



Sustainable Diets: Health People, Healthy Planet

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Overview

- What is a “Sustainable Diet”?
- How does food production impact the environment?
- Key Paper: EAT-Lancet (2019)
- Current Recommendations in the UK (BDA)
- Opportunities to eat a More Sustainable Diet
- Take-away messages



What is a Sustainable Diet?

Sustainable Diets are those diets:

- with **low environmental impacts** which contribute to food and nutrition security and to healthy life for present and future generations.
- are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy
- while optimizing natural and human resources

Food and Agriculture Organisation (FAO) of the United Nations, 2010

Simplified:

'... low environmental impact diets consistent with good health...'

Fischer and Garnett, 2016



What are the Main Issues?

- Feeding a growing population
- Producing food without irreversible damage to the planet (Global warming, deforestation, water and fuel use)
- Protecting biodiversity/survival
- Producing food in an economically fair way



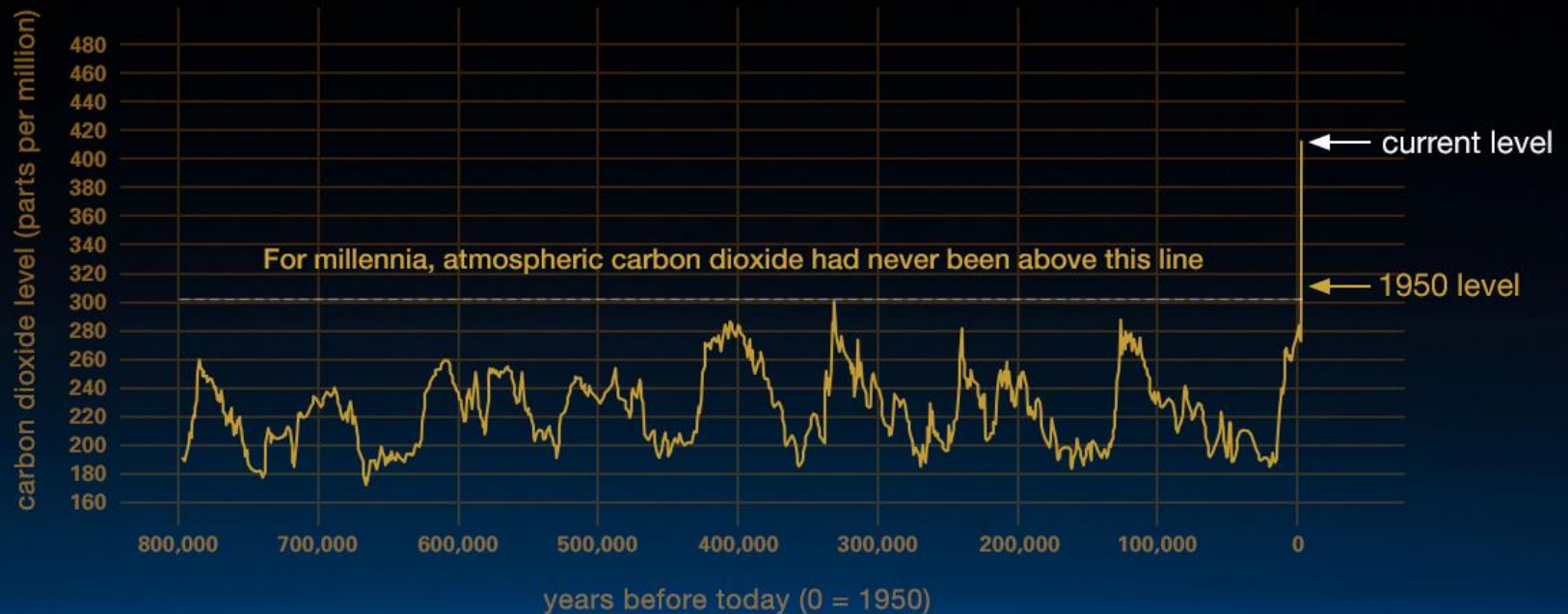
Food Security: Growing Population

- By 2050 we'll need to feed two billion more people.
- This will require us to produce approximately 70% more food
- What we grow on the available land is important – e.g. crops versus cattle.



Environmental Impact: Irreversible Damage to the Planet

- Greenhouse gases (GHGs) mainly carbon dioxide.
- Natural fluctuation of 200-280ppm, now exceeded 420ppm.
- Business-as-usual would see this rise to over 1500ppm if fossil fuel reserves are exhausted



6th Mass Extinction

- 6th great extinction
- Ceballos et al (2017) describe the loss of species as a “biological annihilation”.
- Their findings not only highlight a major loss of biodiversity but also threatens the ecosystem services essential to civilization
- As much as 50% of the number of animal individuals that once shared Earth with us are already gone, as are billions of populations (pre-extinction).



Economically Fair and Nutritious

- Food security is only possible if the basis of production meets the needs of the producers
- Food produced needs to be able to sustain the population and provide sufficient nutrients to support life.



Food Supply Chain

- Growing and Harvesting or Fisheries and Livestock
- Processing and Packaging
- Distribution
- Retail
- Cooking and Eating
- Waste and Recycling/ Landfill



Impact of Food on Environment

How much impact does food have?

