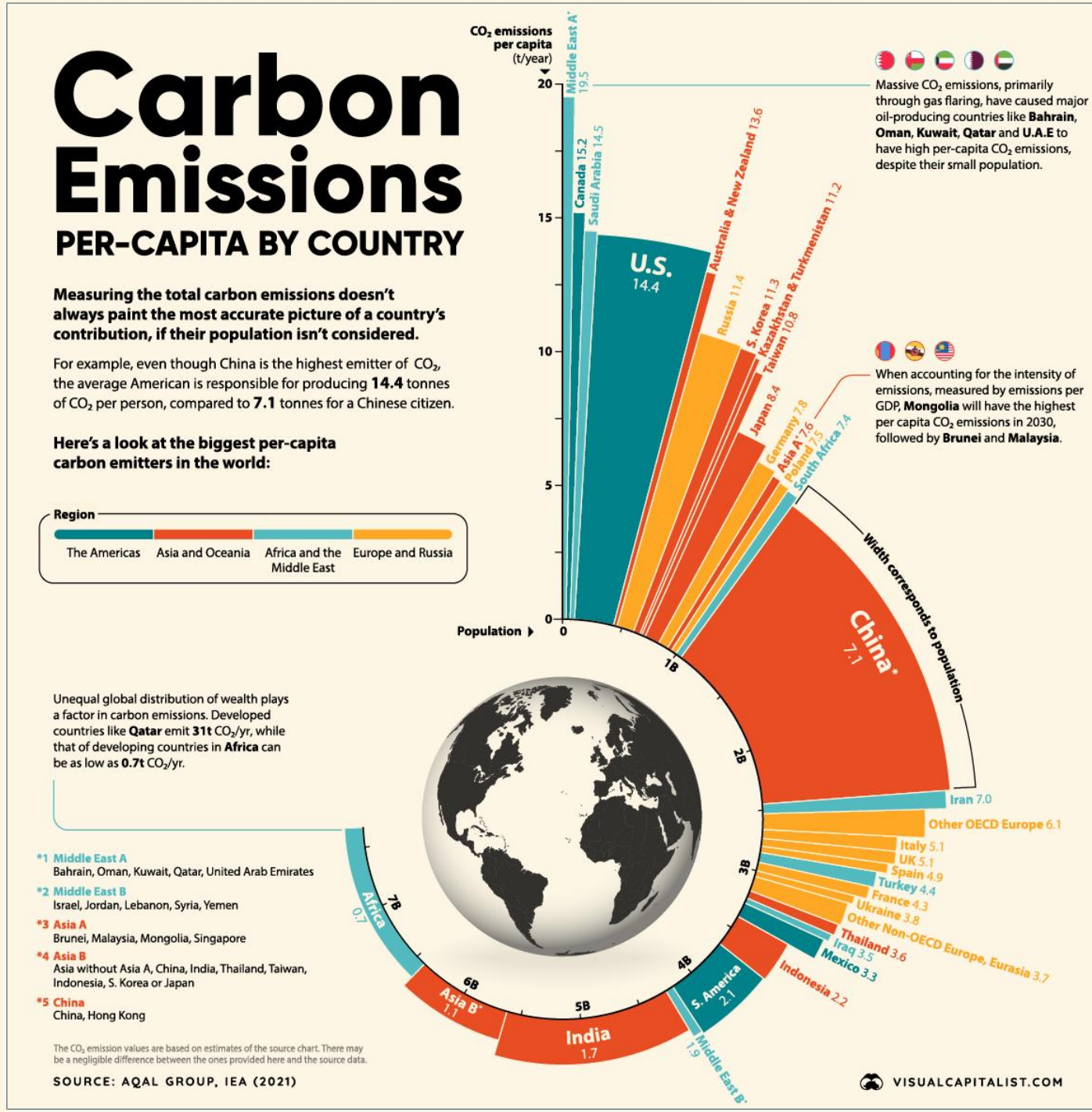
AGRICULTURAL EMISSIONS OF NEW ZEALAND

By: Andrew Gilbert

for Engineers and Scientists (and Susan)

WHY CARE ABOUT EMISSIONS?

