

Ed Winters Talk. Review of Questions by Eco Actions Club

Edit: 15/09/22

- All questions posed at the event and those pending on the zoom chat have been listed.
- Ed's answers can be found at the end of the zoom recording. We have attempted to add some citations to those, and to answer those pending
- Disclaimer: Answers to ethics based questions may not reflect those of the club as a whole. More factually based answers are best effort research. This was put together by the Eco-Actions Club 'dining at CERN' section. As a club we actively encourage discussion and feedback.
- Please comment on this document via the codimd link (if you have access) or email EcoActions@cern.ch with the title 'Ed Questions Review'

Questions and Answers

1. Question from Jaana (summarised and edited):

Going vegan might require some reorganisation in your life. Have you done any research on the effect of going vegetarian, or e.g. dropping red meat? Okay, you already cited that eating fish is not unproblematic either, but what is the relative effect of these emissions to optimise the transition to veganism from an environmental perspective?

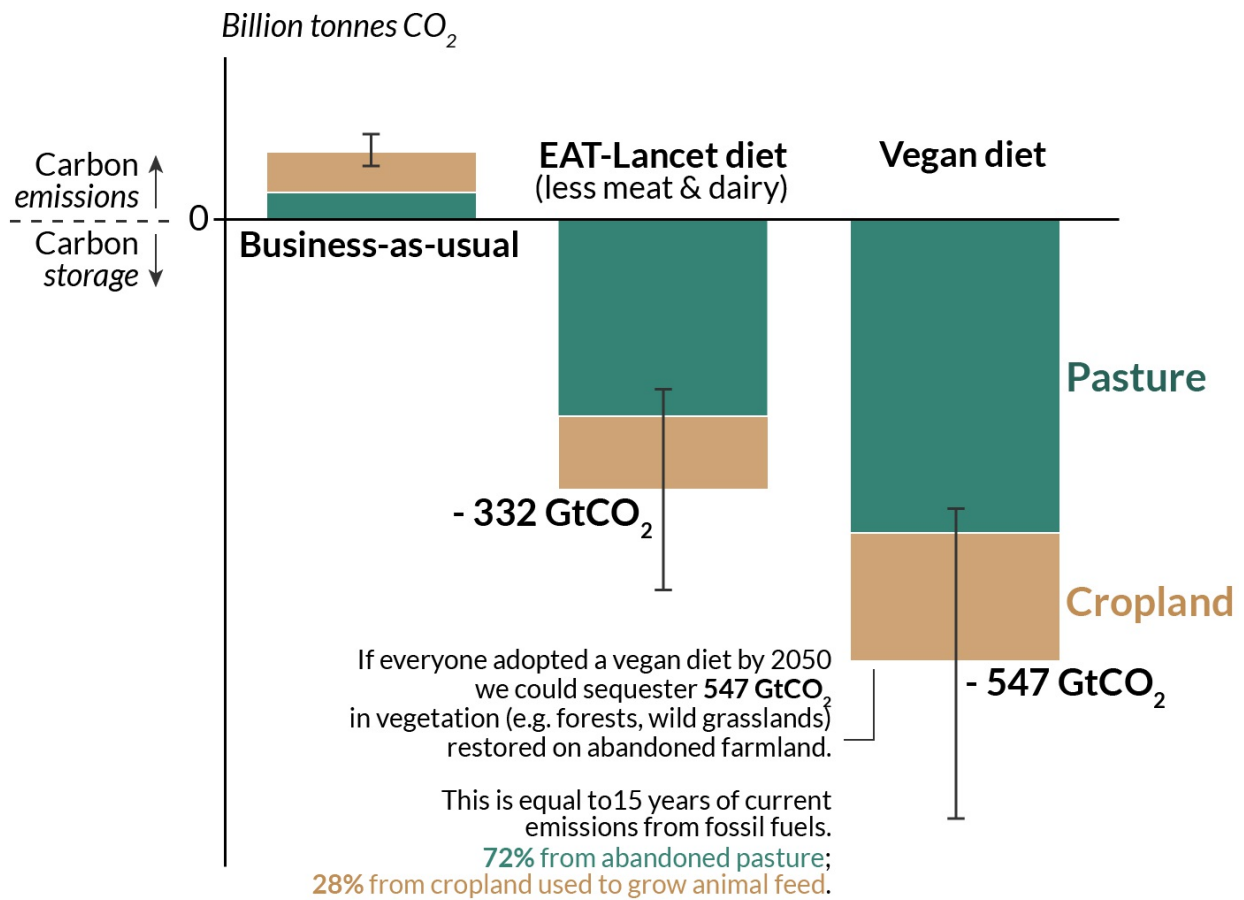
2. Similar question from Shilpi Jain (from zoom chat):

I have a question on a flexitarian diet: Sometimes people tend to opt for a flexitarian diet (i.e. eating meat or seafood twice or thrice a month). I have seen research quoting a decrease of emissions by 50-60%. What is your opinion on that?

Of course every diet must be compared on a case by case basis, but there have been studies that attempt to summarise various diets including flexitarian diets (with very limited use of meat, dairy, eggs, and fish), and fully plant-based diets. The following two graphs show how much we can improve in going from a flexitarian (which must include vegetarian) diet to a fully plant-based diet.

How much carbon dioxide could regrowth of trees and wilderness store if we changed global diets?

Using land for agriculture – either crops or pasture for livestock – prevents natural vegetation, such as forests, or wild grasslands from growing on that land. The CO₂ this land could sequester is the ‘carbon opportunity cost’.



Note: Figures only include carbon storage in vegetation – it does not include reductions in greenhouse gas emissions from food production. Soil carbon sequestration is also not shown, but the authors estimate an additional 135 – 225 GtCO₂ of carbon storage in soils.

Source: Matthew Hayek et al (2020). The carbon opportunity cost of animal-sourced food production on land. *Nature*.

