

Creation Care in a Changing Climate:



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Doing Our Part to Reduce Greenhouse Gas Emissions



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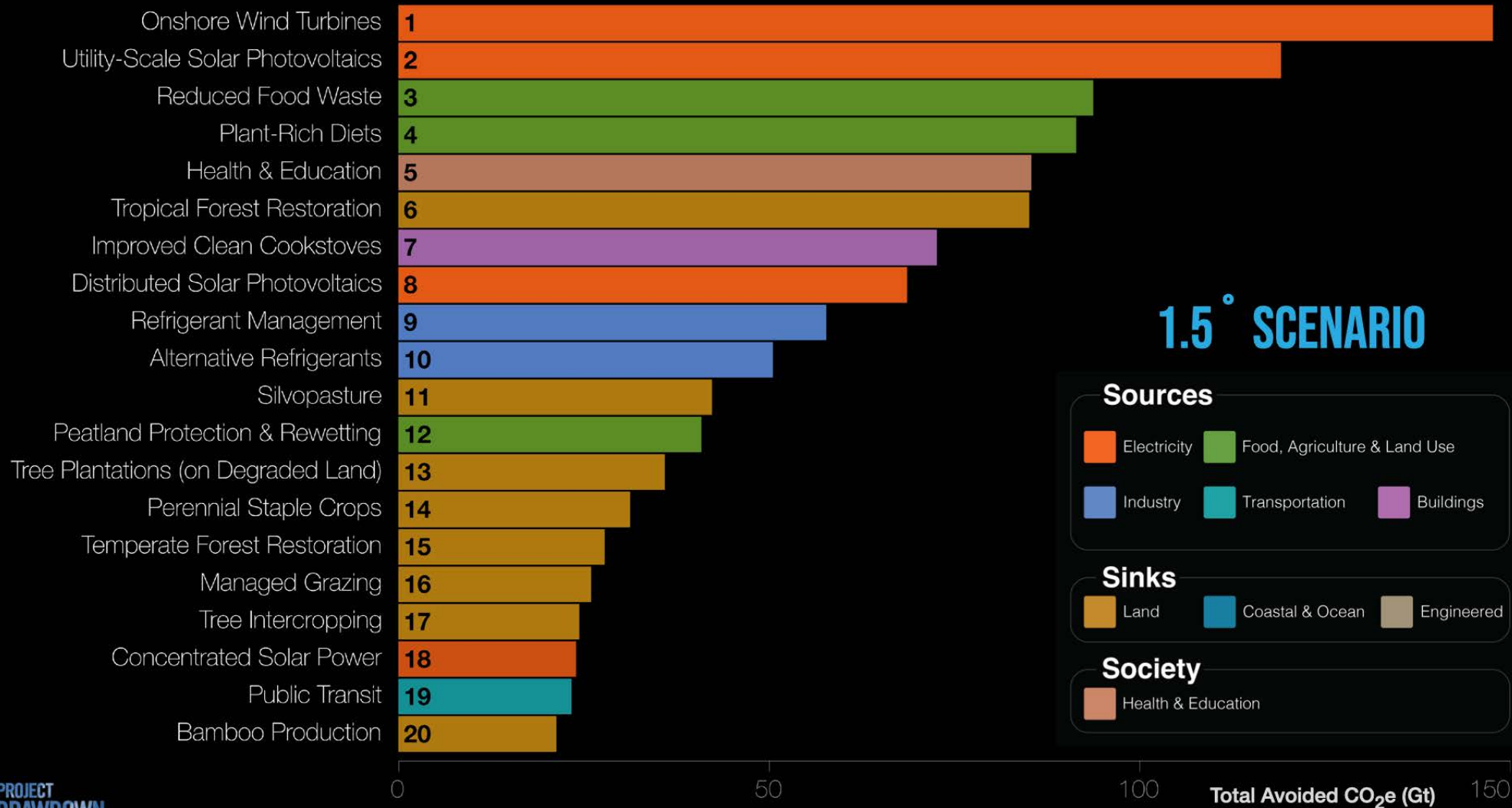
Creation Care in a Changing Climate: Doing Our Part to Reduce Greenhouse Gas Emissions

- Creation Care, Climate Action, and Ministry Priorities for People of Faith:

Biblical, Theological, and Ethical Perspectives

- Advocacy for Clean Energy - Solar and Wind
- Installing Rooftop Solar and Electrifying Everything
- Reducing Energy Use and Increasing Energy Efficiency
- Moving toward a Plant-Based Diet and Other Lifestyle Choices





Why is a meat-based diet a climate problem?

