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Department of Zoology

NERC SCIENCE OF THE ENVIRONMENT

The steaks are high: what approaches work to increase vegetarian sales and reduce meat consumption?

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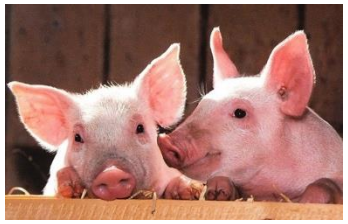
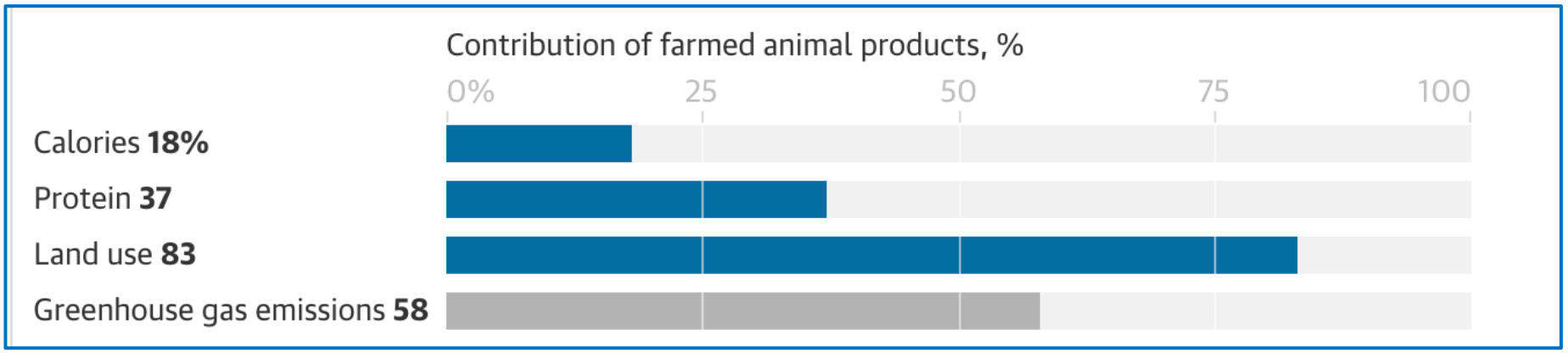
Global Food Security, 12th February 2021

Why is reducing meat and dairy consumption important?

- Livestock farming is a leading cause of habitat loss, climate change and biodiversity loss
  - Inefficient to feed eg soy to livestock to people.
  - Cows and sheep: release methane, very powerful greenhouse gas and use a large amount of land.





Poore and Nemecek (2018) *Science; Guardian* infographic; Machovina et al (2015) *Science of the Total Environment*

What does a global sustainable diet look like?

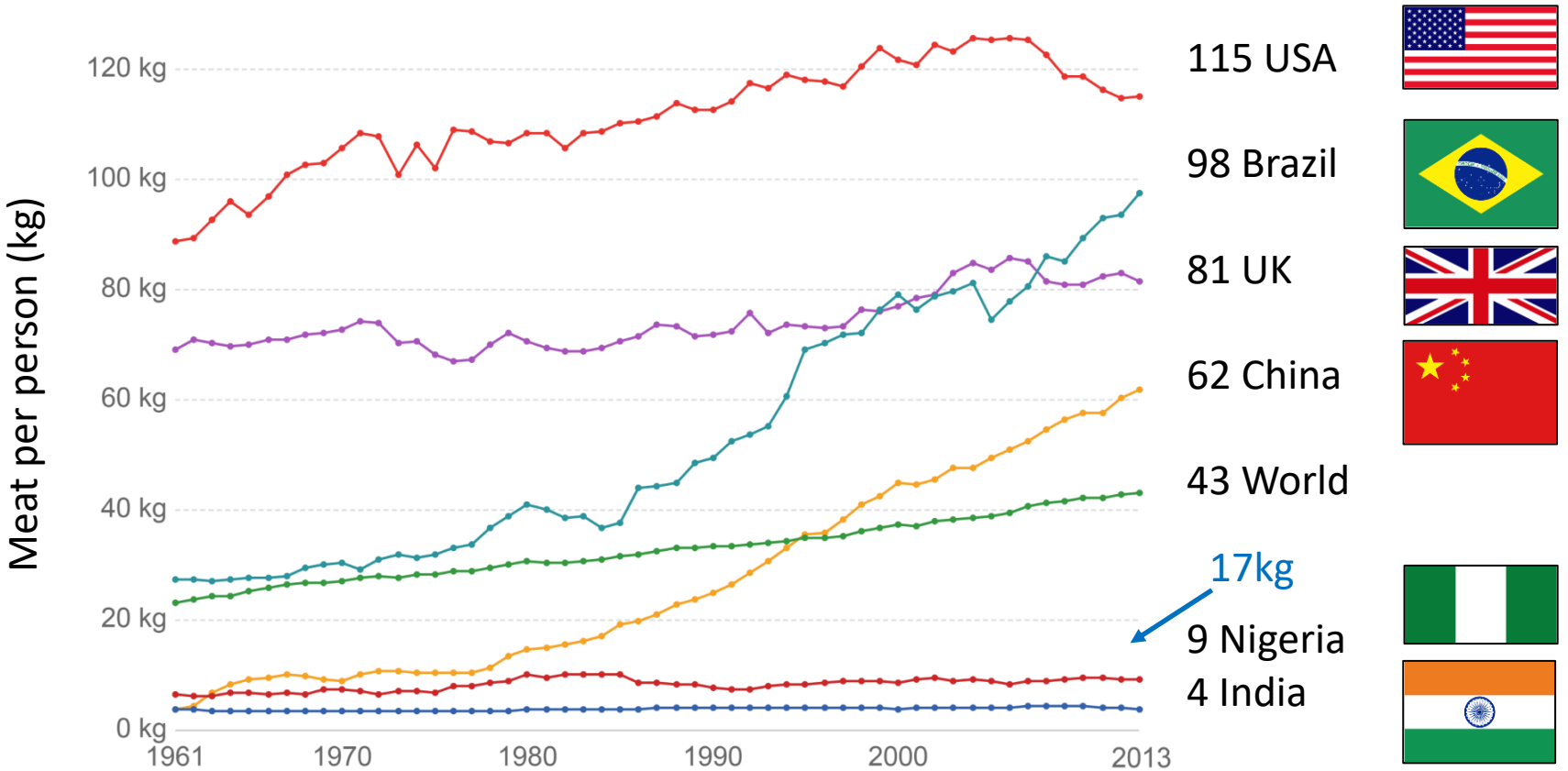
Per week:

- 525g beans and legumes
- 350g nuts
- 85g red meat
  - ~1.5 sausages
- 200g of chicken
  - ~2 portions
- 200g of fish
- 7 glasses of milk

15.5kg of meat per person per year (~17kg to account for food waste)

EAT-Lancet report (2019)

How much meat do we actually eat?



- Globally, 1961 to 2013:
  - Meat per person, 23kg to 43kg
  - Population, 3 billion to 7 billion

https://ourworldindata.org/meat-and-seafood-production-consumption ; FAO data

Imagine you're in a cafeteria

What might influence the meal you chose?

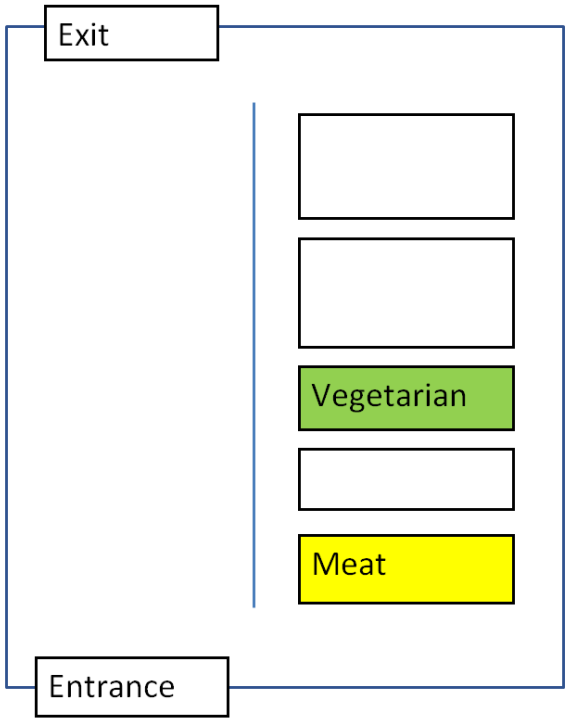
Health, taste, sustainability, ethics, price, availability, cafeteria layout?