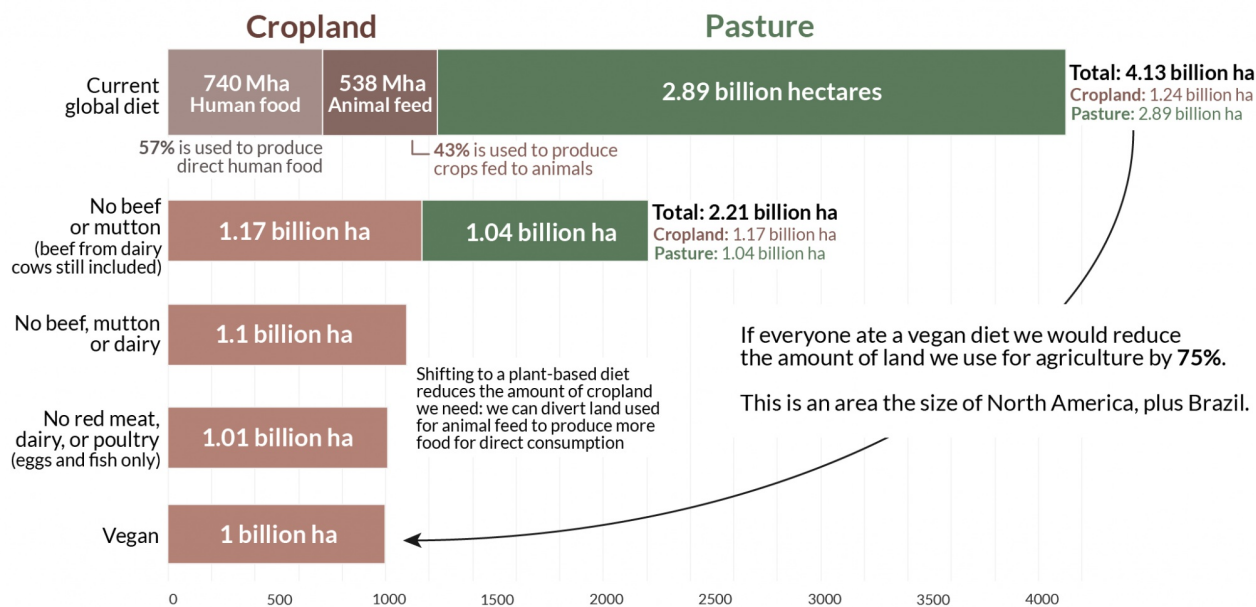
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Global land use for agriculture across different diets



Global agricultural land use is given for cropland and pasture for grazing livestock assuming everyone in the world adopted a given diet. This is based on reference diets that meet calorie and protein nutritional requirements.



Data Source: Joseph Poore & Thomas Nemecek (2018). Reducing food's environmental impacts through producers and consumers. *Science*.
 OurWorldinData.org - Research and data to make progress against the world's largest problems. Licensed under CC-BY by the author Hannah Ritchie.

According to this study, <https://www.nature.com/articles/s41893-020-00603-4>, moving from a very limited meat-dairy diet to a complete plant-based diet can help sequester 215 GtCO₂ more. This is equivalent to 99-163% of the CO₂ emissions budget consistent with a 66% chance of limiting warming to 1.5 °C.

2. Question from Bruce (edited):

I just agree with almost everything you said. I just always want to try and find counter arguments: So first of all, the land use numbers you gave were staggering, but what counts? If we look into Switzerland, here we look at the hills and then the mountains with cows every so often.

(a) Would you count that entire area then as land use for animal agriculture? Because I could imagine large swathes of the earth, today, you can say there are a few cows around and that doesn't count as intensive farming.

(b) How do we answer the often made point that beef/cow products are sustainable because they upscale grass into human food?

Some background on global land use:

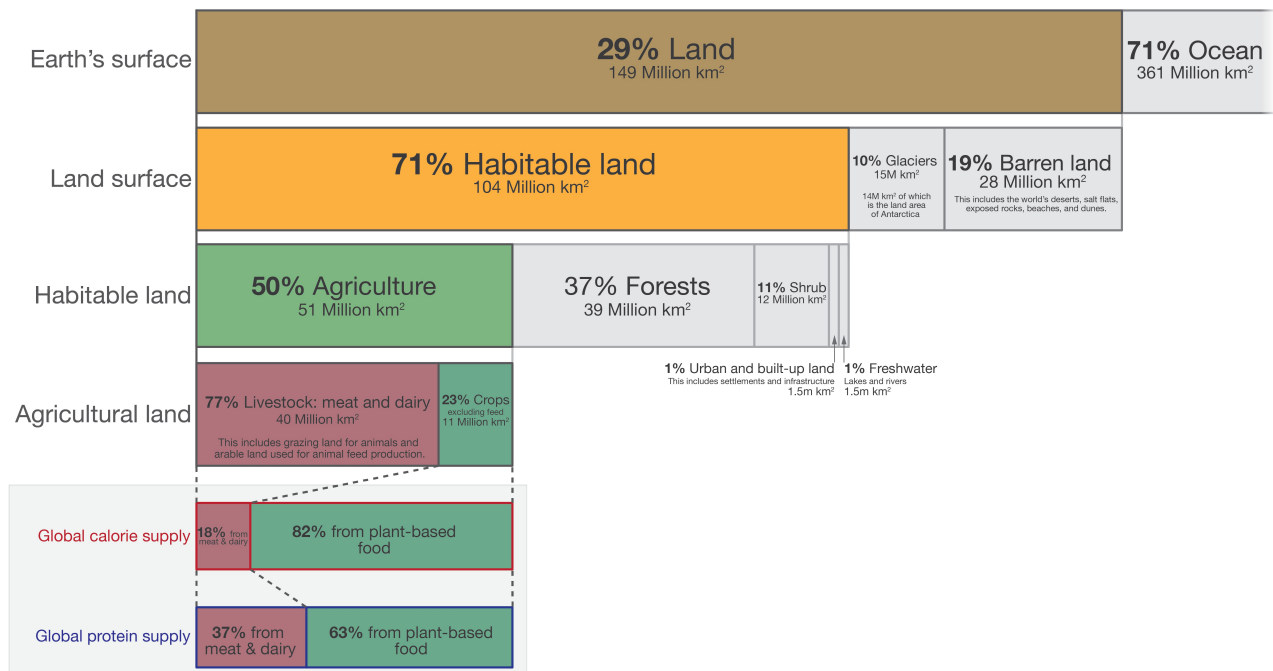
38.5% of our habitable land goes towards animal agriculture while producing only 18% of the total calorie intake and 37% of the total protein intake.

(<https://ourworldindata.org/environmental-impacts-of-food>,

<https://www.science.org/doi/10.1126/science.aaq0216>).

Only 37% of the total habitable land is forest and only 11% shrub.