Proportion of total greenhouse gas emissions from food

A quarter of global emissions come from **food**

Food
26%

Other greenhouse gas emissions 74%

More than half of food emissions come from **animal products**

Animal products
58%

Other food
42%

Half of all farmed animal emissions come from **beef and lamb**

Beef & lamb
50%



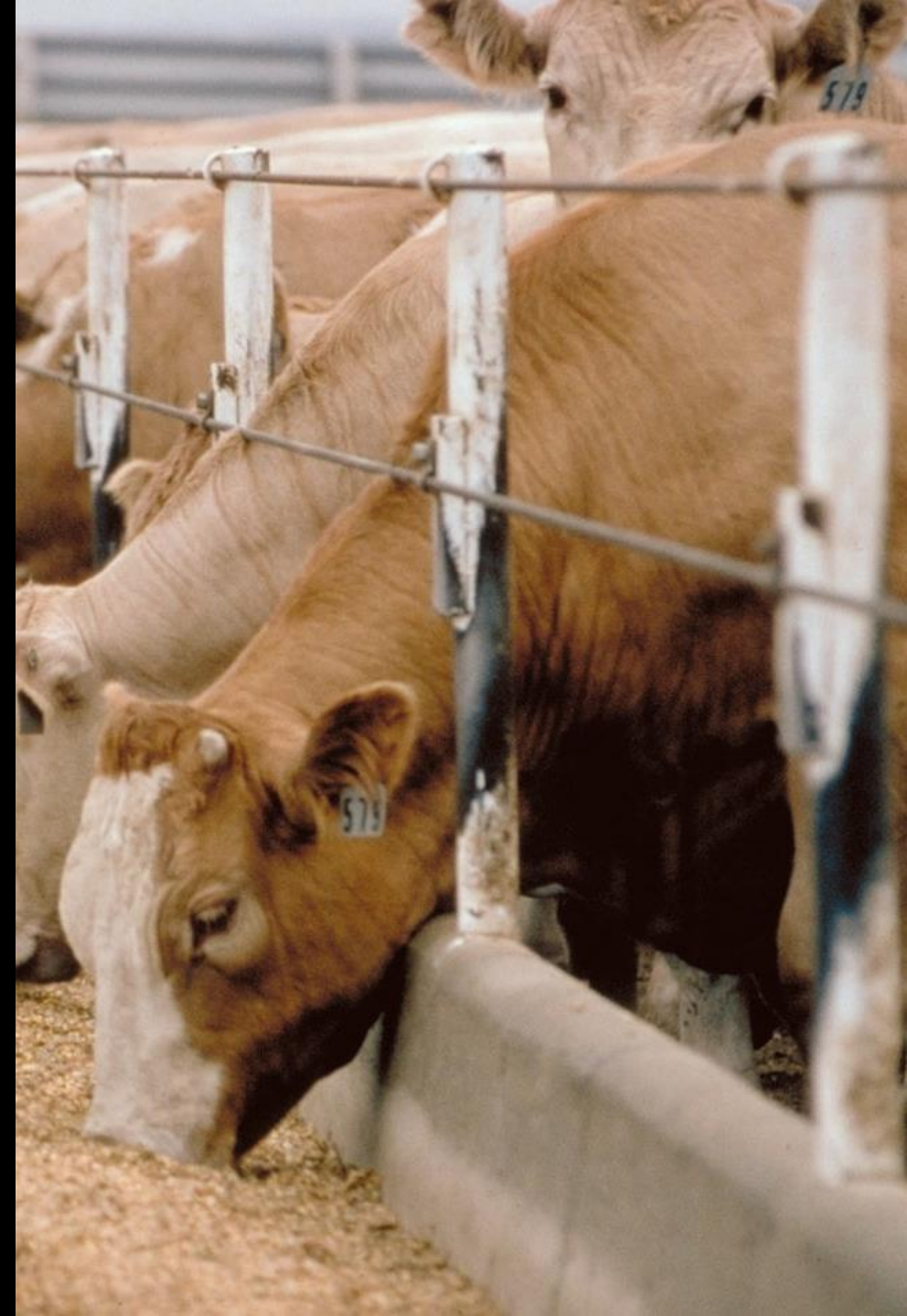
Other animal products 50%

Impact on the Environment: Growing and Harvesting

- **Agriculture dominates GHG's emissions in the food industry.**
- It equates to 61% of foods GHG emissions (81% if including the indirect effect of deforestation)
- Agriculture is also resource intensive and accounts for ~ 43% of global land (excluding ice and desert covered land)
- 87% of this land is used for food and 13% for biofuels and textile crops (e.g. cotton).
- We continue to cultivate 4 main crops that provide half the global farm land: soybeans, wheat, rice, and corn.

Amount Of Food Grown For Livestock

- Currently, about 50% of the globe's vegetated land is dedicated to agriculture
- Globally, 30% of cropland is used to grow grain for animal feed.
- Due to how much land it takes to grow food to feed livestock, meat production is a leading cause of deforestation.



Impact on the Environment: Livestock

- It has been suggested that sustainability campaigners could be reduced to feeding animals.

- Why is this?

Don't feed kitchen scraps to farm animals!



It can introduce and spread disease in animals, such as African and Classical Swine Fever, and Foot and Mouth Disease

 Animal & Plant Health Agency

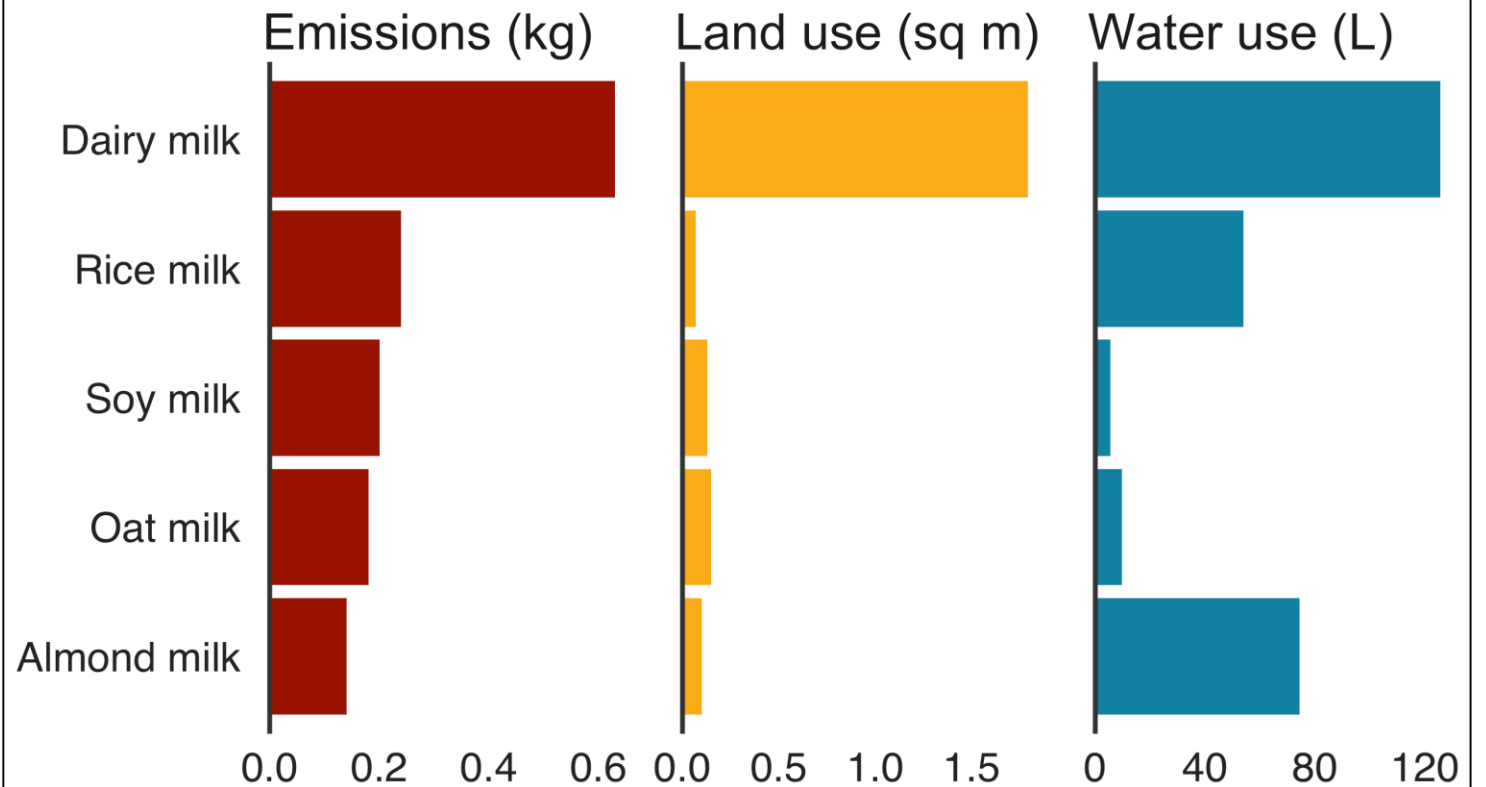


Impact Of the Dairy Industry



Which milk should I choose?