Study setting

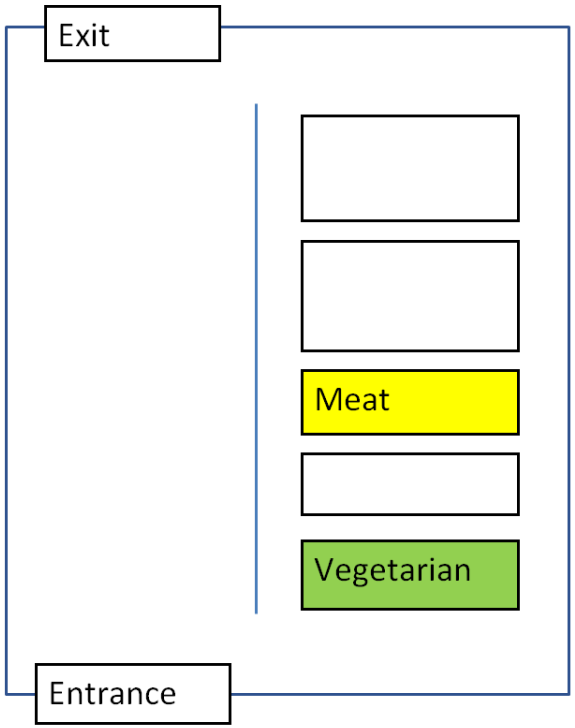
- University of Cambridge cafeterias, UK
- Two different interventions: **order and availability**
- Outcome: % vegetarian main meals sold
- Sales data: >200,000+ individual meal selections

1) Order

- Hypothesis: higher vegetarian sales when vegetarian option is first
- Experimental studies: alternate between **MeatFirst** and **VegFirst,** week by week across 9-week terms



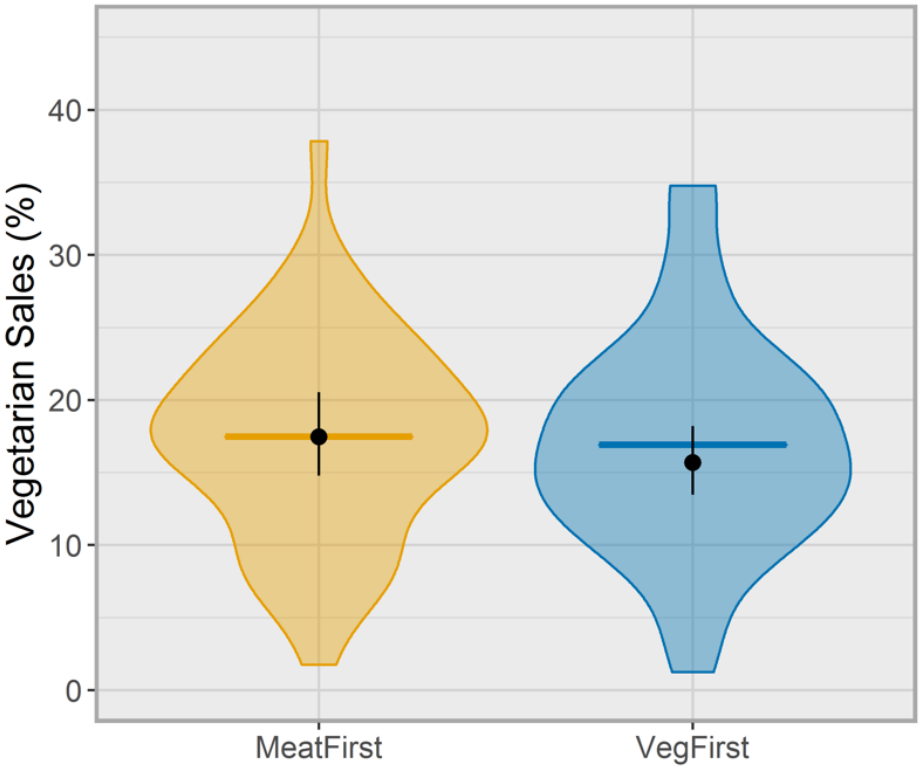
MeatFirst



VegFirst

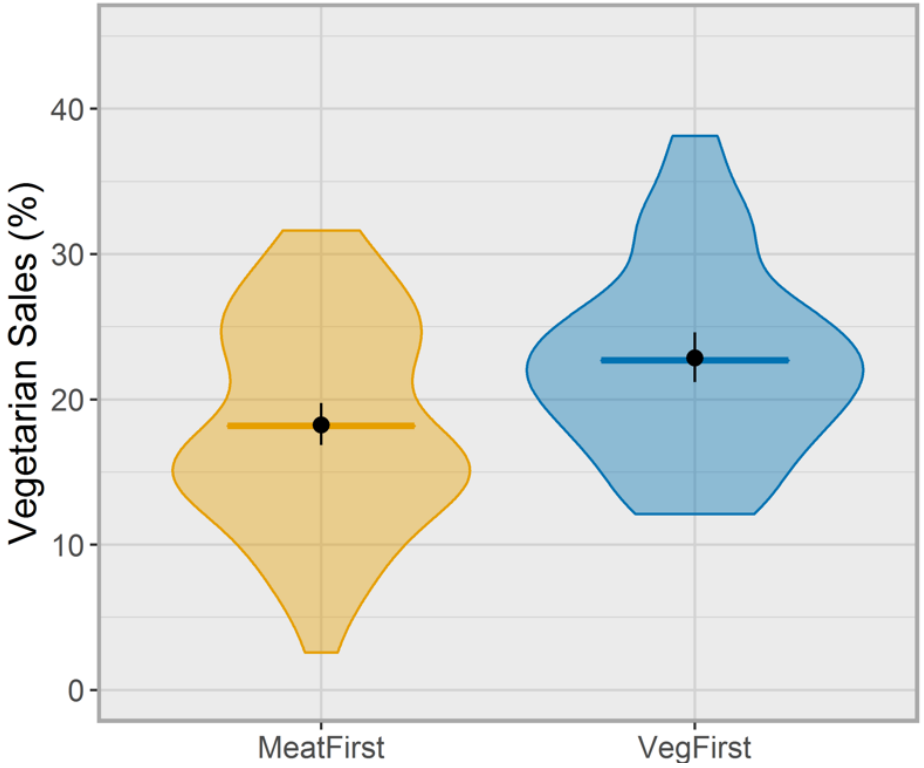
Order: Study 1 – in two settings

Cafeteria A



90 mealtimes; 11,683 meals
p>0.05

Cafeteria B



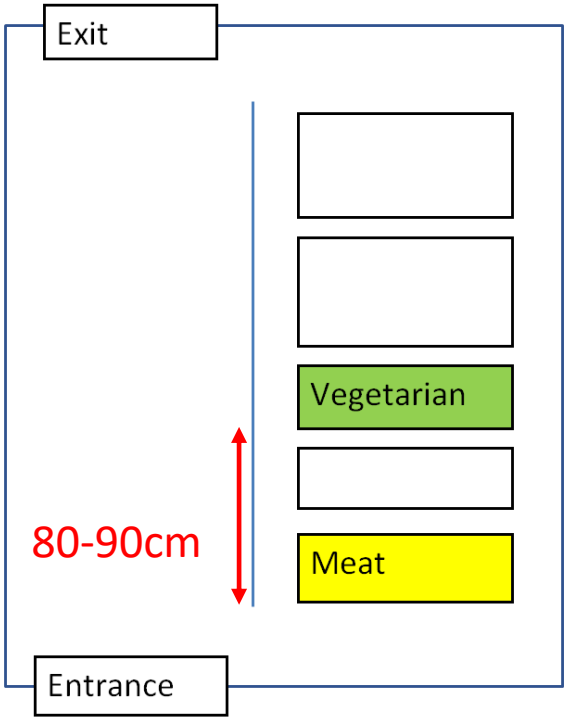
96 mealtimes; 20,554 meals
p<0.001 ***
5 percentage point increase

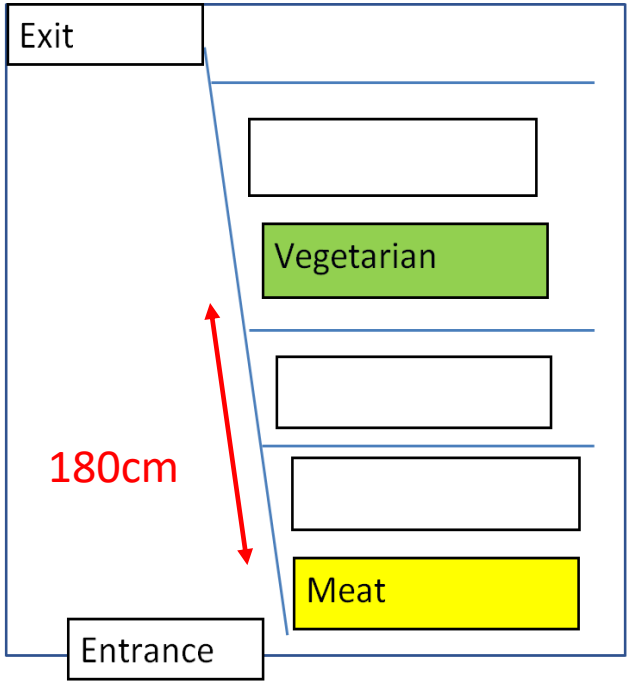
Garnett et al (2020) *Nature Food*

Why did order have an effect in one cafeteria but not another?