Global land use for food production

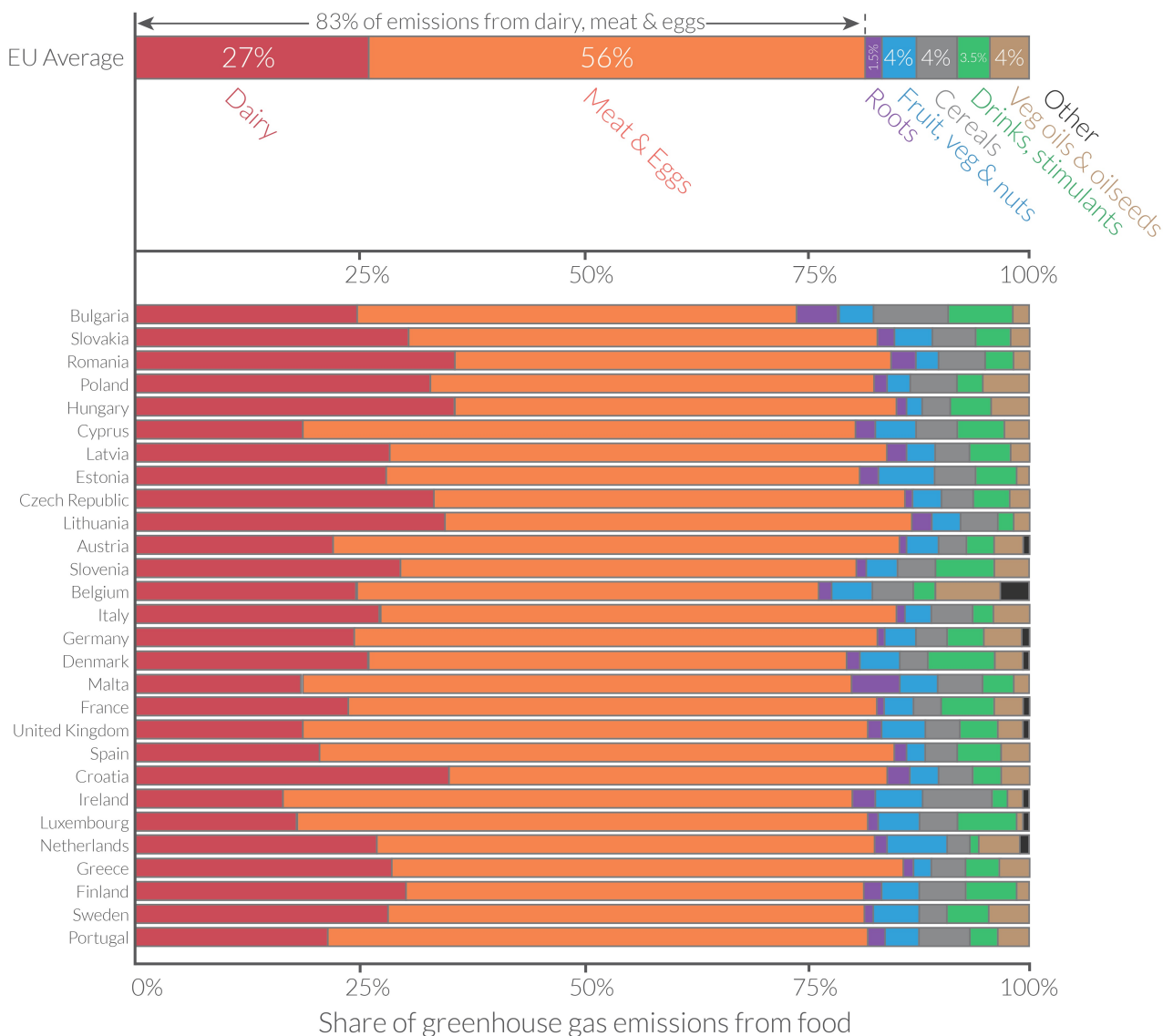


Data source: UN Food and Agriculture Organization (FAO)
 OurWorldinData.org - Research and data to make progress against the world's largest problems.

Licensed under CC-BY by the authors Hannah Ritchie and Max Roser in 2019.

In Switzerland, agriculture contributes to 12.4% of the total emissions of which up to 74% comes from animal agriculture (ruminant + manure management: <https://www.agroscope.admin.ch/agroscope/en/home/topics/environment-resources/climate-air-quality/treibhausgas-emissionen/swiss-national-greenhouse-gas-inventory-agriculture.html>). We are not aware of a study that specifically considers Switzerland, but if we assume that the Swiss average is close to the EU average, then the emissions from animal-based foods are quite large compared to the world average.

Carbon footprint of diets across the European Union: which foods are responsible for greenhouse gas emissions?



Data source: Sandström et al. (2018). The role of trade in the greenhouse gas footprints of EU diets. OurWorldinData.org – Research and data to make progress against the world’s largest problems.

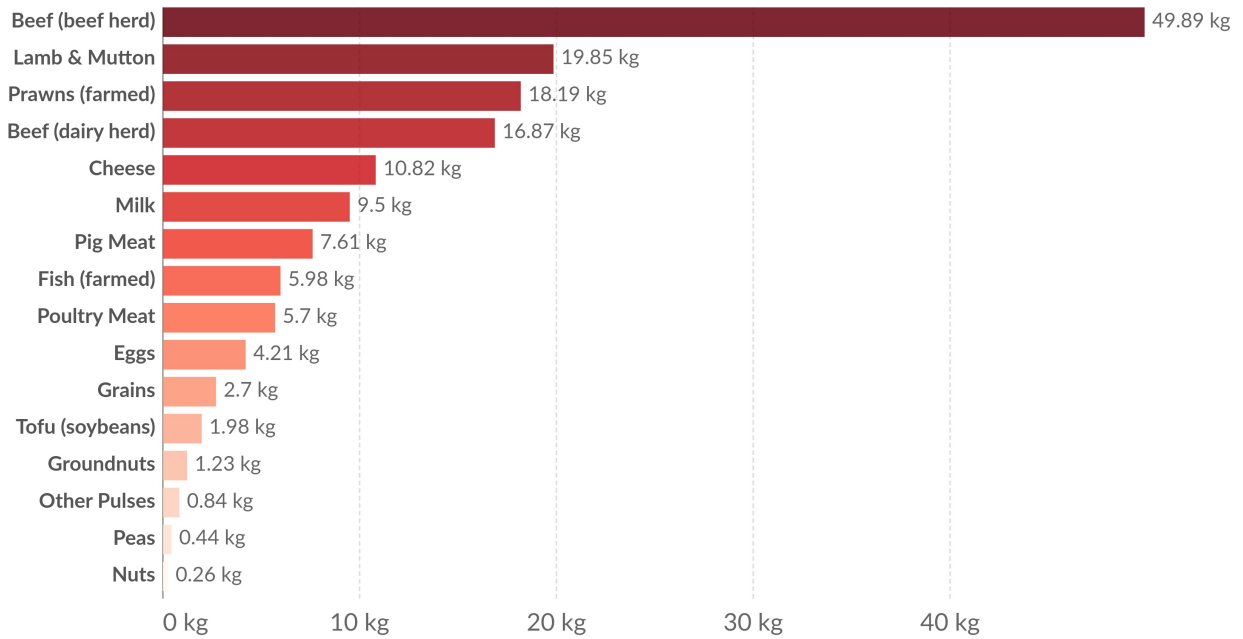
Licensed under CC-BY by the author Hannah Ritchie.