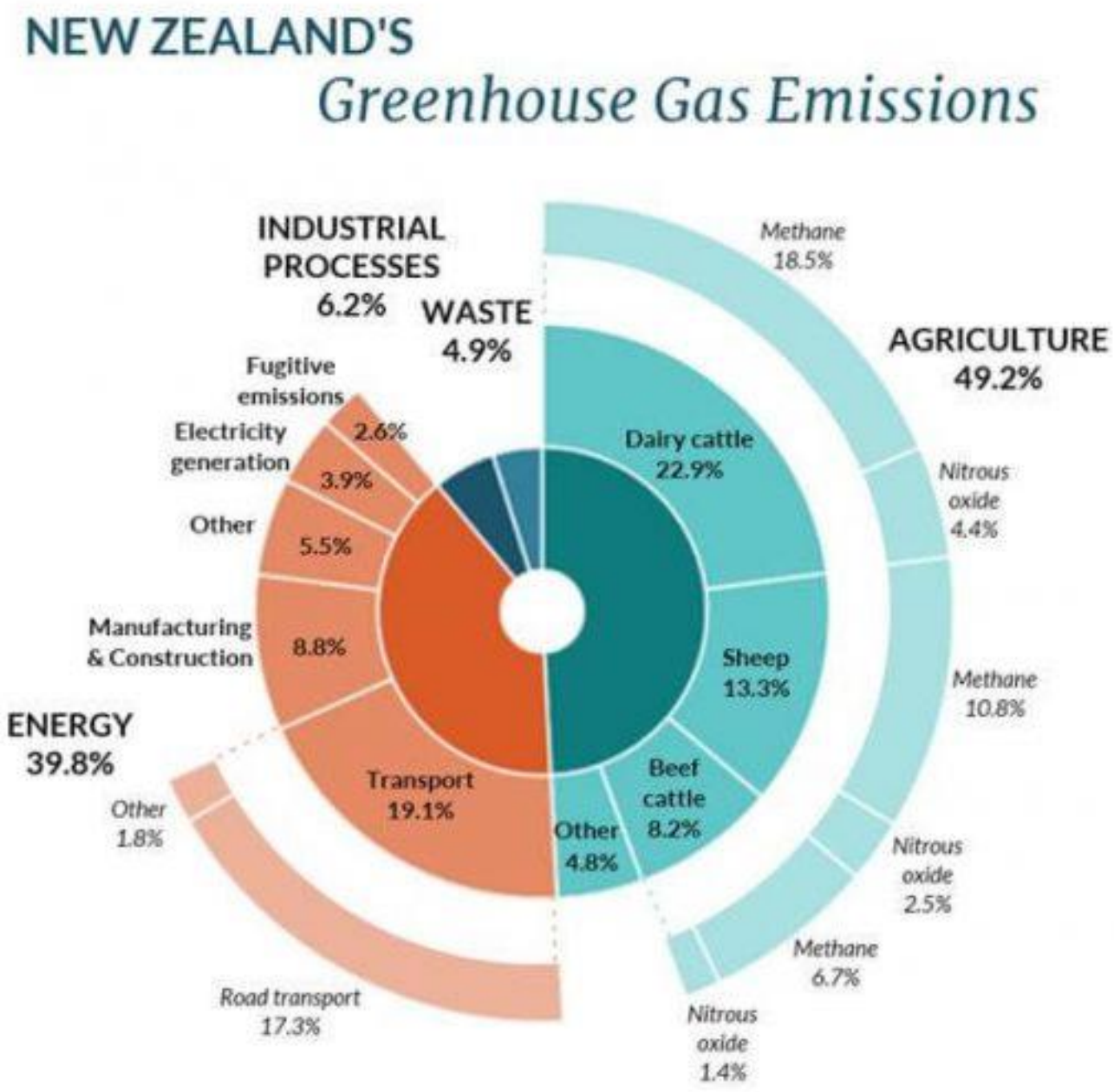
- Isn't NZ too small to make an impact
  - (yes and no)