- Hypothesis: different distances
  - Cafeteria A: **shorter** distance of 80-90cm. **No effect**
  - Cafeteria B: **longer** distance of 180cm. **Effect**

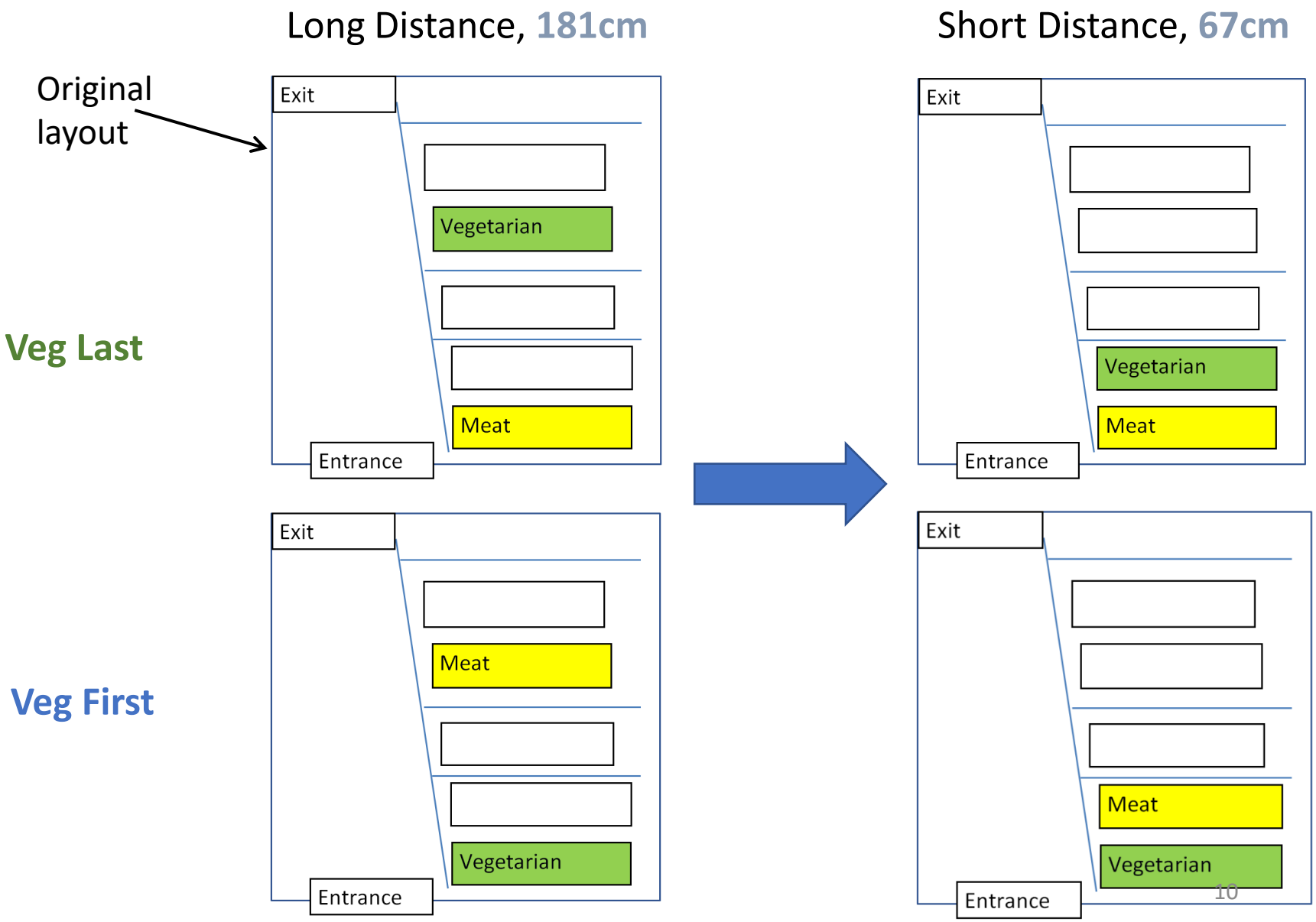
Cafeteria A





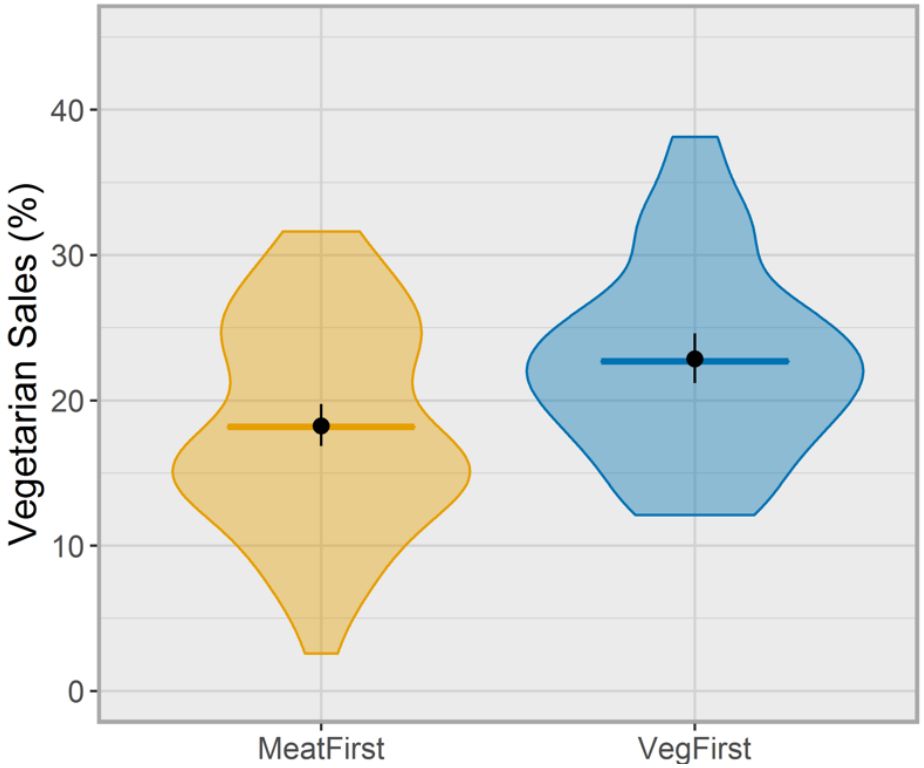
Cafeteria B

Order: Study 2, Changing distance at Cafeteria B



Order: Study 1&2, Cafeteria B results

Cafeteria B: Long distance (181cm)

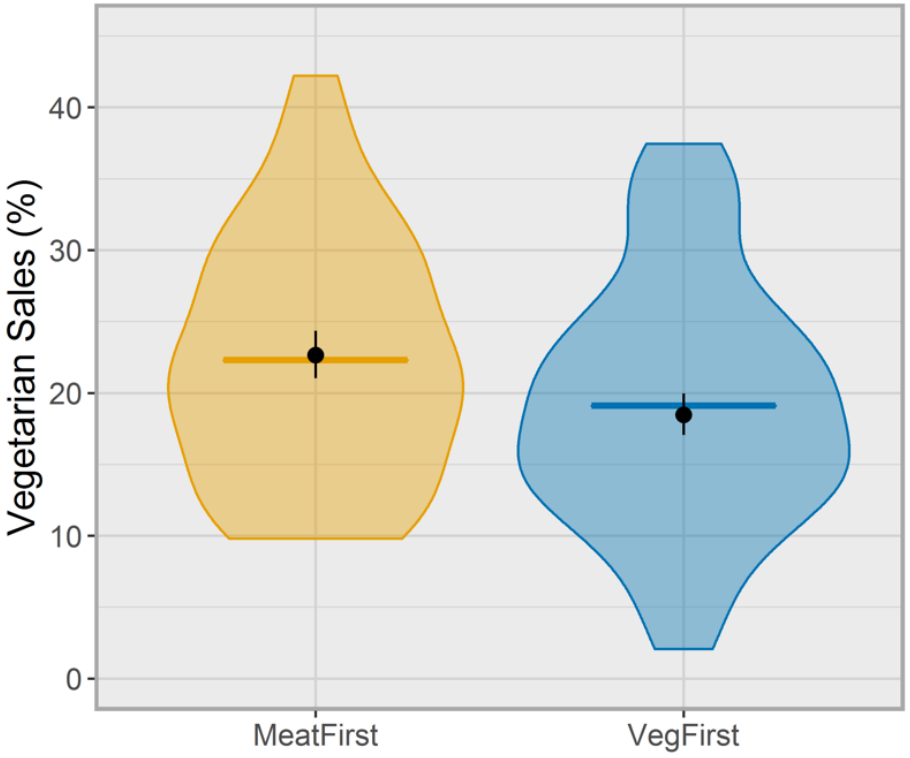


96 mealtimes; 20,554 meals

p<0.001 ***

5 percentage point increase

Cafeteria B: Short distance (67cm)



87 mealtimes; 20,224 meals

Complicated results

Under a short distance, VegFirst does not increase sales

Press coverage

The trick to making cafe diners eat less meat: Place the veggie options at least six feet in front of the meaty ones

- **Six-foot gap is key to getting people to opt for plant-based foods in canteens**
- **UK scientists found veg meal sales soared when six feet in front of meaty meals**
- **Pure human laziness means we tend to choose food options that are closest to us**

By JONATHAN CHADWICK FOR MAILONLINE
PUBLISHED: 16:00, 13 August 2020 | **UPDATED:** 17:15, 13 August 2020

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Canteens should place veggie options six feet closer to diners than the meaty dishes if they want to reduce the planet's unsustainable desire for meat, a study reveals.