So, in answer to (a), consistent with Ed's verbal answer, the grasslands would not typically look in the state we see them for cows, and so it is reasonable to count the land over which they roam in full as land dedicated to animal agriculture. There will be much benefit from rewilding these grasslands if we want to sequester more and more CO2 equivalent.

In answer to (b), concerning the efficient use of grassland for protein production, as for (a), it assumes that the grasslands exist with no other possible use anyway. This is not typically the case and the land could be used better to sequester carbon. The GHG equivalent emitted per kg of protein obtained is still higher than plant-based options no matter how the beef is produced. For beef there is a large variation in GHG emitted per 100 grams of protein, but it still surpasses that of plant-based options significantly, indicating that using 'existing' grasslands for beef farming is still not an environmentally efficient method of protein production for humans.

Greenhouse gas emissions per 100 grams of protein

Greenhouse gas emissions are measured in kilograms of carbon dioxide equivalents (kgCO₂eq) per 100 grams of protein. This means non-CO₂ greenhouse gases are included and weighted by their relative warming impact.



Source: Poore, J., & Nemecek, T. (2018). Additional calculations by Our World in Data.

Note: Data represents the global average greenhouse gas emissions of food products based on a large meta-analysis of food production covering 38,700 commercially viable farms in 119 countries.

OurWorldInData.org/environmental-impacts-of-food • CC BY

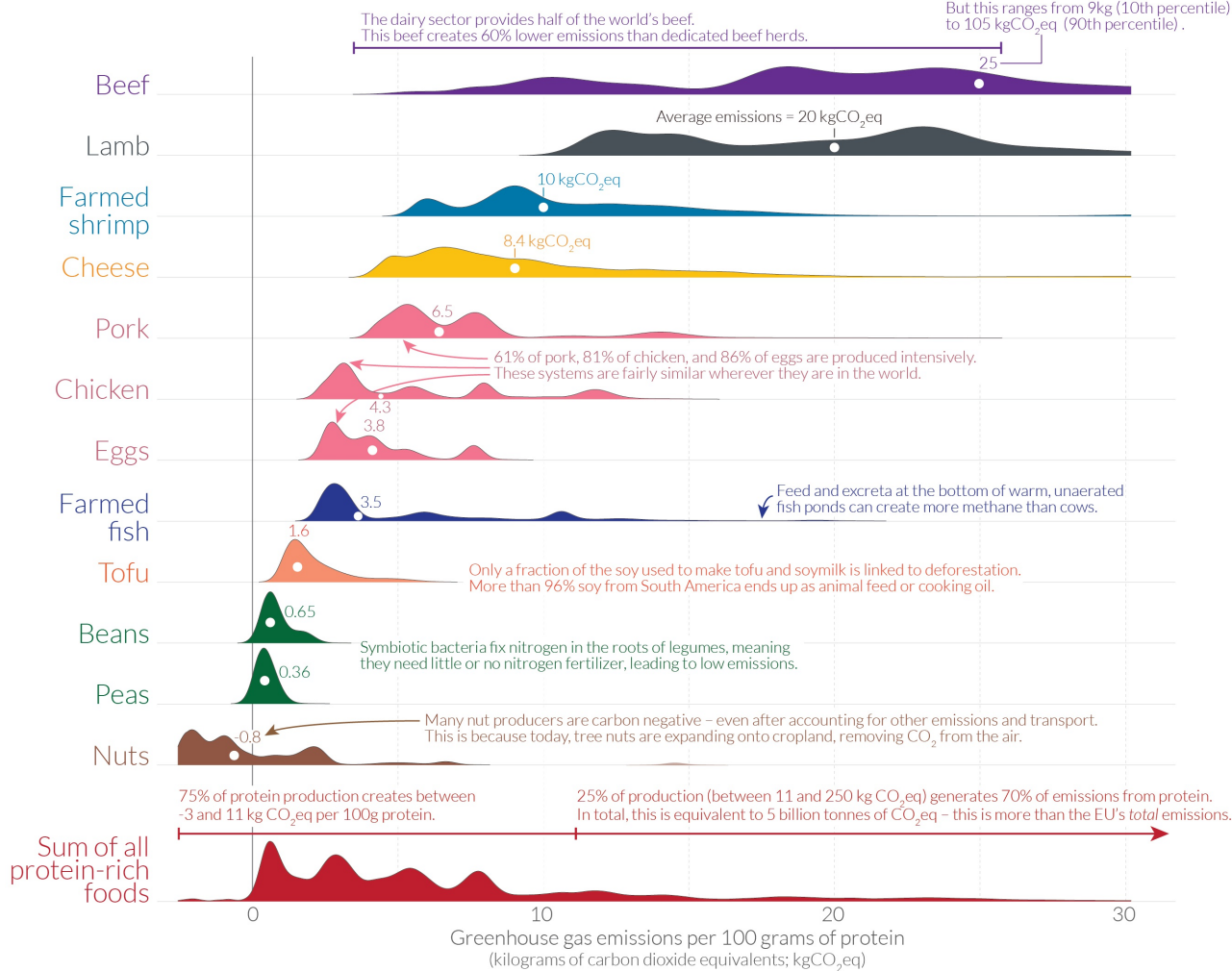
How does the carbon footprint of protein-rich foods compare?



Greenhouse gas emissions from protein-rich foods are shown per 100 grams of protein across a global sample of 38,700 commercially viable farms in 119 countries.

The height of the curve represents the amount of production globally with that specific footprint. The white dot marks the median greenhouse gas emissions for each food product.