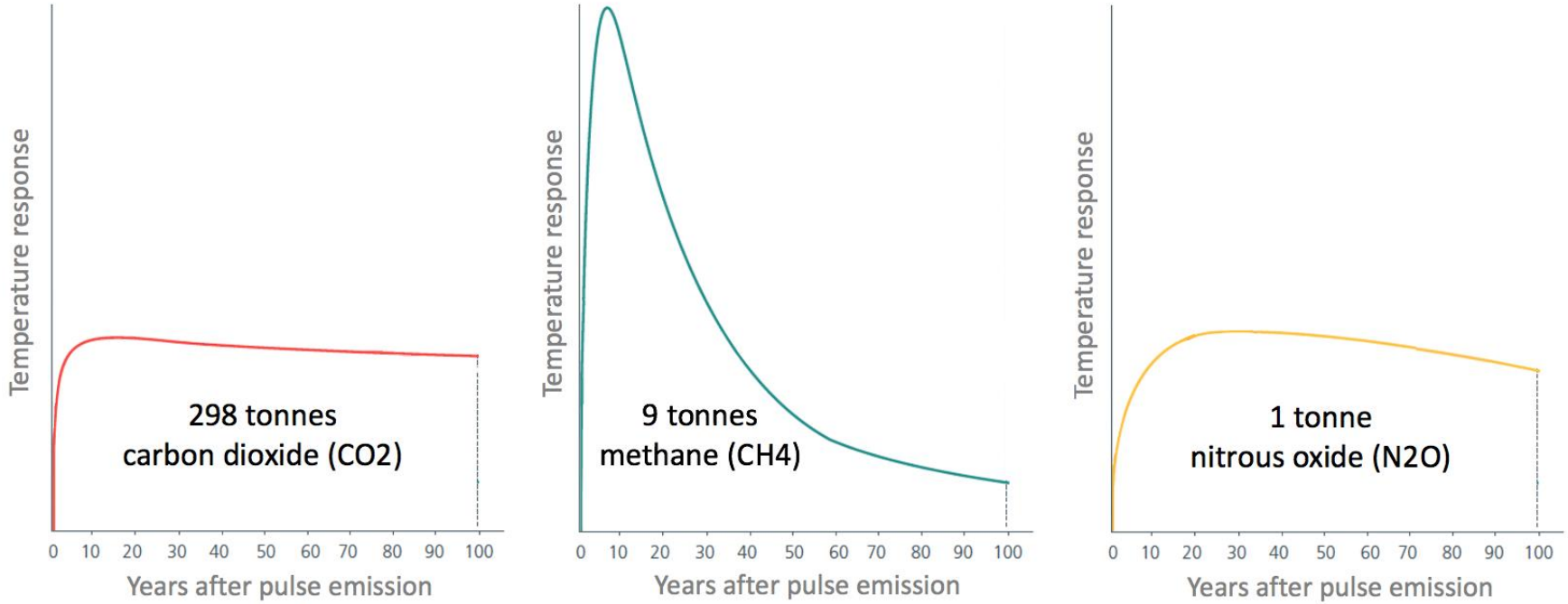
New Zealand's Total Emissions

What is the problem?

Almost half of NZ's emissions come from agriculture either through belching or fertilizer. These emissions are troublesome for achieving net zero carbon as well as other sustainability goals