In university college canteens, UK researchers found sales of plant-based dishes shot up by up to 40 per cent when they were closer to the diners on entry, with a 6 foot gap before reaching the meat options.

Researchers suggest this may be because hungry diners are willing to accept 'the first bite within eyeshot' and are subconsciously put off by the additional effort required to seek out meat.

Lifestyle > Food & Drink

People more likely to choose vegetarian meals if meat option is further away, study finds

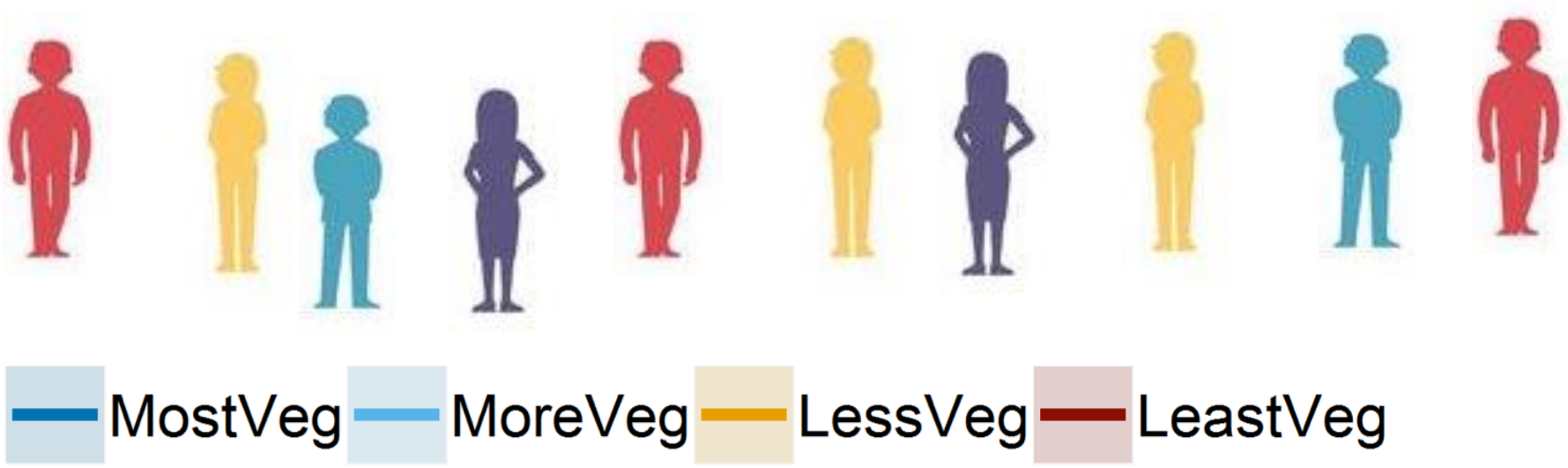
Enforcing some distance between vegetarian and meat options in a canteen can boost sales of plant-based portions

By Madeleine Cuff
August 13, 2020 4:00 pm
Updated August 13, 2020 4:38 pm

Garnett et al (2020) *Nature Food*

Tracking individuals

- Diners pay for meals with their university cards
  - Can track anonymised individuals
  - Using previous data: divide diners into quartiles based on how often they choose vegetarian meals
  - Statistically much more powerful



2) Availability

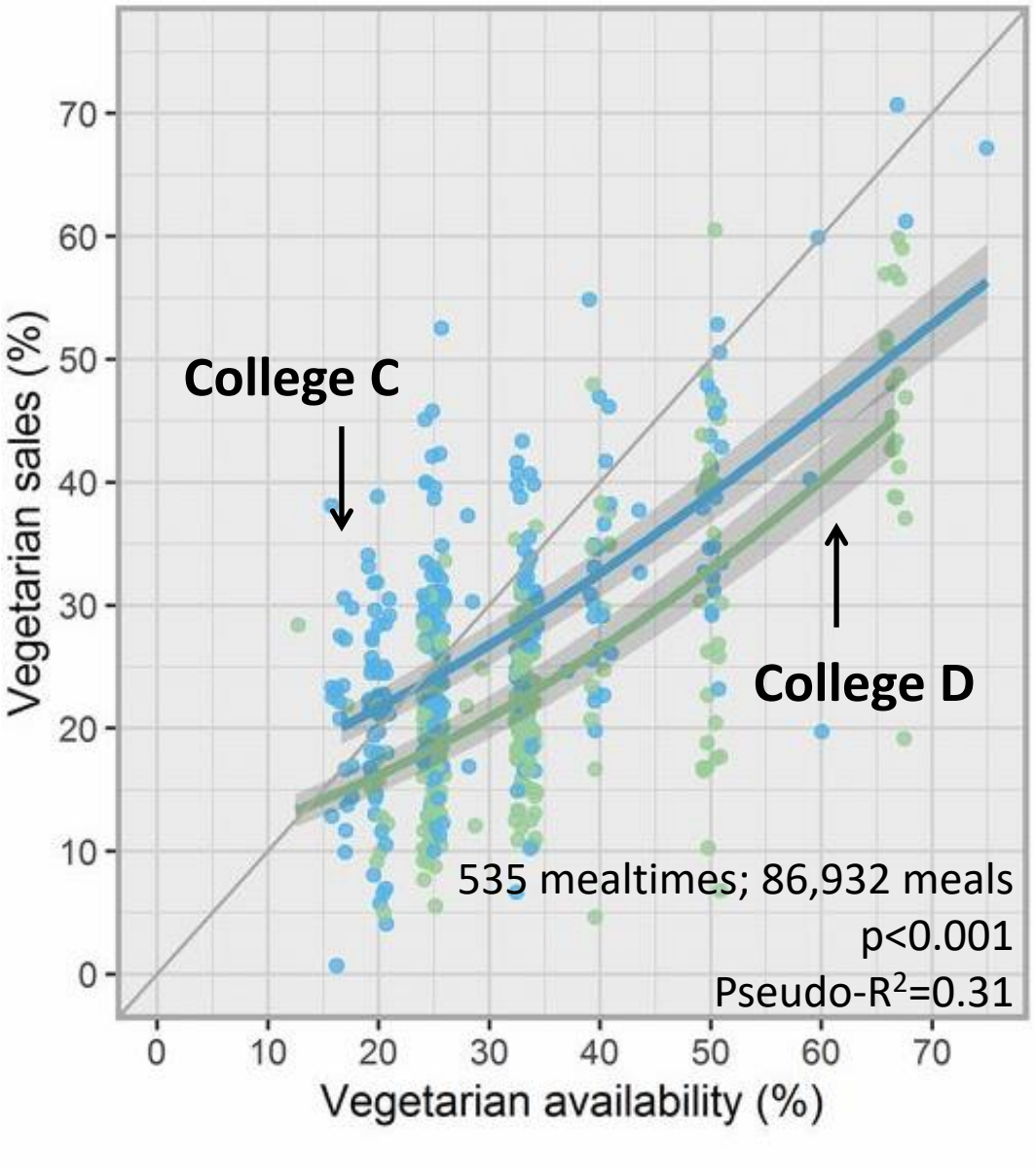
- Hypothesis: increasing the proportion of vegetarian options would increase vegetarian sales

- Two cafeterias
  - Naturally varied number of vegetarian and total options served

Option	Monday lunch	Tuesday lunch	Wednesday lunch	Thursday lunch	Friday lunch
1	VEGETARIAN/ VEGAN	VEGETARIAN/ VEGAN	VEGETARIAN/ VEGAN	VEGETARIAN/ VEGAN	VEGETARIAN/ VEGAN
2	VEGETARIAN/ VEGAN	MEAT/FISH	VEGETARIAN/ VEGAN	MEAT/FISH	MEAT/FISH
3	MEAT/FISH		MEAT/FISH	MEAT/FISH	MEAT/FISH
4			MEAT/FISH	MEAT/FISH	
Vegetarian availability	**67%** (2 in 3)	**50%** (1 in 2)	**50%** (2 in 4)	**25%** (1 in 4)	**33%** (1 in 3)

Availability results

- Doubling veg availability 25% to 50%: **~15 percentage point increase** in vegetarian sales.
- Overall sales remained about constant.