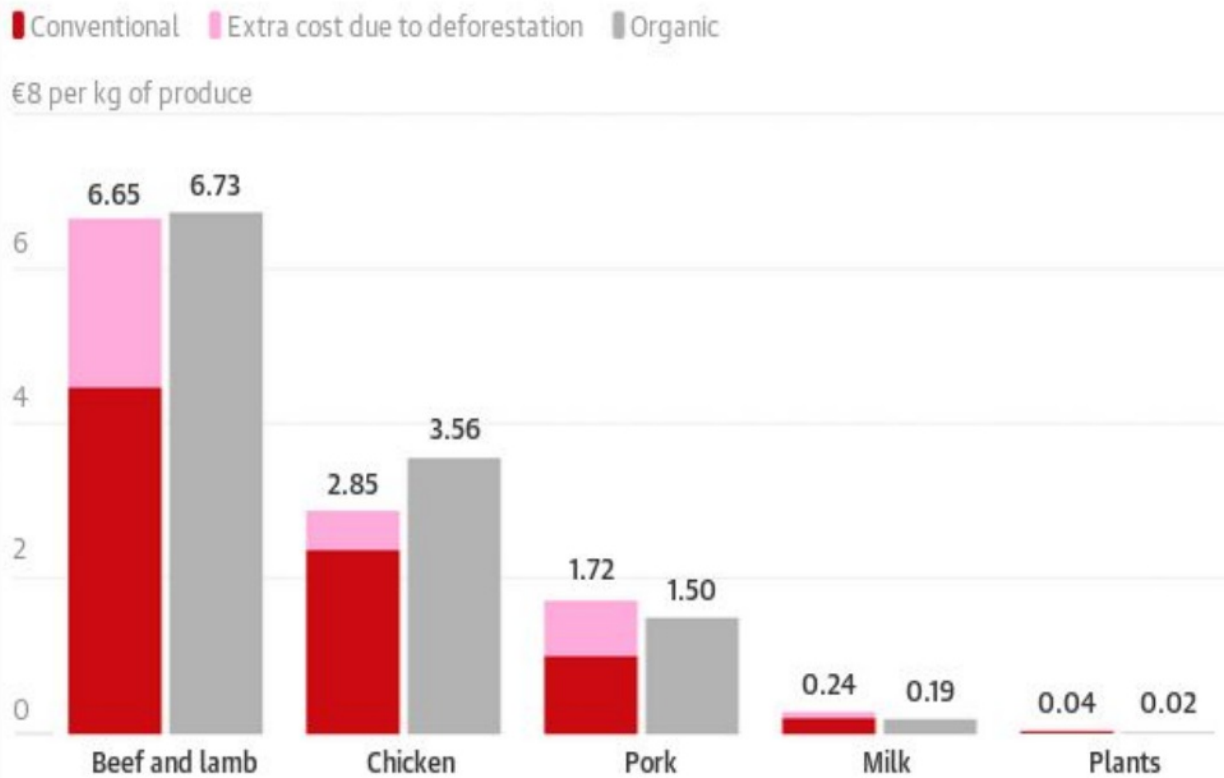
Producing 100 grams of protein from beef emits 25 kilograms of CO₂eq, on average. But this ranges from 9kg (10th percentile) to 105 kgCO₂eq (90th percentile).



Note: Data refers to the greenhouse gas emissions of food products across a global sample of 38,700 commercially viable farms in 119 countries. Emissions are measured across the full supply-chain, from land use change through to the retailer and includes on-farm, processing, transport, packaging and retail emissions. Data source: Joseph Poore and Thomas Nemecek (2018). Reducing food's environmental impacts through producers and consumers. *Science*. OurWorldinData.org – Research and data to make progress against the world's largest problems. Licensed under CC-BY by the authors Joseph Poore & Hannah Ritchie.

The variation will depend on many factors but to understand why grass-fed and pasture-fed cows often emit more than factory-farmed ones, one can review the following study published in Nature. <https://www.nature.com/articles/s41467-020-19474-6>.

Climate costs are similar for organic and conventional meat



Guardian graphic. Source: Pieper et al, Nature Communications, 2020

In Switzerland from 2001 to 2021, 4.2% of tree cover loss occurred in areas where the dominant drivers of loss resulted in deforestation.

Ref: <https://www.globalforestwatch.org/dashboards/country/CHE/?category=summary&location=WyjJb3VudHJ5IiwQ0hFIIO%3D&map=eyJjZW50ZXIiOmsibGF0Ijo0N>

3. Question from Lorna Muddiman:

In an ideal world what could transitioning to a plant-based food system look like? In reality, we're likely to get a lot of pushback from the meat and dairy industry, which have extreme lobbying power with governments. Question is how do we (climate activists, vegans, environmentalists, etc.) - with our limited resources - mobilise to influence policy makers to take concrete action against climate change and animal agriculture? While I support empowering individuals to take action - at a critical time when we need systemic change to tackle the climate crisis and environmental destruction, I don't believe individual action is enough.

- Additional comment by hosts: we have had 4 environmental science talks hosted at CERN (not CERN eco actions club), none of which addressed (or dared to address?) the subject of animal agriculture.

Taking the opportunity to provide some background on why veganism is one of the most important individual environmental actions: According to the biggest study on the subject done by Poore and Nemecek: (<https://www.ox.ac.uk/news/2018-06-01-new-estimates-environmental-cost-food>), our diet shifts to fully plant-based ones can reduce our individual emissions by up to 73% and a plant-based world would require 76% less of the total farmland, helping in restoring biodiversity, significantly (wild mammals only account for 4-6% of the total mammalian

biomass today [<https://www.pnas.org/doi/10.1073/pnas.1711842115>,
<https://ourworldindata.org/environmental-impacts-of-food>]).

The dairy and meat industries are already giving the plant-based industry serious pushback. Some of these include forcing them to not call their products soya milk, plant-based meat alternatives, etc. with excuses that consumers will be confused.

What we personally feel we can do is write to (1) various companies or restaurants already providing plant-based alternatives, asking for more products, and environmentally friendly packaging, (2) companies or restaurants not providing such alternatives and ask for such alternatives mentioning other companies who do and educating them about their climate impacts through simple data, (3) writing on social media posts of local governments, UN, WHO, and other important decision making bodies, to name a few. I fully agree that individual actions are important, but systemic changes are way more important. As a case study, I can refer you to the Eco Actions Club and the Vegans at CERN group constantly writing to the HSE and the CSR such that they understand the climate crisis and introduce more plant-based options in their menus. It is a work in progress.