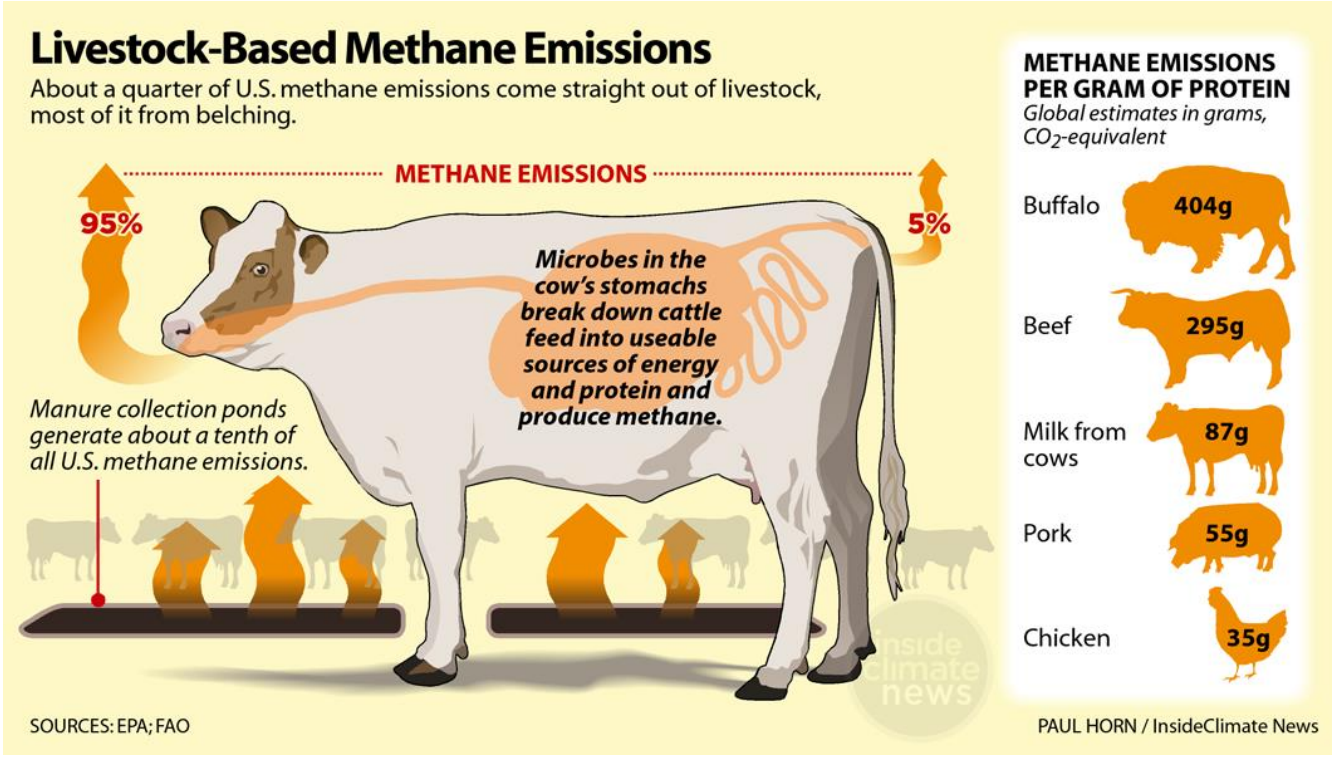
What's *really* so bad ?



Warming Potentials of CO2, methane and nitrous oxide

Where do these gasses come from within the farm?

- Cows, sheep, goats, moose, camels, deer, giraffes, and buffalo are ruminant animals (meaning they have four stomachs)
  - Methane is belched after the microbes in the stomachs break down their food
- Nitrogen comes from animal dung, urine and fertilizer
  - Fertilizer nitrogen has increased sharply in the last few years