Environmental impact of one glass (200ml) of different milks



Source: Poore & Nemecek (2018), Science. Additional calculations, J. Poore

Impact on the Environment: Growing and Harvesting

- Consider that there are very different farming practices around the world (E.g, UK and America) and some are more intensive and different climates may require more resources than others.
- For example, it might be considered better to use 1000 litres of water in the UK to produce a litre of dairy milk than to use 385 litres of water in California to grow almonds to make a litre of almond milk.



Soil Damage From Modern Agricultural Methods

Soils are becoming severely degraded due to a combination of intensive farming practices and natural processes

Generating 3cm of top-soil takes 1,000 years

The UN has warned that the world's soils face exhaustion and depletion, with an estimated 60 harvests left before they are too degraded use.

A 2014 study in the UK estimated 100 harvests remaining in UK soils

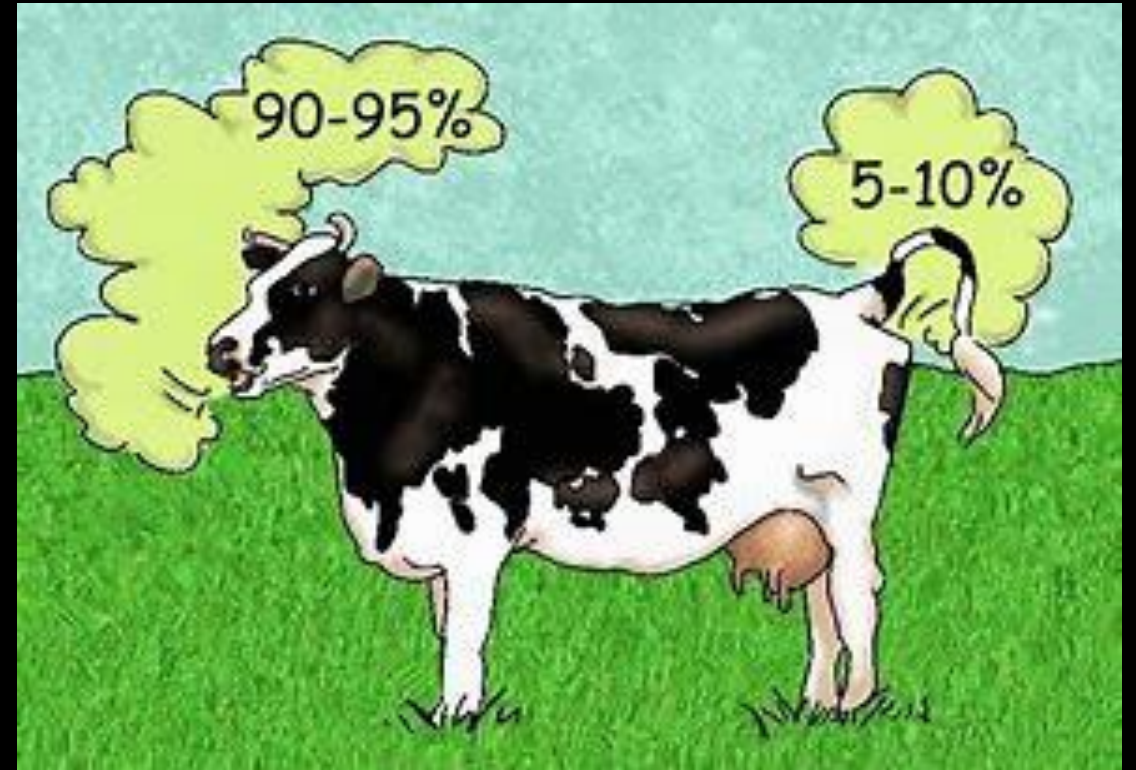
Growing and Harvesting: Deforestation

- Deforestation – clearing large parts of forest (36 football fields/minute)
- 5 main causes: Agricultural plantation expansion, cattle ranching, logging, infrastructure expansion (roads) and overpopulation.
- Deforestation can cause a vicious cycle; deforestation drives climate change, which in turn damages the food production capacity of existing farmland and motivates farmers to cut down more trees in order to meet quotas.



Impact of Meat on Environment

- In addition to the land used for grain fed cattle, deforestation for cattle ranching... 30% land surface
- Cows also contribute to GHG's directly through methane (CH_4) emissions.
- >1.5 billion cattle globally contribute ~ 40% of the annual methane produced annually.



Reducing Methane Emissions from Cows

- Preliminary research has indicated a small amount of marine algae added to cattle food can reduce methane emissions from cattle gut microbes by as much as 99 per cent
- A compound found in some seaweed disrupts enzymes used by the microbes to produce methane

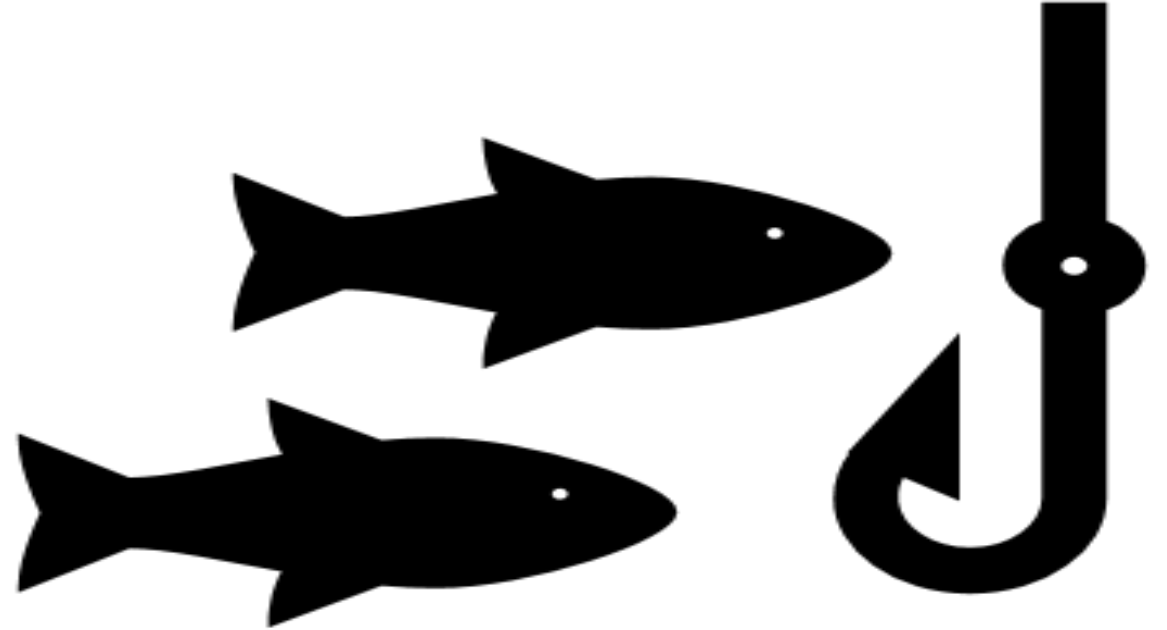
<https://www.independent.co.uk/environment/cows-seaweed-methane-burps-cut-greenhouse-gas-emissions-climate-change-research-a8368911.html>