4. Question from Pat:

Hi Ed! So happy to have you with us. I have a somewhat general question: do you think becoming a vegan can be done "in a click" or is it a process? I think a big barrier (that at least I had) was that my vegan friends told me it's either vegan or not, while I now think it's useful to replace things (be it food or any other animal product) in steps. I thought about this mostly from your 'reducetarianism' video. In other words, what do you think about it but as a step towards veganism? And more broadly, is being vegan a binary thing, or can we become more vegan with time and some effort?

The following questions touch on personal perspectives, so Shankha has given his, pending/ supplementing Ed's response.

Answer from Shankha:

You are absolutely right. We wanted to answer this separately as this question delves more into the moral side of things. It varies from person to person and the reasoning behind it. Whilst veganism is a philosophy solely for animals, a plant-based lifestyle can be for various reasons, including the environment. What worked out best for me was watching documentaries (Earthlings, Dominion, Cowspiracy, Seaspiracy, etc.) and visiting animal farms (where they are raised to be killed) and sanctuaries. For a lot of vegans, it is a social justice movement like many others, and hence binary. However, if the end goal is to become a vegan, and if the resolution is firm, steps do work. As Ed and many other activists mention, becoming vegan often seems like a daunting task as many think that the meals need to be completely changed, and we have to change every single thing in our lives. What I found to be useful was not to change my meals but just ingredients. As an example, instead of meat mince, I use lentils or soy mince in my spaghetti Bolognese. When I need to travel somewhere, I just plan a day in advance, and so on. I hope this helps and I will be happy to discuss this further with you.

5. Question from Pat:

And if there's time for an extra question from me later on: apart from the whole very important environment topic, which is reason enough: Is the ability of animals to feel joy and suffer the main driver, or is it not taking a life 'if we don't need to'? I mean, we give a vaccine to a baby that makes them suffer, not because we want them to suffer, but because we want to protect their life. In other words, do you personally value life 'more' than suffering, or is the feeling more valuable than life?

Answer from Shankha:

That is a very important point. The whole premise of veganism stands on causing the least harm possible. As humans, our very existence would always cause harm, including deaths of animals while cultivating crops (more in this video as to how important it is: https://www.youtube.com/watch?v=0QTNgKpV_K4). However, the issue is always to try and minimise the harm inflicted upon sentient beings. The idea is to recognise whether our fleeting pleasure derived from a meal (which can also be satiated from plant-based alternatives) is more important than the entire existence of a sentient being, who has been bred into existence. So, it is both the suffering as well as the life, as all animals are killed at mere fractions of their lives.

6. Question from Pat:

Last I make, if there's time! Talking about devil's advocate: what's the strongest (similar-values) argument you've encountered yourself against veganism in general? I have a couple of my own arguments, but I'm super curious about yours! :)

Answer from Shankha:

The only things that I have heard to be very strong reasons are availability and financial condition. Oftentimes, a plant-based diet is thought to be a replacement diet including expensive products like beyond burgers, plant-based ice creams, etc. In many countries, where the demand is less, many of these products are expensive. Another factor that plays here is that the meat and dairy industries receive massive subsidies from the governments of many countries. I personally know of several vegans from developing nations like Bangladesh, and Pakistan. For them, whole food plant based diets are often the cheapest which include rice, beans, lentils, pastas, seasonal and local vegetables and fruits. Hence, I haven't yet found a strong enough justification against adopting a plant-based lifestyle.

One of the recent studies done by the Oxford University shows that for high and medium income countries, a healthy plant-based diet can often be cheaper.

[<https://www.sciencedirect.com/science/article/pii/S2542519621002515?via%3Dihub>,
<https://www.ox.ac.uk/news/2021-11-11-sustainable-eating-cheaper-and-healthier-oxford-study>]

7. Question from Luke

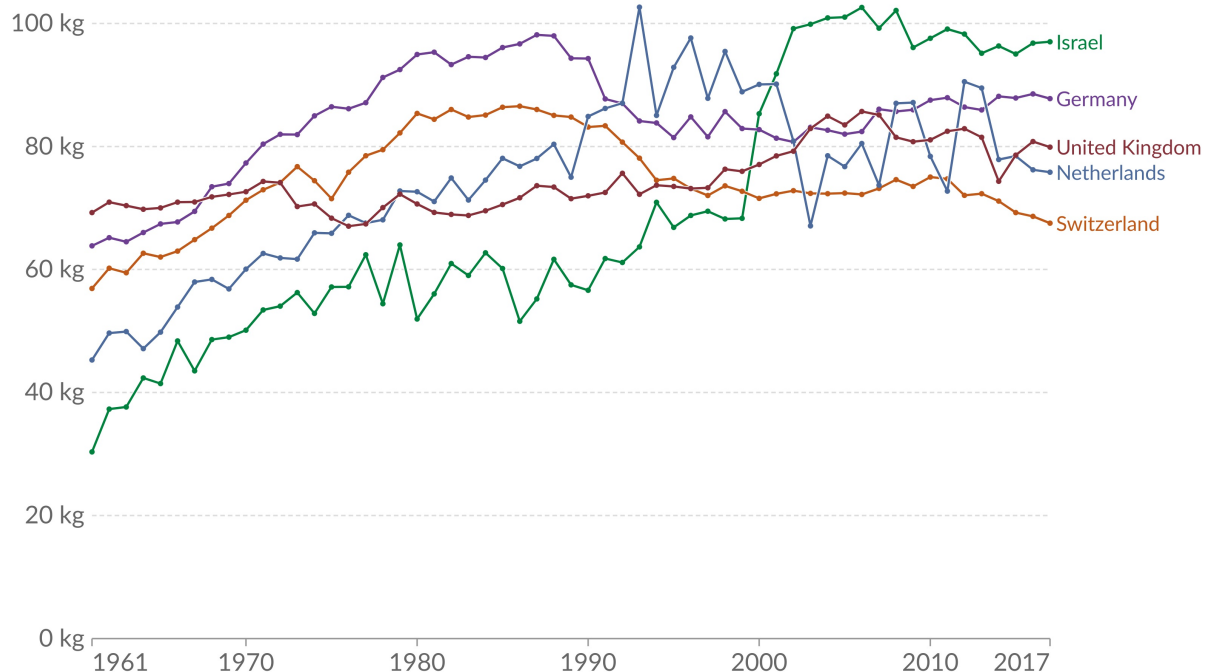
Plant based diets are growing traction, has there been any direct reduction on animal farming as a result? I'm worried about a sort of rebound effect whereby market forces reduce the meat price and a 'doesn't give a crap' gets a quadruple whopper...