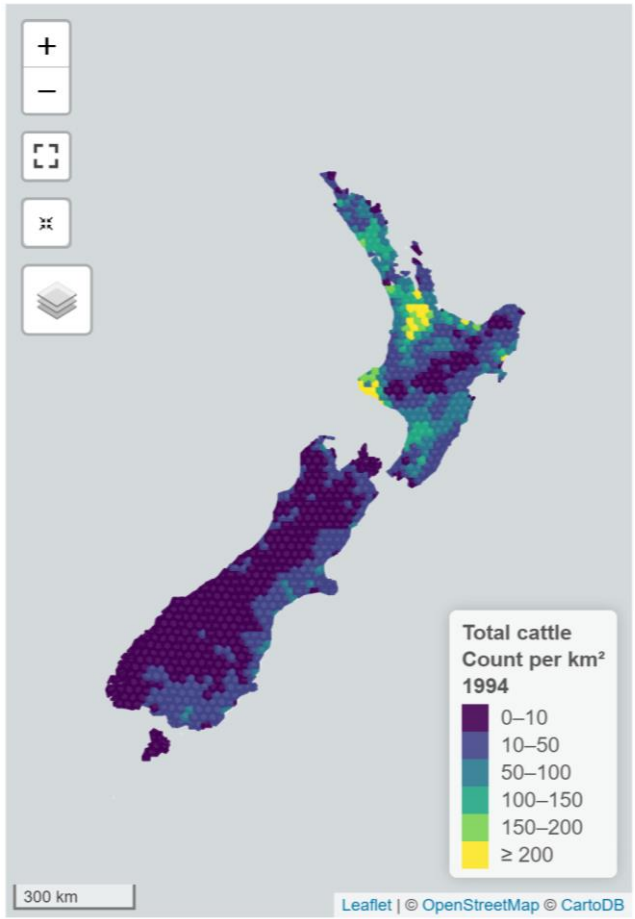


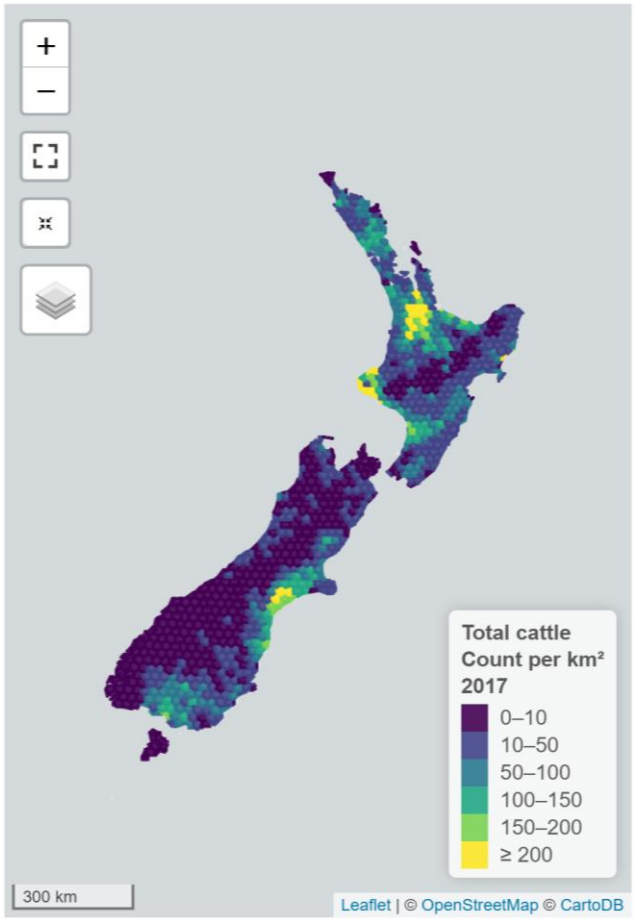
Increases in Livestock

Ranking Of Countries With The Most Cattle Per Capita

	World	1,000,967,000	7,713,468,100	0.13
Rank	Country	Cattle	Population	Per Capita
1	Uruguay	11,946,000	3,461,734	3.45
2	New Zealand	10,063,000	4,783,063	2.10
3	Argentina	53,831,000	44,780,677	1.20
4	Brazil	252,700,000	211,049,527	1.20
5	Australia	23,217,000	25,203,198	0.92
6	Belarus	4,300,000	9,452,411	0.45
7	Canada	11,150,000	37,411,047	0.30
8	United States	93,595,000	329,064,917	0.28
9	India	305,500,000	1,366,417,754	0.22
10	European Union	85,545,000	447,700,000	0.19
11	Mexico	17,000,000	127,575,529	0.13
12	Russia	17,953,000	145,872,256	0.12
13	Egypt	7,850,000	100,388,073	0.08
14	South Korea	3,774,000	51,225,308	0.07
15	Ukraine	3,001,000	43,993,638	0.07
16	China	95,620,000	1,433,783,686	0.07
17	Japan	3,922,000	126,860,301	0.03

Source: FAS/USDA (head/people)





Cow density of NZ in 1994 and 2017

Increases in fertilizer

AIR PODS BREAK

Please check your surroundings and make sure that your air pods are accounted for

WHAT IS BEING DONE?

