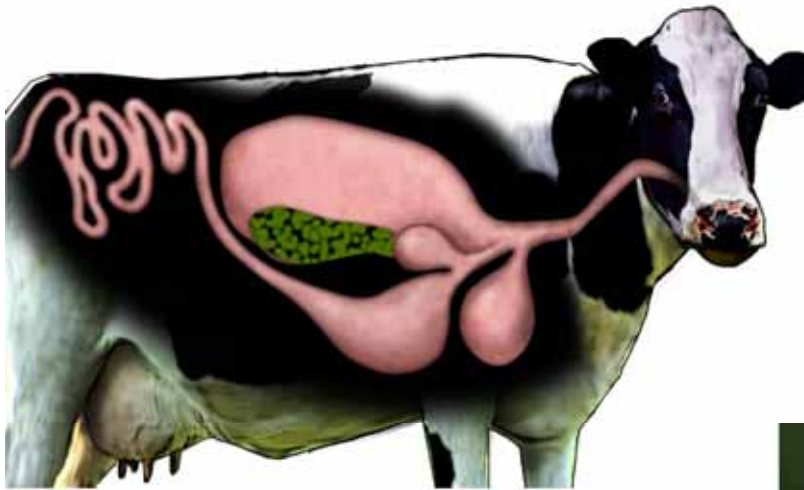
Nitrous oxide,
methane, carbon
dioxide (diffuse gas loss
to atmosphere)

Diffuse losses from Agriculture



nitrogen, phosphorus,
sediment and bugs
(diffuse losses to water)

Many stomachs (Ruminants) vs One (Monogastric).....



- Dairy cow = 128 kg methane/head/year
- Dairy Heifer= 55 kg methane/head/year
- Sheep = 11 kg/head/year