The comprehensive data can be found at this link: <https://ourworldindata.org/meat-production>

It is true that some countries are already reducing their per capita consumption of animal products but the overall trend would become clearer in a decade I think. From my personal experience, having lived in the UK for three years, I saw the prices of plant-based alternatives getting normalised and some even being reduced when compared to their meat-based counterparts. The above link can help you make several plots. Unfortunately, the graphs stop in 2017. I have made a simple graph for illustration. I hope this helps to an extent.

Meat supply per person, 1961 to 2017

Average total meat supply per person measured in kilograms per year.



Source: UN Food and Agriculture Organization (FAO)

OurWorldInData.org/meat-production • CC BY

Note: Data excludes fish and other seafood sources. Figures do not correct for waste at the household/consumption level so may not directly reflect the quantity of food finally consumed by a given individual.

8. See 1*

9. Question from Ana:

Hi! A doubt from a gym perspective: what is the best way to build up muscle (doing weight lifting) on a vegan diet? What I mean by this is, what considerations does a vegan have to make, in contrast with a non-vegan? 2. As far as I know, a plant-based diet does not contain the whole chain of aminoacids that are needed/recommended, but I can't seem to find good sources about either this or the other side. Do you have any source/thought from the top of your head about this (or where can I find information about this?). Thanks for your time!

Many top athletes are switching to a fully or almost fully plant based diet. That is not to say that a diet that includes a moderate amount of meat cannot be optimal or healthy, but the notion that plant-based diets are risky, sub-optimal for our health, or deficient in proteins and other nutrients is clearly a myth.

Diets must be analysed on a case-by-case basis and what we absorb easily varies from one individual to another. Without speaking in the capacity of a nutritionist, we can share the following. Almost every single plant-based food group has all the 9 essential amino acids in varying proportions. So, as long as one is having a sufficiently varied calorie-rich diet, there is almost no chance of having protein deficiency. A useful researcher/MD/YouTuber in this field is Dr. Gil Carvalho. The following two videos might help clarify a lot of the concerns.

https://www.youtube.com/watch?v=_qndZ8_6vTk&t=2s

<https://www.youtube.com/watch?v=TEcpCrUo>

<https://www.youtube.com/watch?v=TEcpCrUoqml>

A few key ingredients that need to be taken care of in a plant-based diet are vitamin B12, vitamin D3, and omega-3 fatty acids.

Vitamin B-12 is not found in plant-based foods (an anomaly is apparently duckweed, which is now shown to contain good amounts, but the research is still in its nascent stage, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7600829/>). It is found in some vegan fortified yeast based products (like marmite) but supplementing is typically essential.

The absence of B-12 in a vegan diet cannot really be presented as a case against veganism on unnatural grounds. Firstly there is nothing particularly natural about the way we live anyway so ethics, environment, and health should be prioritised. Secondly, the industrial farming complex required to produce meat for our current rates necessitates that animals have to be supplemented with B12 themselves.

For most countries having less sunlight, vitamin D3 supplementation is suggested for both vegans and non-vegans. It is especially true in most countries on higher latitudes.

Plant-based sources of omega-3 fatty acids include chia seeds, flax seeds (ground), walnuts, etc. However, these are short chain omega-3 fatty acids called ALA. What we actually need are the long chain ones (DHA and EPA). Our body does convert ALA to DHA but the conversion rate varies with age. So, most vegans use algal oil (EPA) supplements instead of fish.

To learn more about plant-based bodybuilders and athletes, we can recommend watching some of the following documentaries; The Game Changers, What the Health, and Forks over Knives. We must admit that there have been some criticisms regarding the sensationalist approaches in these films. They nevertheless highlight the benefits of plant-based diets, in general. It is however the position of both the American and the British dietetic associations that well-planned plant-based diets are optimal for all stages of life, including but not limited to athletes.

<https://pubmed.ncbi.nlm.nih.gov/19562864/>

<https://www.bda.uk.com/resource/british-dietetic-association-confirms-well-planned-vegan-diets-can-support-healthy-living-in-people-of-all-ages.html>

Here's a list from the vegan society about the various key nutrients and where to find these from.

<https://www.vegansociety.com/resources/nutrition-and-health/nutrients>

10. Question from Vitor:

a) If you would have to prioritise between environment and ethics in terms of position yourself in favour of one in detriment of the other, which one would you stand for and what would be your thoughts to make such a choice.

b) Can an environmentalist not be vegan and be coherent?

a) This is a very interesting question. Personally, I do not know offhand. Fortunately, as it happens, a plant-based diet is one of the most environmentally-friendly diets and hence we do not need to choose one from the other.

<https://ourworldindata.org/environmental-impacts-of-food>

b) Because agriculture contributes to more than a quarter of the global emissions (with animal agriculture contributing somewhere between 14.5% and 18% of the total global emissions) along with massive contributions to deforestation, freshwater depletion, eutrophication, and loss of biodiversity (graph below), we tend to think that it is very important for an environmentalist to be plant-based.

11. Question from Paulo:

Hi Ed! Following Vitor's question nr.2, very pertinent in terms of coherence, I would also like to know your opinion if, considering that all animals share the same "home" (mother Earth) and that their well-being depends on the quality of their environment (ecosystem), can someone be a coherent vegan, without worrying about their environmental conscience (consumerism, CO2 emissions, waste recycling, etc.)? Let's take a classic example of a vegan who changes his iphone every year. Even though he does not consume any animal products, his iphone consumption habit contributes to the bursting of mountains in search of lithium to produce more batteries. However, in those mountains there are also animals living and an endangered ecosystem. Could that be consistent with a way of being vegan? Thank you very much for your valuable and courageous contribution to a more evolved human consciousness :)

Great question - it requires that we define what it means to be vegan and what it means to be coherent / consistent.

We should define that veganism is a philosophy that is solely about the animals whom we use for food, beverages, clothing, animal-testing, and entertainment. The concept of veganism is to abstain from direct use of an animal, where the animal is typically a commodity.

So within the strict definition of veganism, of course it is consistent to consume products that damage the environment, but the question is of course rather, is that definition meaningful?