Impact on the Environment: Fishing

The environmental impact of fishing includes:

- Availability of fish
- Overfishing
- Fisheries and fisheries management
- By-catch



Over 90% of predatory species like cod and tuna have already been caught and, according to the UN, 70% of fisheries are overfished.

How does Food Impact the Environment?

- Energy, water required for production
- Effect on soil depending on type and intensity of farming
- Energy required for Transport
- Type and Amount of Packaging
- Energy Required for Preparation and cooking of Food
- Food Waste

How do we measure environmental impact?



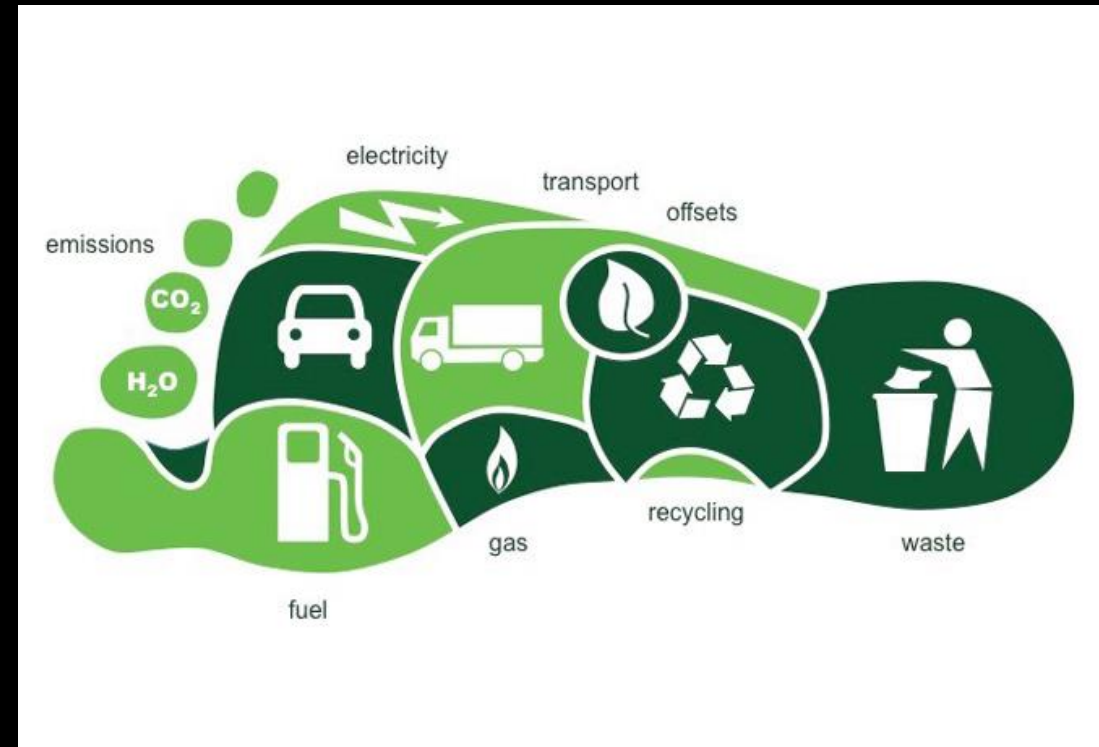
Food Miles

- This is a measure of how far a food has travelled from it's initial production to the consumer.
- Buy local food that is in season rather than buy food that needs to be transported around the world.
- However, total miles travelled in not the whole story of a foods environmental impact.



More than Miles... Carbon Footprint

- **Carbon:** represents the total emissions of global warming greenhouse gases (GHG's) released including Carbon Dioxide and Methane
- **Footprint:** best estimate of the full climate change impact of something
- Expressed as carbon dioxide equivalent: **CO₂e**



Carbon Footprint of A Punnet of Strawberries



Local and Seasonal

• **150g CO₂e per punnet**

**Out of Season/ Flown in or grown in
a hothouse**

• **1800g CO₂e per punnet**

- **>10 x the carbon footprint**
- **Do they taste as good as local, seasonal fruit?**

How bad is a
Banana's
Carbon
Footprint?

Discuss



How bad is a Banana's Carbon Footprint?

- What is your first impression of the carbon footprint of a banana?
- What if it was grown in natural sunlight, requiring little energy to produce?
- What if it was transported across the world by boat because they keep well?
- What if it did not require much packaging because it came in its own package?

= 80g CO₂e per banana



Impact on the Environment: Consumer: Food Waste

- Research by WRAP indicates that on average **£60 a month** is wasted by each household on uneaten food

Why?

- Food not being eaten before it goes off
- Incorrect food storage
- Confusion around 'sell by' and 'use by' dates
- Too much food being cooked, and the excess thrown away (e.g., pasta and rice)
- Lack of meal planning
- Not checking what food they have already before they go shopping

**In the UK,
we throw away
a third of the
food we buy**

Sad, isn't it?