**Pig = 1.2 kg
methane/head/year**

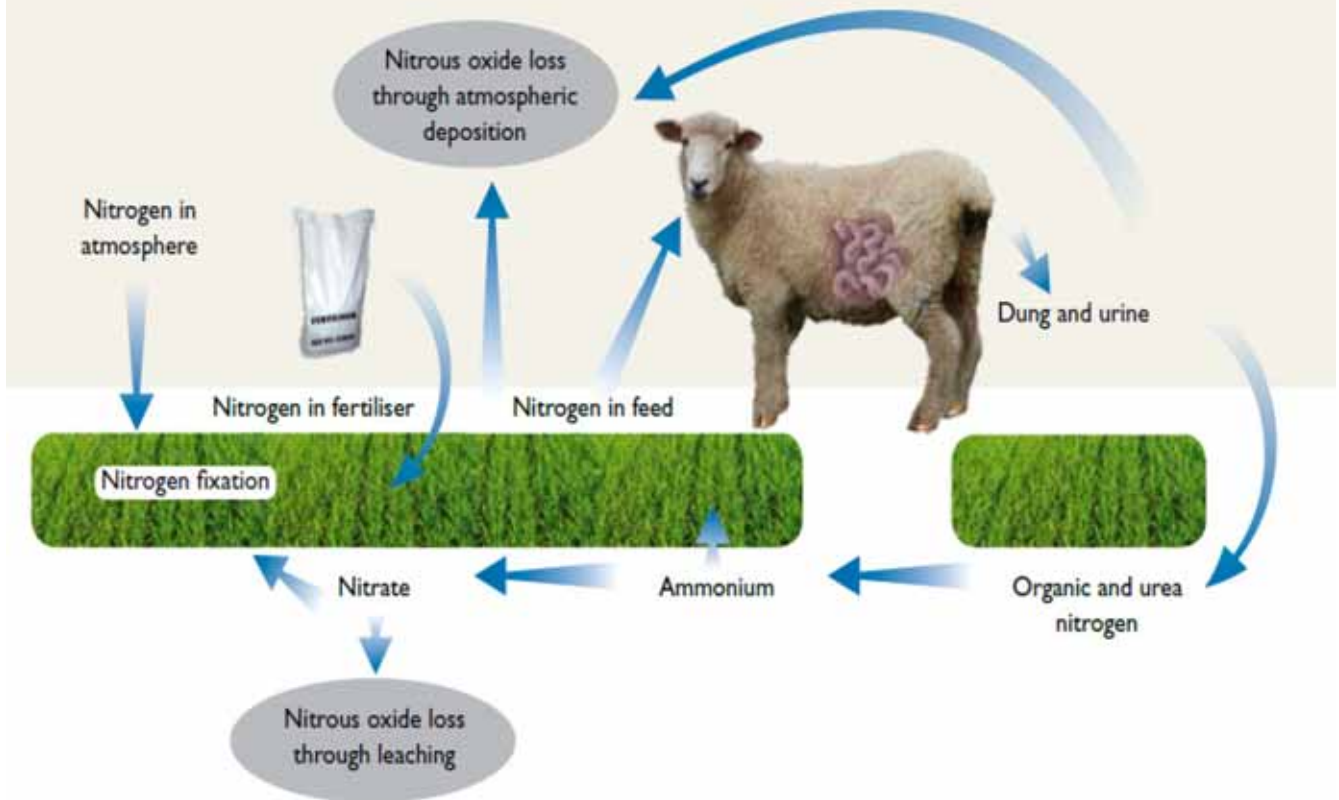


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Figure 2: Nitrous oxide emissions from livestock manure and fertiliser usage



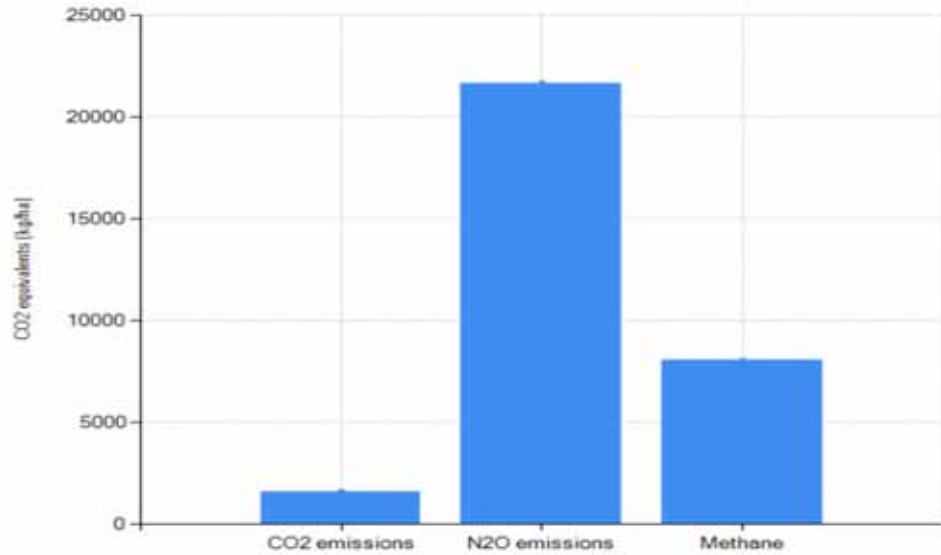
Source: Hoofprint: Alliance: Sept 2014

Canterbury Dairy Farm GHG

Is Nitrous Oxide easier to manage?

This report has been developed using IPCC global warming potentials.

[Download this report](#)



Change diet(manage methane) or change farm system(manage nitrous oxide)?

? Brassicas (turnips, swedes) – 2-3% ↓ GHG

? Methane Inhibitors – 20-30% ↓ GHG - unproven -Fed daily -cost, will it profit?

✓ Compounds: Naturally occurring Feed additives: Oils/Enzymes

✓ Special Plants/Forages: Tannins 15-20% ↓ GHG

✓ Precision Nutrition – improve efficiency and wellbeing

✓ Rethinking overall diet/system – ie rethink our monoculture of pasture and fertiliser.

X Antibiotics (Ionophores)



MANAGEMENT	RISK OF DIFFUSE LOSS				
	N	P	Sediment	Pathogen s	GHG
REDUCE Stock	↓	↓	↓	↓	↓
REDUCE supply of protein (N) in diet	↓				↓
REDUCE Fertiliser	↓	↓			↓
RESTORE and REPLANT vulnerable soils	↓	↓	↓	↓	↓
REDUCE irrigation for PASTURE on leaky soils	↓	↓		↓	↓
REDUCE Cropping on	↓	↓	↓	↓	↓

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win- win for rivers and profit



The 2025 NZ Dairy Farm

- **25- 30% REDUCTION** in total GHG:
- **40% REDUCTION** in Nitrous Oxide emissions profile.
- **60 -100% more PROFIT** (high efficiency legitimate story, milk + meat highly valued)
- **DIET IS VARIED**, forages and shelter synergy supplying feed, health benefits and welfare
- **More calves reared** for alternative revenue streams.
- **“Fruit salad”** of forages, herbs, deliver: precision wellbeing
- **CLOSED LOOP** nutrient cycling: pathogens reduced.
- **FEWER STOCK, OPTIMISED**, highly productive, well fed, 25% fewer cows and replacements ..25% less support land required.....

Time for a change of heart?