In order to survive we have an impact on our environment where we compete for resources with other sentient beings and it is impossible to measure the indirect effects that we have. But veganism is not simply the only way we can define a strict boundary with direct effects, it is meaningful from an ethical standpoint for 2 reasons:

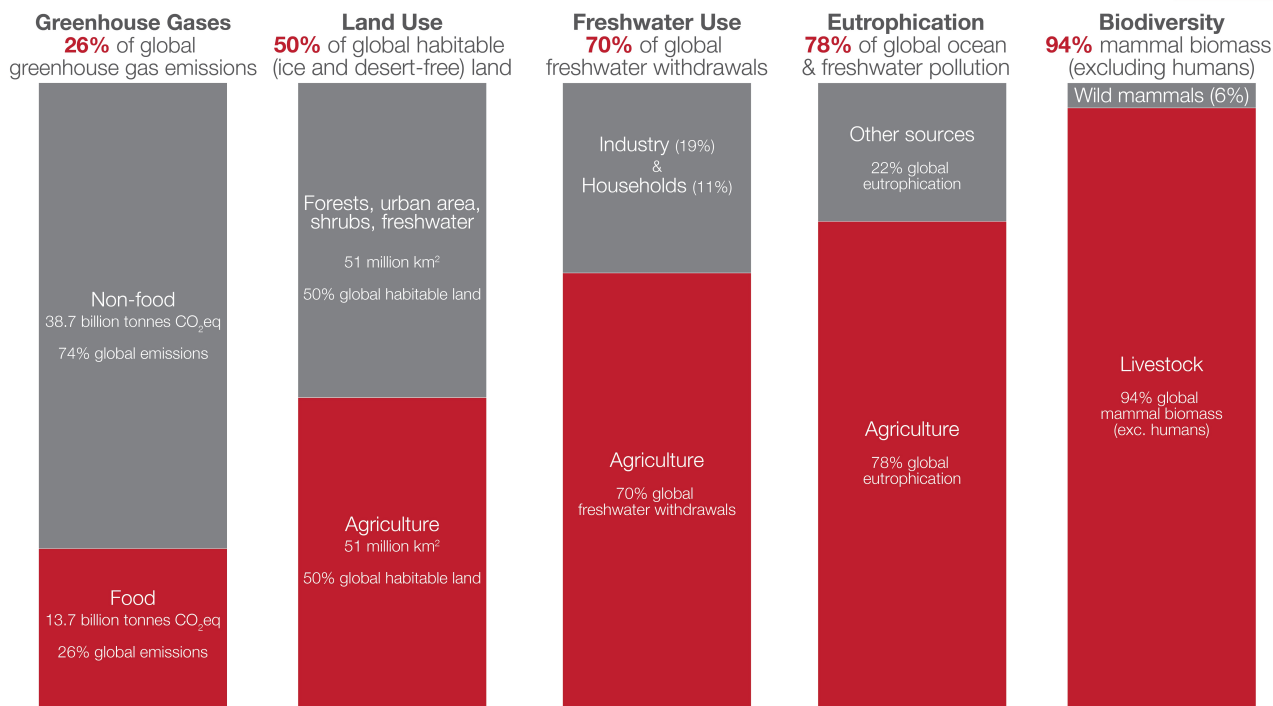
1. In general, the prolonged suffering and abuse happens when the animal is the commodity.
2. If we want to survive but limit competition with wild animals, from an environmental perspective, one of the best ways is still to consume fewer animal products.

Right now, if you compare the biomass of the mammals on land, the ratio of humans:livestock animals:wild mammals = 36:60:4-6 ! (<https://ourworldindata.org/environmental-impacts-of-food>)

Because livestock farming takes close to 38.5% of our entire habitable land, wild species suffer the most from animal agriculture.

Livestock farming is also directly responsible for deforestation, freshwater depletion, and eutrophication.

What are the environmental impacts of food and agriculture?



Data sources: Poore & Nemecek (2018); UN FAO; UN AQUASTAT; Bar-On et al. (2018).
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It is certainly not ‘inconsistent’ to be less than perfect in every way. Even in the extreme cases where true inconsistency might occur, i.e where many bad practices outweigh the benefits of a vegan lifestyle (environmentally), we should keep in mind that this is still not a logical argument against veganism itself.

It is of course good practice for any environmentalist to follow the principle of reuse-reduce-recycle. Taking your example, we agree: new phones, and not only iPhones, cause excess harm while trying to find minerals like lithium. These are not only harming non-human animals in mountains and other mine areas but also violate a lot of human rights issues. It would of course be ethically consistent for a vegan, like many environmentalists try to take action by abstaining from such products, and buying second hand and refurbished phones, where possible.

The only problem we can see is if veganism is used as an excuse to be environmentally relaxed in other areas. In general (anecdotal), we have not found this to be the case, rather the opposite.

In conclusion we do not find it particularly necessary to mix and compare the two concerns (the overconsumption of animal based products and overconsumption of wildlife damaging products) other than to note that the former is a huge part of the latter. Both are very important and can be dealt with in parallel.

- Question from Andrew: You mentioned George Monbiot in your responses a few moments ago. I've just finished reading his book *Regenesi* (mentioned also by Lorna above), and would love to hear your views on his conclusions around the need for precision fermentation to create alternative protein sources (particularly as a way to reduce land use). To what extent do you think such technologies will have to play a role in the much-needed transition away from animal-based farming? I am broadly supportive, but am worried about the risk of increasing monopolisation of our food-producing systems (as with seeds, fertilisers and large companies).

Answer from Tati (Ed's Team):

In terms of the last question, I am just speaking from my perspective here, it seems like opinions are quite split on whether we really need precision fermentation and cultivated meat or whether plant-based alternatives will be enough.

Speaking with non-vegans about this technology, some say they are just waiting for those products to full change their diet, others actually say they prefer to consume more plant-based Beyond Burgers. The cultivated chicken that is sold in Singapore right now is still very expensive so we have a way to go till we reach that point.

On the point of food monopolisation, I would say it is also to be determined. For now more and more startups are coming into the space but it is clear that not all of them will survive and some are being bought up by larger companies (many non-vegan ones) already. I do sense a feeling of more collaboration between all of these startups than in other food sectors. I could see more monopolisation happening among the ingredient companies supplying all the plant-based companies or the co-packers actually helping the startups scale up.

We do have a report on this coming out soon which might give more good info. I also recommend checking out the Good Food Institute.