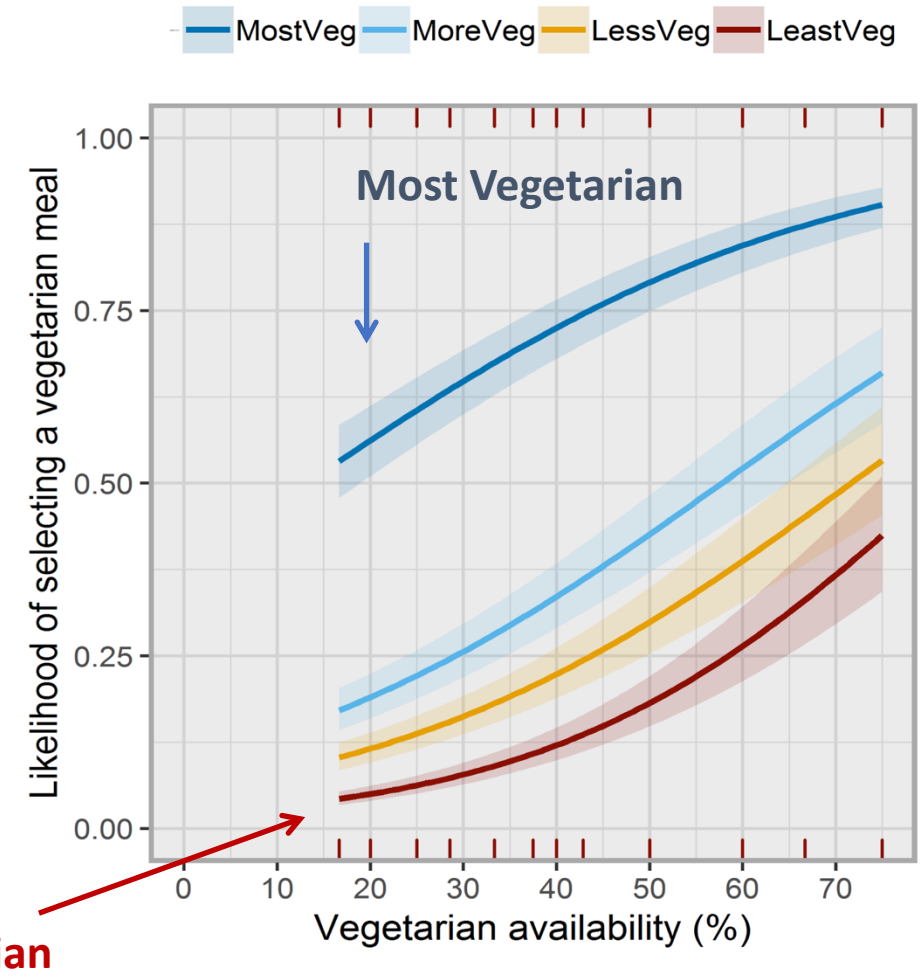


Garnett, Balmford, Sandbrook, Pilling and Marteau (2019) *PNAS*

Increasing vegetarian availability → all demographics buy more vegetarian meals

- Individual diners divided into quartiles from Least to Most Vegetarian
- Least Vegetarian quartile: strongest response (interaction term, $p<0.05$)

College C: individual diners



Possible discussion

- How does prince influence what we eat? Food prices, taxes
- What about grass-fed beef and sheep?
  - Shouldn’t we be producing food from all the land we can?
- What about food miles and eating locally?
- What about organic food?

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Conclusions

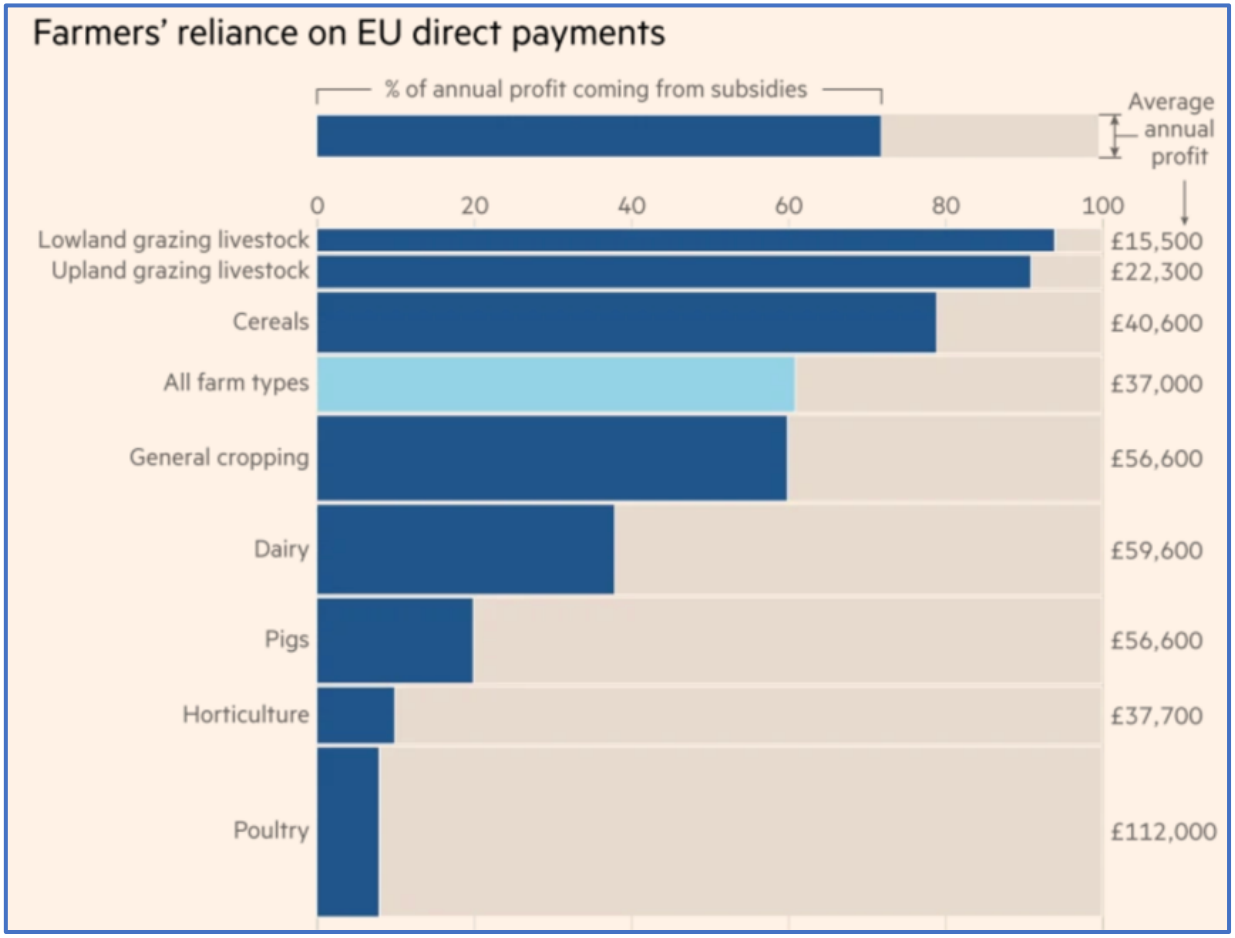
- **Reducing meat consumption:** vital in high-income countries to combat climate change and improve human health

- **Placing vegetarian option first**: some contexts increases vegetarian sales by ~5 percentage points but unreliable

- **Doubling availability of vegetarian options**: ~15 percentage point increase in vegetarian sales, effective across all groups of diners

3) Price

- Price is an important influence on citizen food purchases.
- Many calls for meat tax, but none currently in operation.
- Subsidies dominate UK farming profits.



Financial Times (2018) UK farmers prepare for overhaul to farm subsidies after Brexit