**LOVE
FOOD**
WRAP

Impact on the Environment: Consumer: Food Waste

- Households throw away, on average, 1.96kg of food per day.
- Recent research suggests that 1Kg of food waste going to landfill produces the same carbon emissions as landfilling 25,000 plastic bottles (Zero Waste Scotland, 2021)



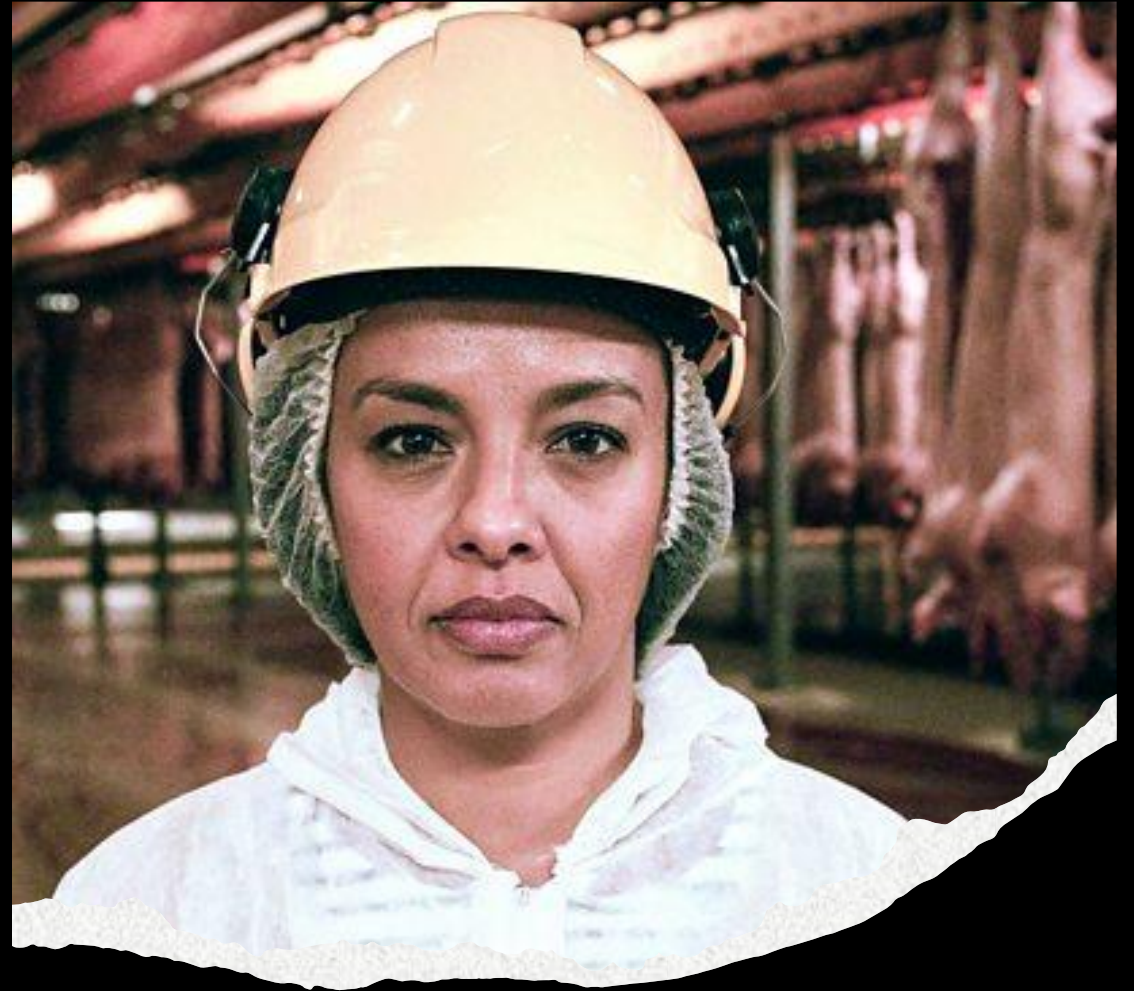
Sustainable Diets –Meat Reduction

- According to recent studies, one of the biggest ways to reduce your environmental impact is to reduce intake of meat and dairy products.
- In fact, experts have suggested that eating less red meat would be a better way for people to cut carbon emissions than giving up their cars!
- The environmental impact of meat and dairy was shown on a Panorama BBC 1 programme.
- However, little discussion was made to the difference in farming methods in the UK and globally

TV BBC1 (via iPlayer)

- **Meat: A Threat to Our Planet?**

www.bbc.co.uk/iplayer/episode/m000bqsh



NFU Response:

“At no point did the documentary explain the vast differences between American meat production and UK production. This was a massive oversight considering the BBC’s audience and would have left people with the impression that all meat is produced in the same way”

“Beef production in the UK is already 2.5 times more efficient than the global average and 4 times more efficient than places which are deforesting land”.

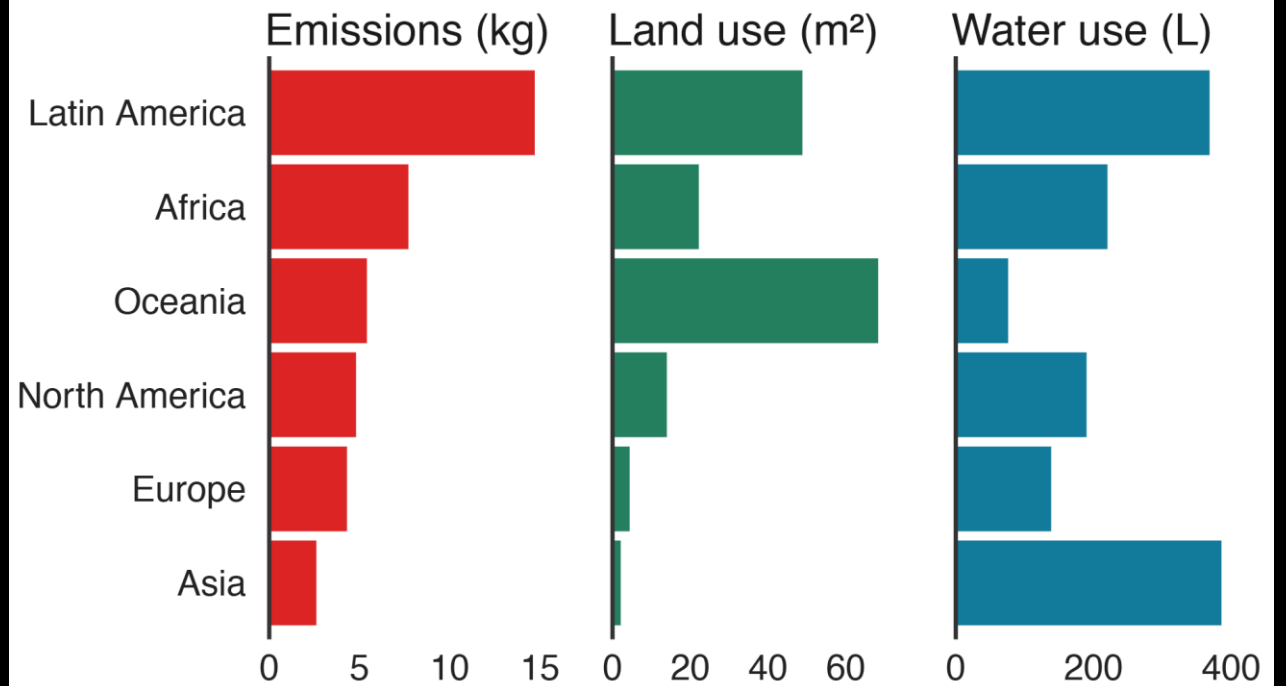


Varying Impact of Beef Globally

- <https://www.bbc.co.uk/news/science-environment-46459714>

The impact of beef is highest in Latin America

Climate footprint of one serving of beef by production region



Source: Joseph Poore (Oxford University)