How is NZ dealing with their agricultural emissions?

New Zealand's One Billion Trees

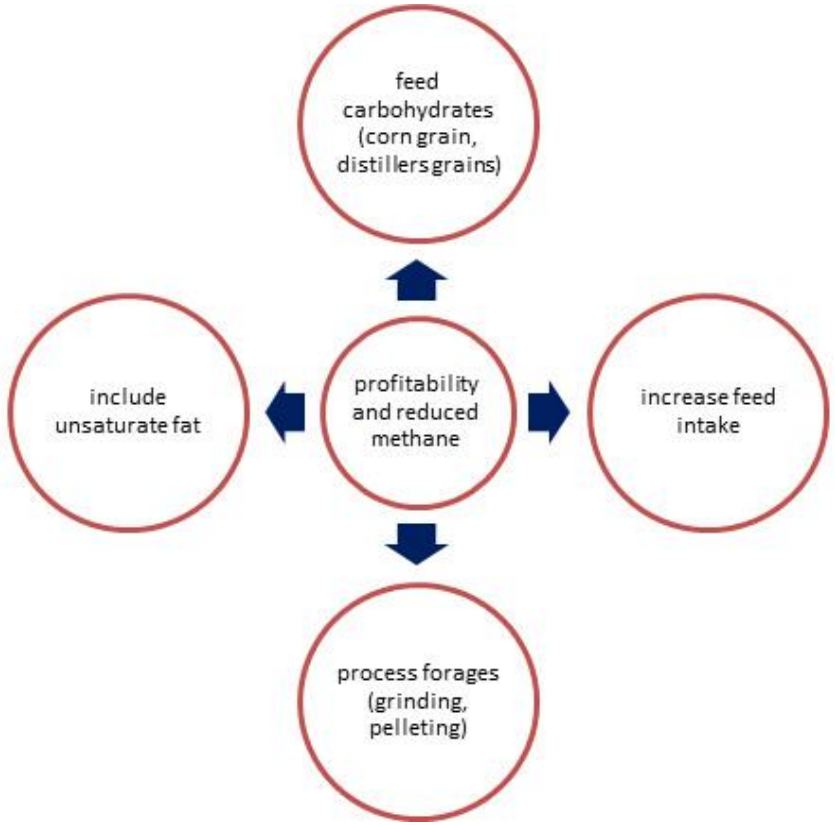
- Trees convert carbon dioxide to oxygen, allowing for something called emissions offsets
- Basically, more trees = less CO2
- This is great but it does not impact other greenhouse gasses

DOES NZ REALLY CARE ABOUT THIS ISSUE?

YES, it is in their emissions reduction plan and New Zealand plans to tax emissions as soon as 2035

Ways to reduce emissions

- Use less fertilizer
- Have less cows (probably not an option)
- Change food feedstocks to seaweed and corn
- Other methods are still being researched
  - Vaccines, experimental feeds, microbial balances and more
- More research is needed to properly address this issue



Source Dump

- https://www.livekindly.com/livestock-dairy-50-new-zealand-greenhouse-gases/
- https://www.mpi.govt.nz/funding-rural-support/environment-and-natural-resources/emissions-trading-scheme/agriculture-and-greenhouse-gases/
- https://www.theglobaleconomy.com/New-Zealand/fertilizer_use/
- https://www.usdairy.com/news-articles/farmers-reducing-methane-gas-from-cows?gclid=CjwKCAjw0N6hBhAUEiwAXab-TVA29Z4q60eyuiKQXFji6l1YgBPEB6SNSDyqlbH9OC7JwXNNKB2diRoC6dMQAvD_BwE