DEFRA. (2016). *Food statistics pocketbook 2016*

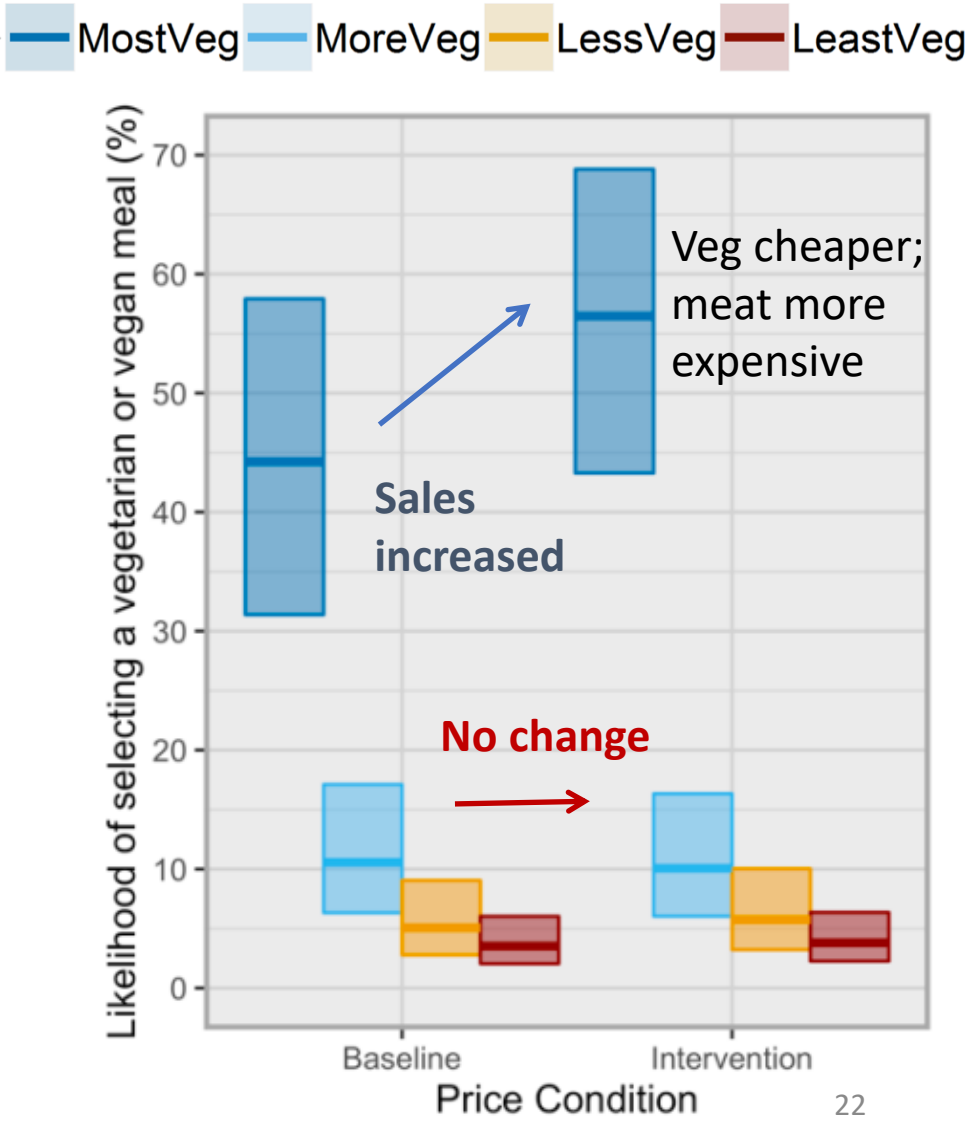
Price experiment design

- Cafeteria E: autumn term 2018

- Half way through term:
  - Increased meat option price by 20p £2.52 to £2.72
  - Decreased vegetarian option price by 20p £2.05 to £1.85

Price experiment results

- 106 mealtimes; 5330 meals.
- Small increase in overall vegetarian sales.
- Driven by Most Veg quartile
  - **~12 percentage point increase**



Garnett et al (in prep)

Food is glorious

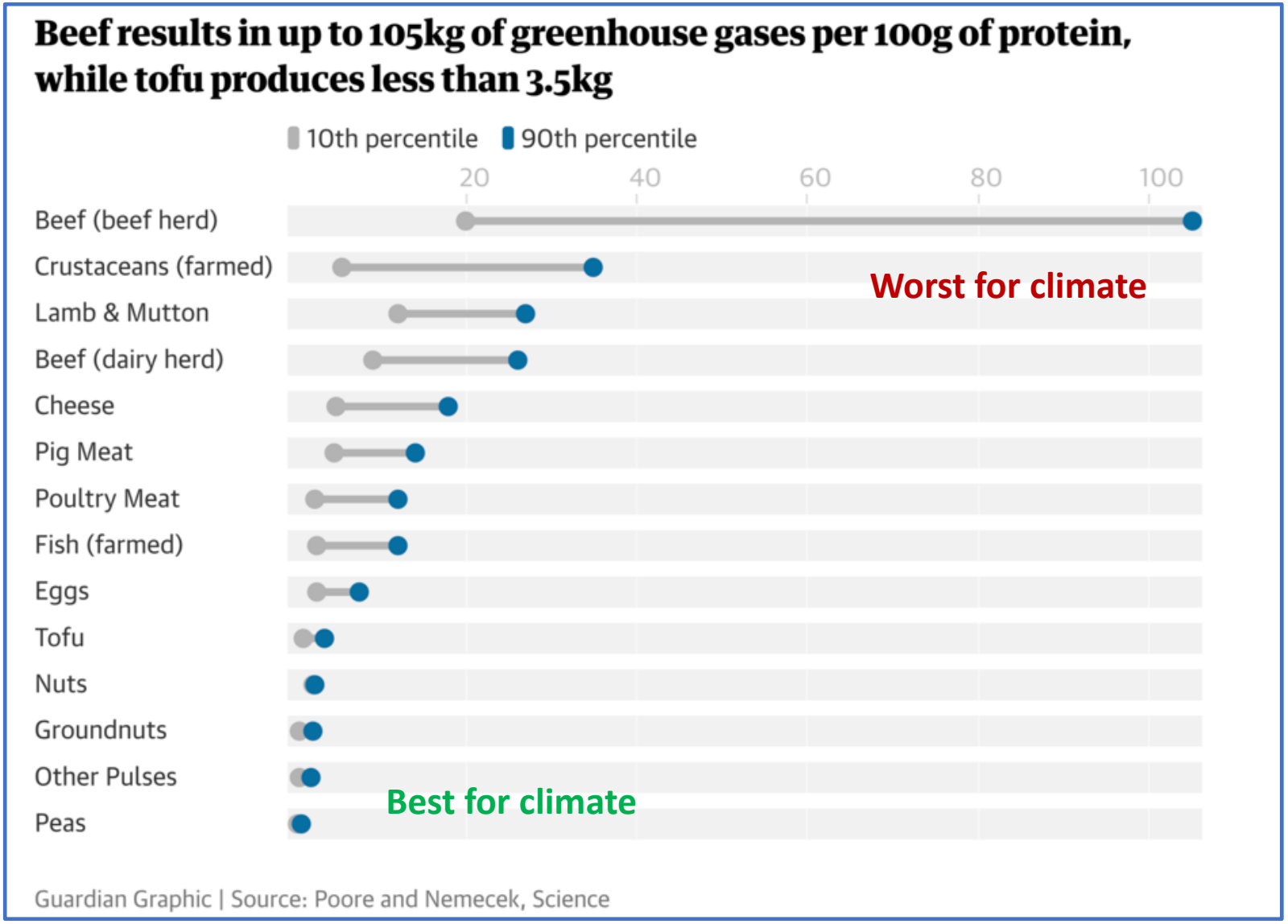







Jack Monroe @BootstrapCook ; Meera Sodha @meerasodha ; Kate Taylor https://cookieandkate.com/

Footprint of different foods



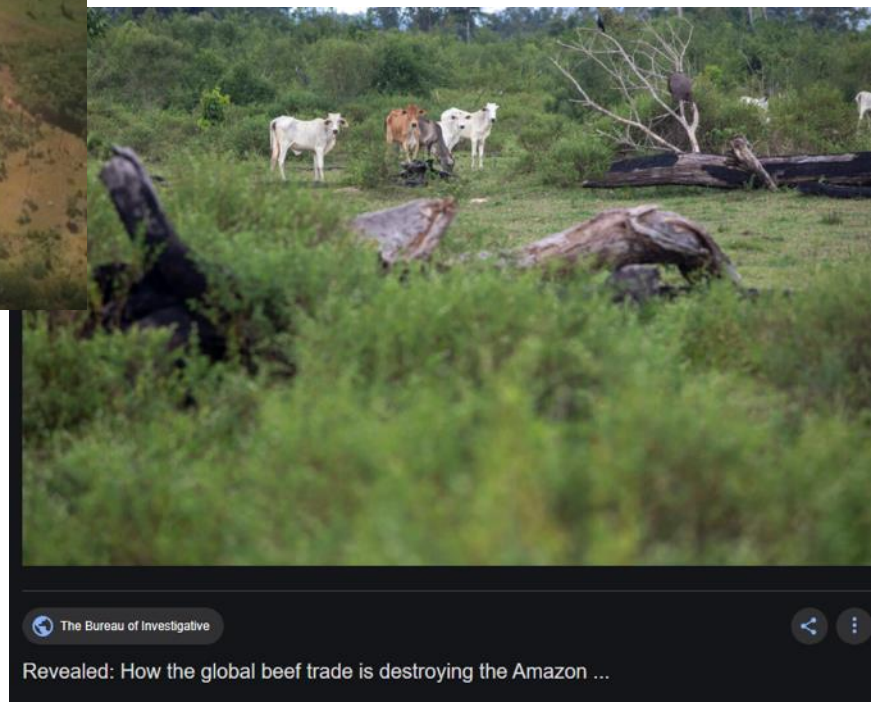
Cows, sheep and shrimp

Pigs, poultry, fish

Tofu, beans, nuts

Brazilian vs UK beef farms

“It’s like flying over the British countryside and we are in the middle of the Amazon”