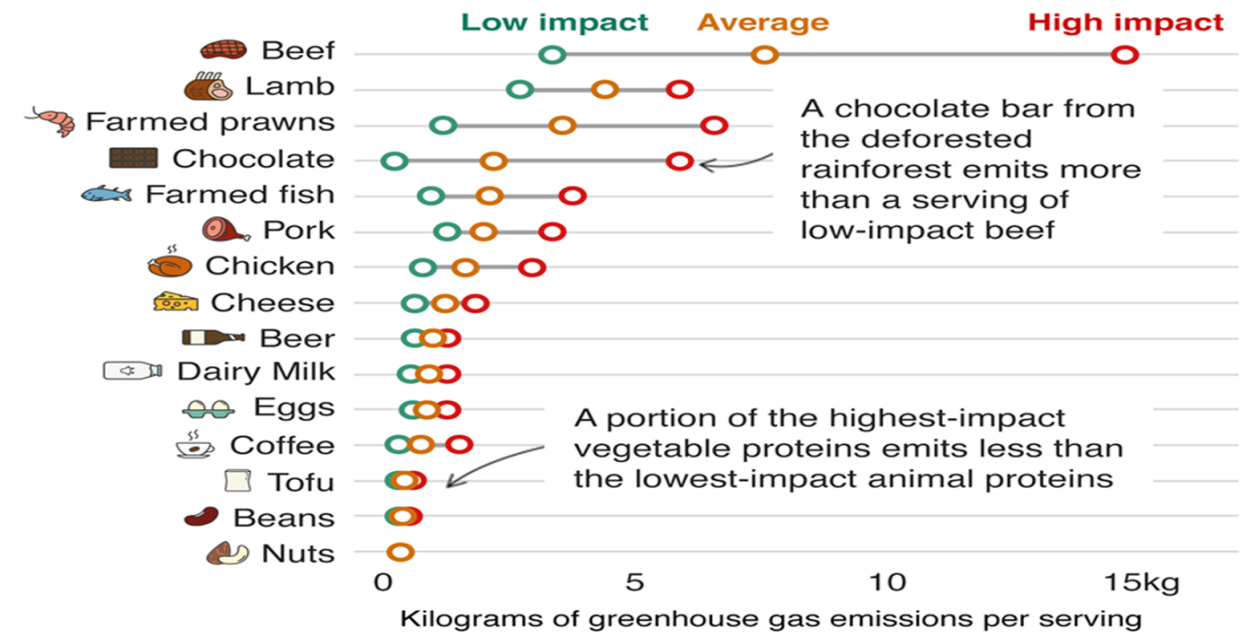


Poore and Nemecek, 2019

- The impact of the lowest impact animal products typically exceeds those of a plant-based nature.
- Cutting meat and dairy from the diet could reduce the amount of **land required** to produce food by **75%** and could reduce **carbon footprint by 2/3**.

Beef has the biggest carbon footprint - but the same food can have a range of impacts

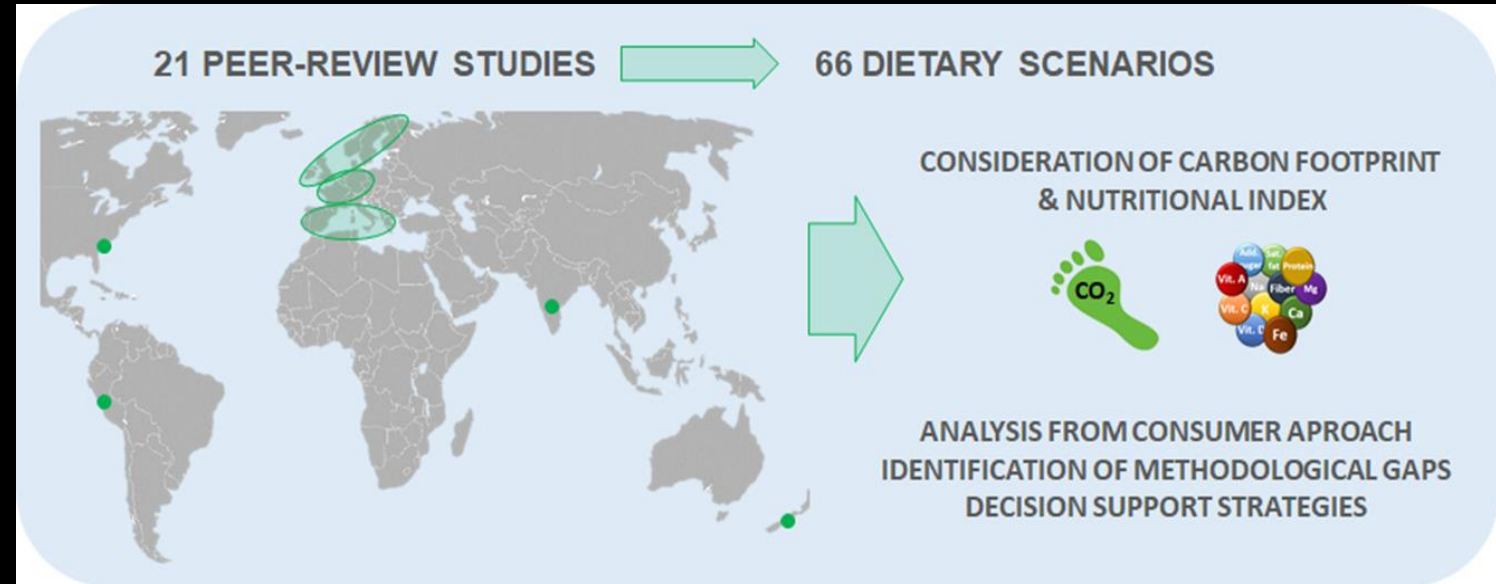
Kilograms of greenhouse gas emissions per serving