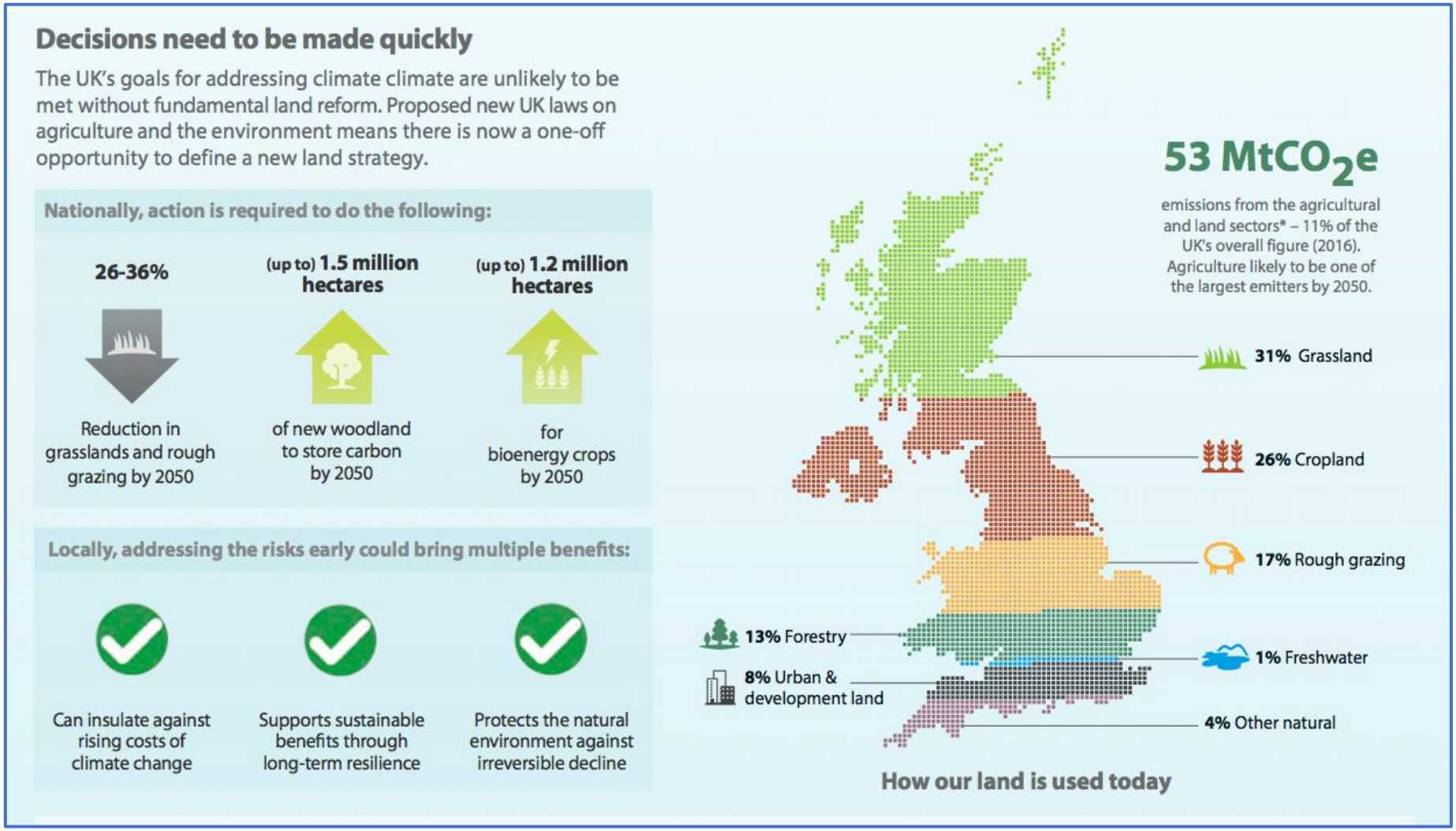


What about grass-fed beef?

- Grass-fed beef and lamb is still not good for the climate.
- *"The contribution of grazing ruminants to soil carbon sequestration is small, time-limited, reversible and substantially outweighed by the greenhouse gas emissions they generate*."
- Grass-fed =/= sustainable. E.g. Brazilian cows on former rainforest

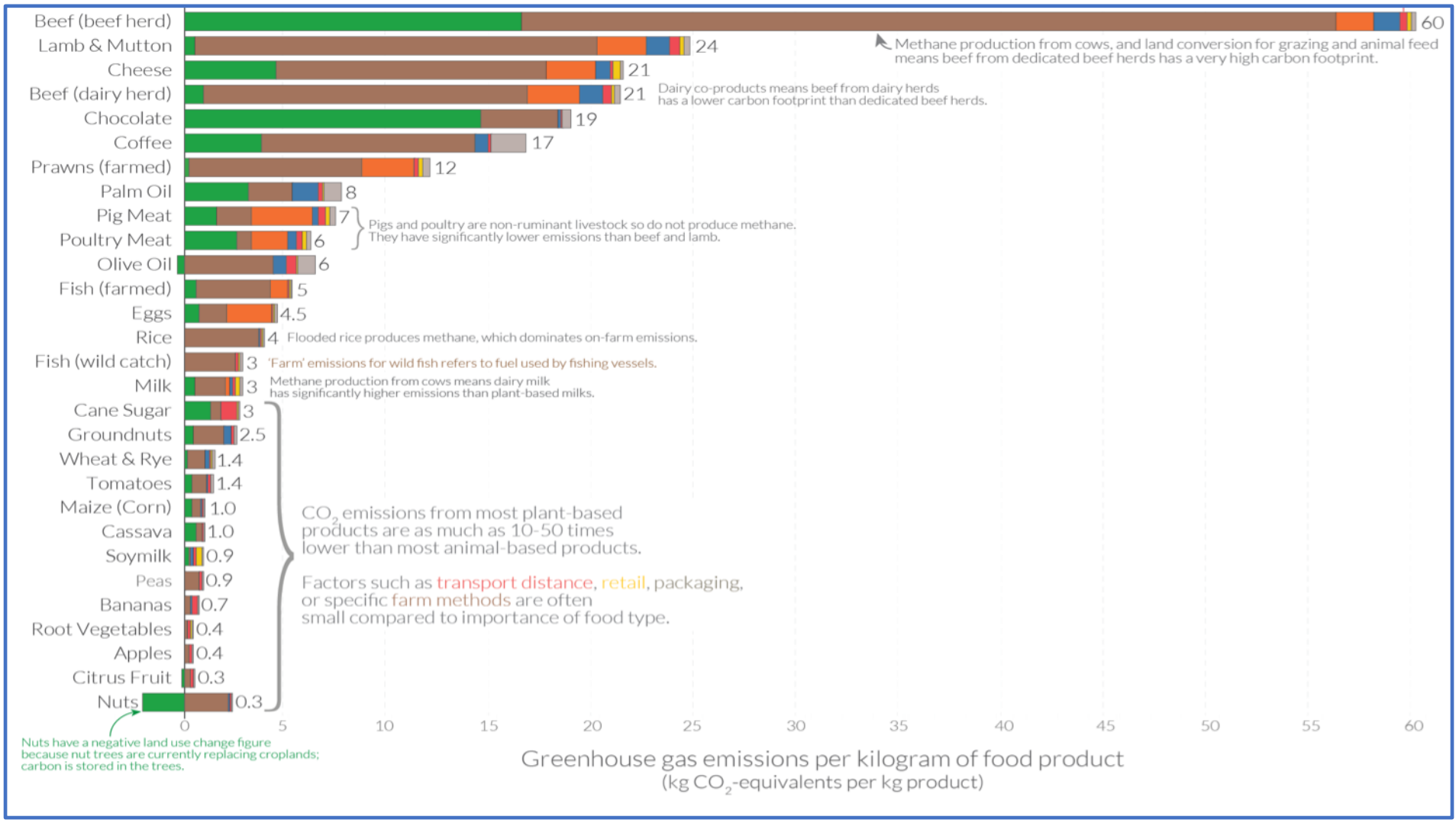
Food and Climate Research Network, *Grazed and Confused? (2017)*

Deforestation/reforestation

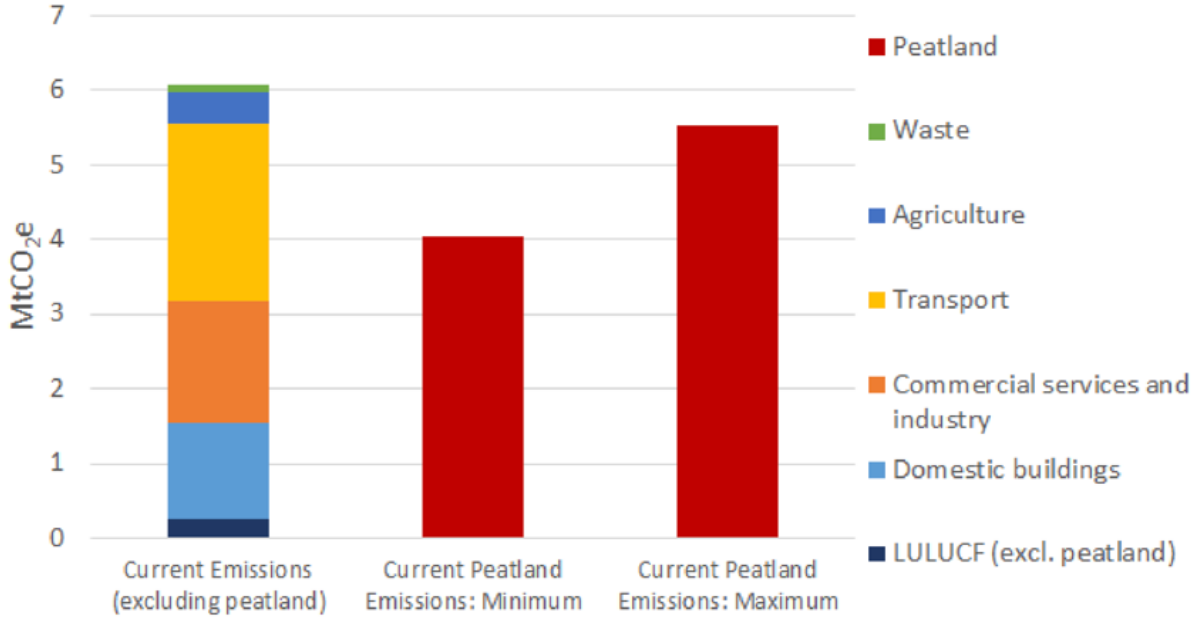


Committee on Climate Change (2018) Land use report infographic

Supply chains and food miles



Cambridgeshire emissions and peat



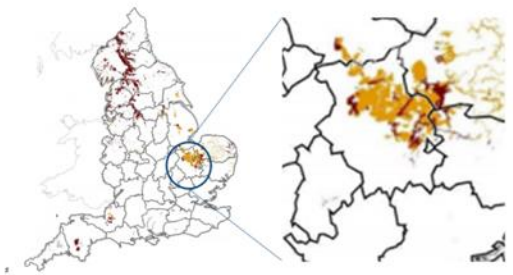
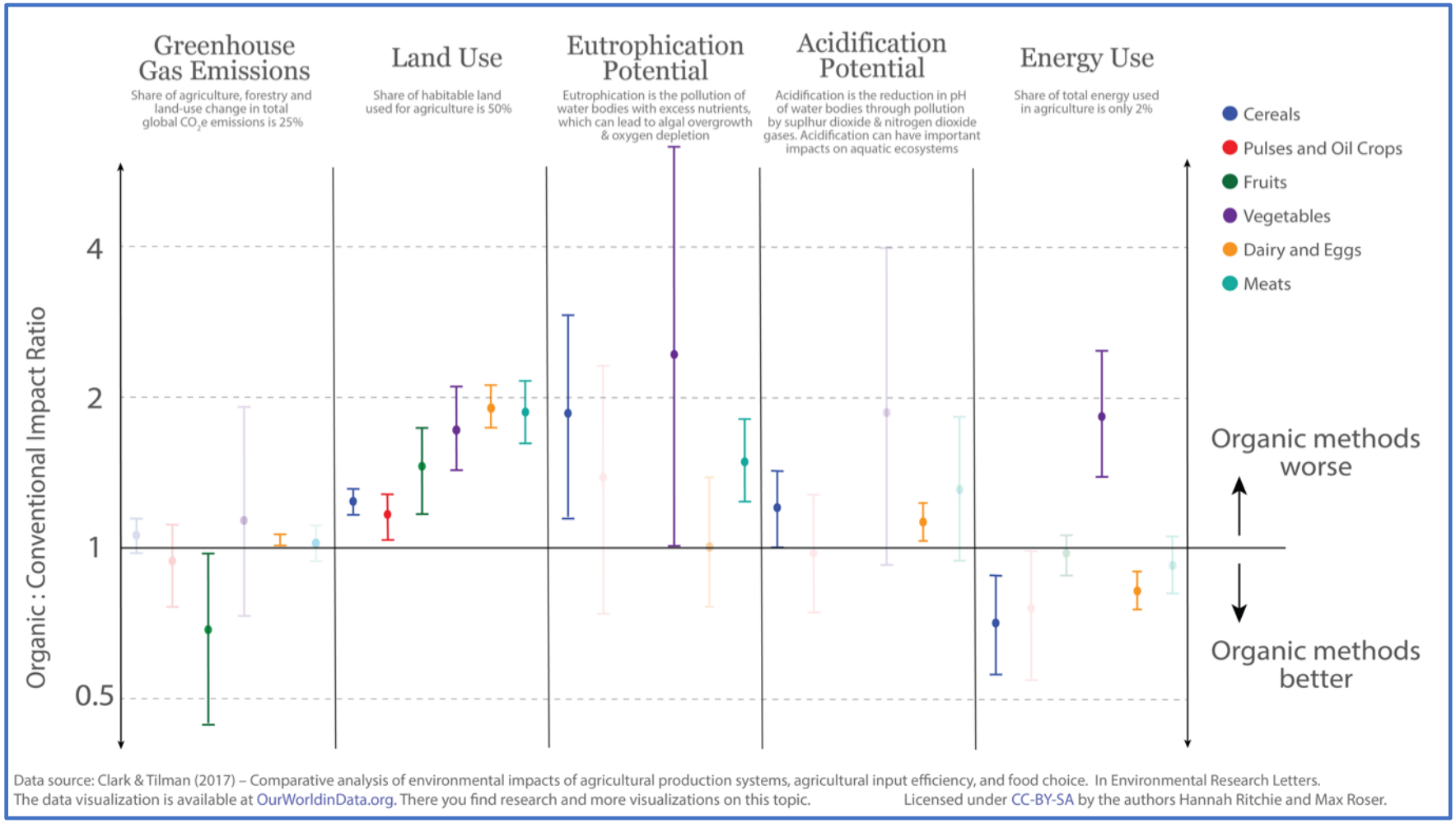


Figure 4.4: Map of deep peat (dark red) and wasted peat (yellow-orange) in England overlayed with the outline of the ceremonial counties of England. Insert shows the area in Cambridgeshire[55]

Net Zero Cambridgeshire (2019)

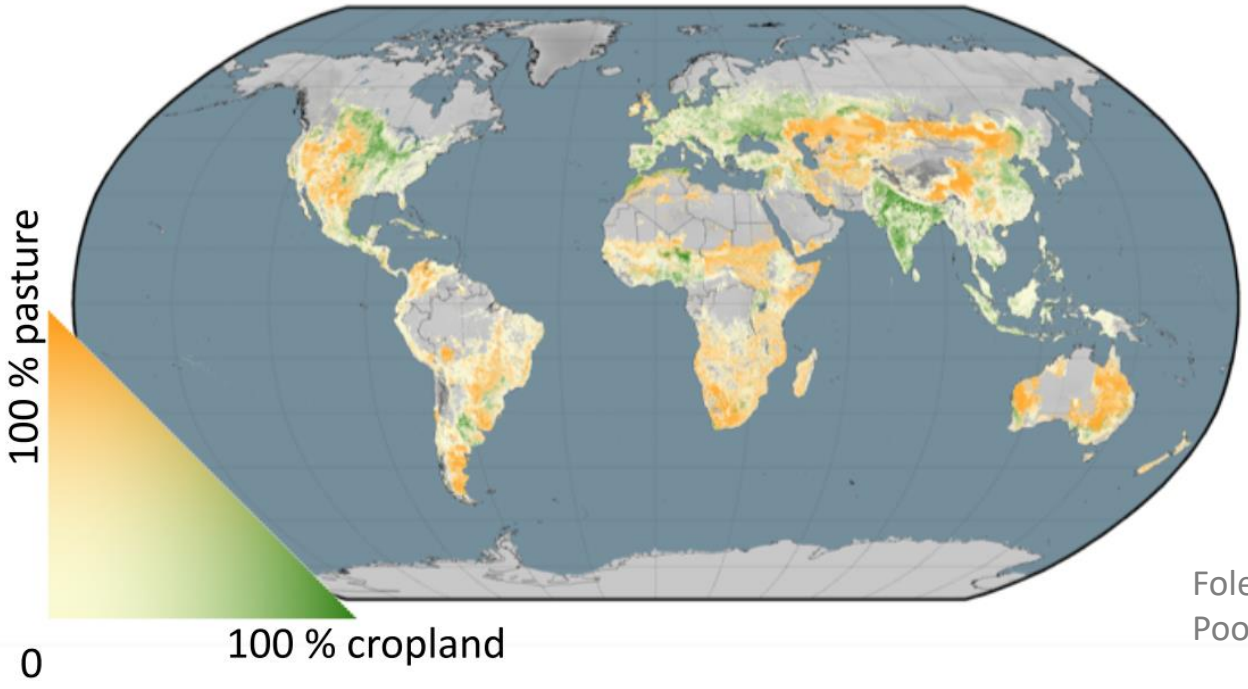
What about organic?



https://ourworldindata.org/is-organic-agriculture-better-for-the-environment

Producing food has transformed the planet

- 26% of greenhouse gas emissions
- 38% of Earth's ice free land
- 70% freshwater withdrawals



Foley et al (2011) *Nature*
Poore and Nemecek (2018) *Science*

How could we change diets?

"The whole world wants me to eat meat! I can't fight it anymore!"

Lisa Simpson, *The Simpsons*

- Nudging (or "choice architecture"):
  - Strategic changes in the environment
  - Anticipated to alter people's behaviour in a predictable way
  - Without forbidding any options

Bianchi, Garnett et al (2018) *Lancet Planetary Health*

Conclusions

- Reducing meat consumption in high-income countries is vital to combat climate change and improve human health

- Simple changes in cafeterias can increase vegetarian sales and reduce meat consumption

- Ambitious government policies are also needed to bring about healthy and sustainable diets

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