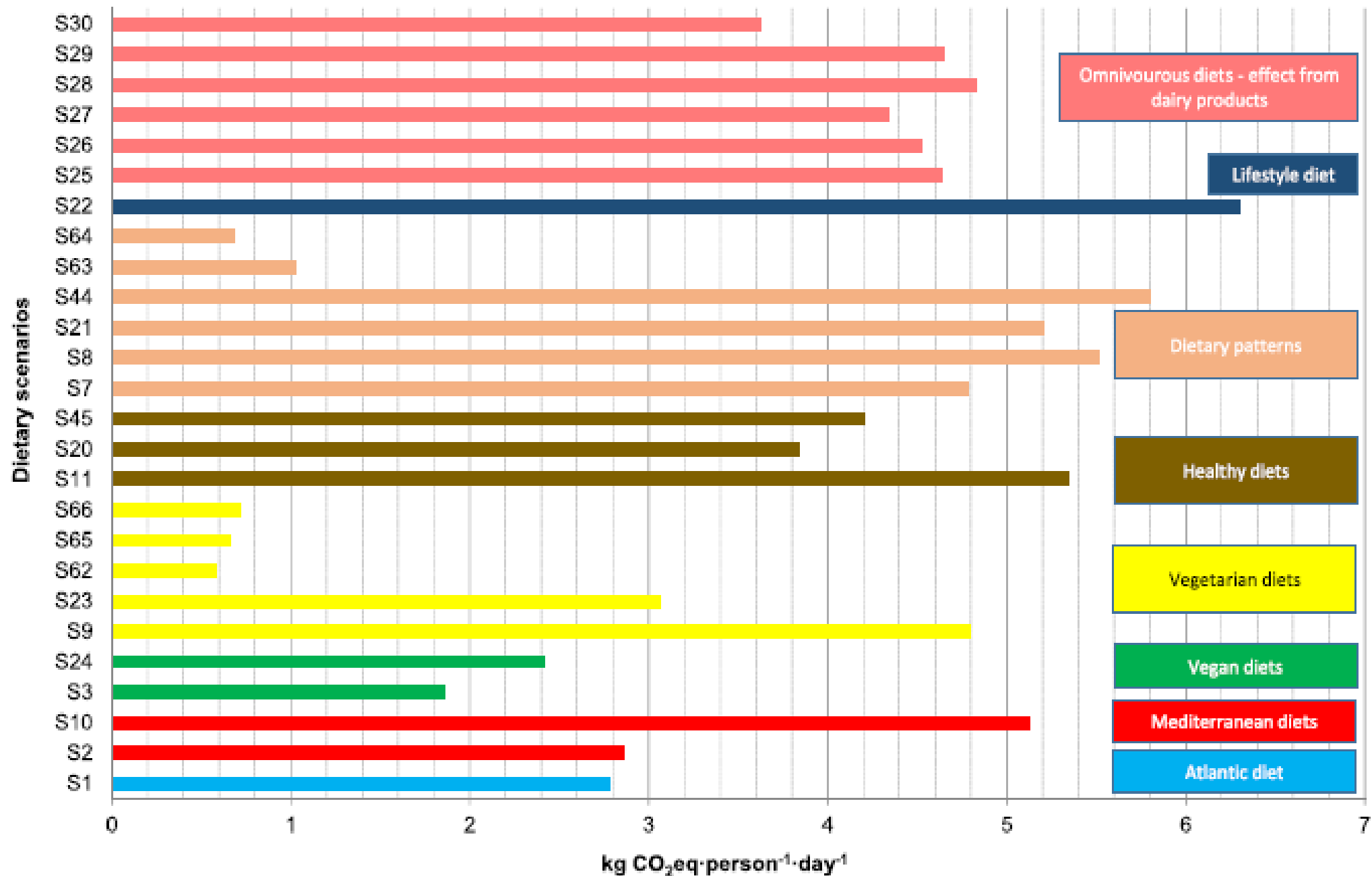
What Diets are
Environmentally
Sustainable?

- **Considering the types of agriculture that are most damaging to the environment, what type of diet do you think would be most sustainable (globally)?**
- **How sustainable is the UK diet?**

Carbon Footprint of Different Dietary Patterns



- Carbon footprint and nutritional quality of different human dietary choices, (González-García et al, 2018)



Summary Of Paper

- Mediterranean and Atlantic diets present high nutritional scores and low carbon footprints.
- **Northern and Western Europe/United States, have the highest carbon footprints, particularly from dairy products.**
- Dietary choices rich in vegetables (e.g., vegan/vegetarian) have a better environmental profile than those rich in meat.

Sustainable Diets and Health

The evidence from most scientific studies demonstrates some commonalities between sustainable and healthy diets.

Diets with a reduced reliance on livestock products (especially beef and dairy), with a shift to more plant-based proteins (including wholegrains, beans, nuts and seeds), and reduced intakes of pre-packaged or highly processed foods, especially those high in fat, salt, and sugar have both benefits for human health and the environment.

UK Dietary Habits

- Current UK dietary habits (based on the National Diet and Nutrition Survey 2013/14) are estimated to contribute on average 2.1 tonnes CO₂ eq per person per annum (with expected under-reporting of energy intakes, this may be as high as **3 tonnes CO₂e per year**).
- Although the awareness and intention is there, it is clear from the latest UK dietary survey that this has yet to translate into sustainable dietary behaviour change for the majority, and significant barriers will need to be identified and overcome.

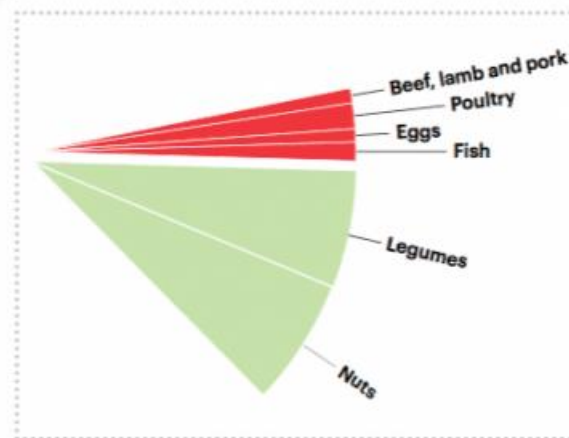
Sustainable diets in the UK

- A study by Wrieden et al (2019) looked at the affordability, environmental sustainability and nutritional quality of diets in the UK
- They found that only 16% of households could be described as more sustainable than average
- When increasing the Diet Quality Index to 80% of recommendations only 0.8% of the sample were met the criteria.
- This means there is a lot of work to do – but where to start?

EAT-Lancet (2019)

- A landmark study by a prestigious scientific paper, the Lancet was published in January (2019)
- “Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems”.
- This 47 page paper was written by a team of 17 experts and 20 co-authors over a period of two years
- They proposed a global transformation of food systems that set boundaries, limits and estimates for the foods that humans should eat to nurture both human health and the environment.





EAT LANCET Planetary Plate

- https://eatforum.org/content/uploads/2019/07/EAT-Lancet_Commission_Summary_Report.pdf

This includes:

- more than **doubling** in the consumption of healthy foods such as **fruits, vegetables, legumes and nuts**, and a greater than
- > 50% reduction in global consumption of less healthy foods such as **added sugars and red meat**
- For example = **14g red meat per day**
- an **85% reduction** in the **90.5g** that we are currently consuming each day in the UK.

Responses to EAT-Lancet Paper

The study and report were widely acclaimed but there have been some criticism:

The Sustainable food trust (2019):

<https://sustainablefoodtrust.org/articles/eat-lancet-reports-recommendations-are-at-odds-with-sustainable-food-production/>

Withdrawal of support from the World health Organisation:

<https://www.bmj.com/content/365/bmj.l1700>

NFU response: <https://www.nfuonline.com/news/latest-news/nfu-responds-to-the-eat-lancet-commission-report/>

Affordability of EAT-Lancet Study

- Hirvonen et al (2019) estimated the affordability of the EAT-Lancet recommendations across 159 countries.
- the EAT-Lancet diet costs a small fraction of average incomes in high-income countries but was not affordable for the worlds poorest countries.
- the Eat-Lancet diet exceeded household income for 1.58 billion people.
- the Eat-Lancet Diet is more expensive than a diet at the minimum cost of nutritional adequacy.
- Current diets differ greatly from the targets. Improving diets in many countries is affordable but for many people would require some combination of **higher income, nutritional assistance and lower prices.**

British Dietetic Association Campaign: One Blue Dot

The BDA launched a campaign in November 2018 to highlight the importance of environmentally sustainable nutrition to assist dietitians in advising patients about the advantages both environmentally friendly, affordable and nutritious diet.

In line with the BDA policy on sustainability.

BDA The Association
of UK Dietitians



**Eating patterns for health and
environmental sustainability**



British Dietetic Association (BDA) Recommendations

Food Group	Recommendation
Red Meat	Less than 70g/per person per day or less than 350g-500g per person per week.
Processed Meat	Avoid
Plant Protein	Prioritise beans and lentils, soya (beans, mince, nuts, tofu), mycoprotein (Quorn™), nuts and seeds.
Fish	From sustainable sources and follow oily fish recommendations.

British Dietetic Association (BDA) Recommendations

Food Group	Recommendation
Dairy	Moderate dairy consumption. Use calcium fortified plant-based alternatives where needed.
Potatoes/bread/pasta, rice/starchy carbohydrate	Recommend wholegrain. Recommend tubers such as potatoes.
Fruit and veg	Seasonal, locally produced vegetables/fruit or tinned/frozen. Avoid air freighted, pre-packed and prepared fruit and vegetables.

British Dietetic Association (BDA) Recommendations

Food Group	Recommendation
Portion Control	Reduce Animal Products, Moderate Dairy Produce and Avoid high fat, sugar and salt foods
Hydration	Tap water and tea or coffee in place of soft drinks
Reduce food waste	Reduce food waste. Especially perishable fruit and vegetables. Increase recycling of food waste

Eat Well Guide

- By switching our diet to the Eatwell Guide, from a typical UK diet, we can reduce our environmental impact by 31%.
- Eating a varied diet from a wide range of sources means we are not missing out on essential nutrients.
- You only need a moderate intake of animal products to achieve the Eatwell Guide's recommendations.

BDA, 2021



Top Tips for Consumers (BDA)

- **Make one change at a time.** Trying to change everything at once can be overwhelming and difficult to maintain.
- **Choose a mostly plant-based diet.** Try having one meat-free day a week. Reducing red meat portions to 50-70g per day (350-500g/week) is advised. Shift to more plant foods like beans, lentils, nuts and meat alternatives such as 'mycoprotein'.
- **Moderate your dairy intake.** Prioritise lower fat and sugar dairy options such as milk and yoghurt over ice cream and desserts. If you have plant-based alternatives, make sure to opt for fortified options with added calcium and iodine.
- **Aim for your 5-a-day** but keep it sustainable. Choose local and seasonal produce, reduce fruit and veg that have been flown in or grown in greenhouses. Avoid prepped and packaged fruit, veg and salads. Remember, tinned and frozen count too.

Top Tips (BDA) Continued

- **Soft drinks and fruit juice** are the third biggest contributor of dietary greenhouse gas emissions. **Tap water** remains our most sustainable source of hydration - use **refillable bottles**.
- **Avoid processed meats** and highly processed, high-fat-high-sugar foods. Choosing less processed foods will be beneficial for your health and for the environment. Overall food intake in the UK is too high, especially high calorie foods such as biscuits, crisps, chocolate and takeaways which are less nutritious.
- **Two 140g portions of fish** is recommended per week, one of which should be oily. Choose fish from **sustainable sources**. Look out for fish with the **Marine Stewardship Council Certificate (MSC)**.

Simplified:

Eat food.
Not *too* much.
Mostly plants.

Michael Pollan,
In Defense of Food



Recipes:

Free sustainability
cookbook!

[https://www.gcu.ac.uk
/student/news/studen
tnewsdieteticscookbo
ok/](https://www.gcu.ac.uk/student/news/studentnewsdieteticscookbook/)

Video Clips:

- Importance of soil:
<https://www.youtube.com/watch?v=BSHR4sUZpcw>
- More on the EAT Planetary Plate Diet
<https://www.youtube.com/watch?v=mnlaBhD-124>

Useful Sources

- DEFRA - Green Food Project (2012)
 - Eating Better - Better by Half
 - FAO - Dietary guidelines and sustainability
 - Food Climate Research Network
 - Food Ethics Council
 - Food Systems Academy
 - Marine Conservation Society
 - Marine Stewardship Council
 - Medact
 - Soil Association
 - Sustain
- Nourish Scotland
- The EAT-Lancet Commission on Food, Planet, Health
 - Love Food Hate Waste and WRAP - tackling food waste
 - WWF - Livewell: Healthy Eating for a Healthy Planet
 - BBC Food calculator: What's your diet's carbon footprint?

References

- Burlingame B, Dernini S, Nutrition and Consumer Protection Division, editor. Proceedings of the International Scientific Symposium: Biodiversity and Sustainable diets united against hunger 3–5 November 2010. Sustainable diets and biodiversity directions and solutions for policy, research and action. Rome: FAO; 2012. <http://www.fao.org/docrep/016/i3004e/i3004e.pdf>
- Committee on Climate Change. The Fourth Carbon Budget - reducing emissions through the 2020s [Internet]. 2010 [cited 8/29/2018]. Available from: <https://www.theccc.org.uk/publication/the-fourthcarbon-budget-reducing-emissions-through-the-2020s-2/>
- Gerardo Ceballos, Paul R. Ehrlich, Rodolfo Dirzo (2017) Biological annihilation via the ongoing sixth mass extinction signaled by vertebrate population losses and declines *Proceedings of the National Academy of Sciences*: 114 (30) E6089-E6096; DOI: 10.1073/pnas.1704949114 <https://www.pnas.org/content/114/30/E6089>
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