(Especially one that uses a lot of beef)

- Large forest areas cut down to feed animals.
- 80% of deforestation is due to clearing lands for pasture or growing feed.
- 91% of the Amazonian deforestation caused by such land clearing.

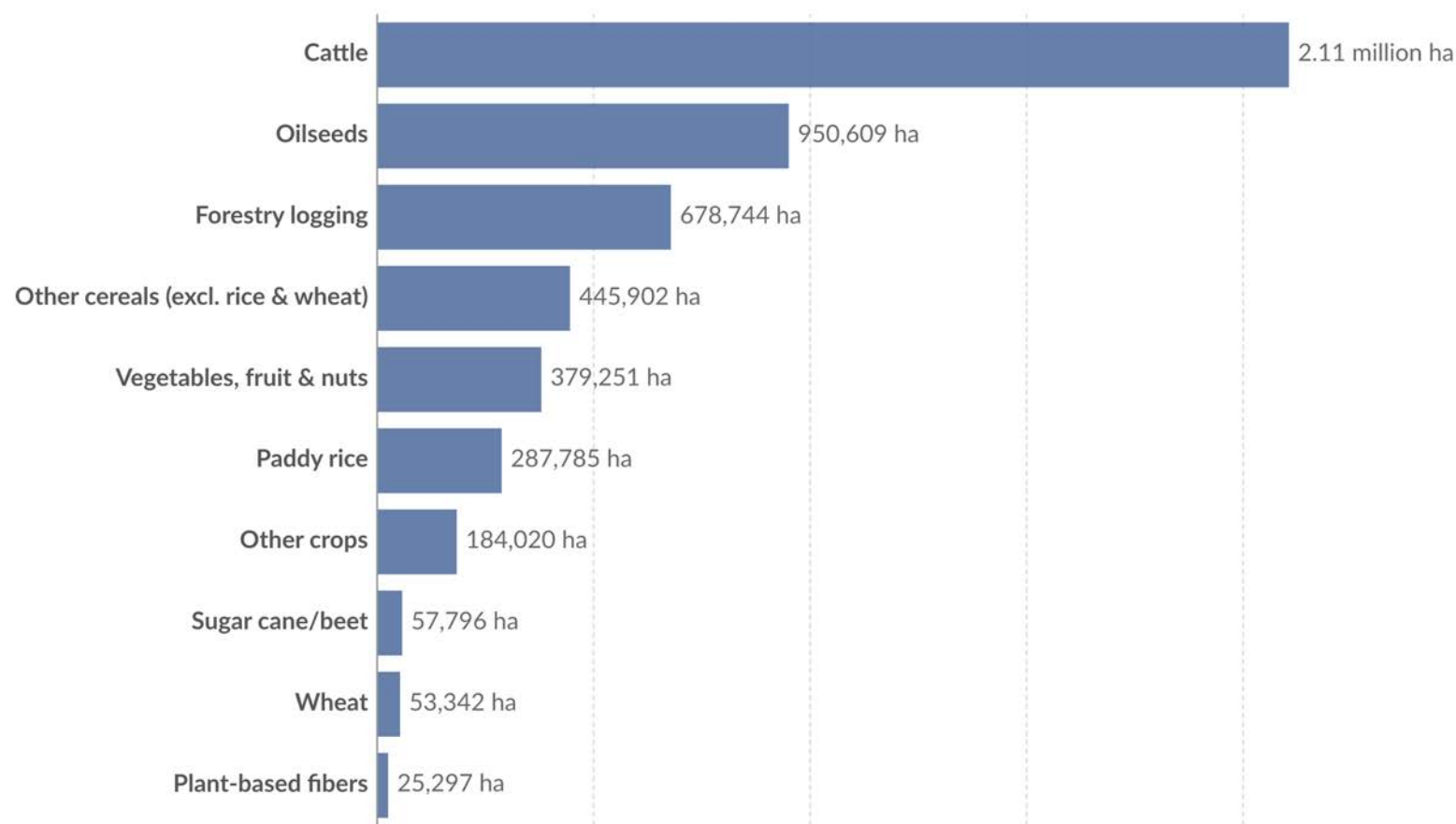
(Jonathan Safran Foer, *We are the Weather: Saving the Planet Begins at Breakfast*, 2020)



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Annual tropical deforestation by agricultural product

Annual deforestation is measured as the average between 2010 and 2014, and is measured in hectares.

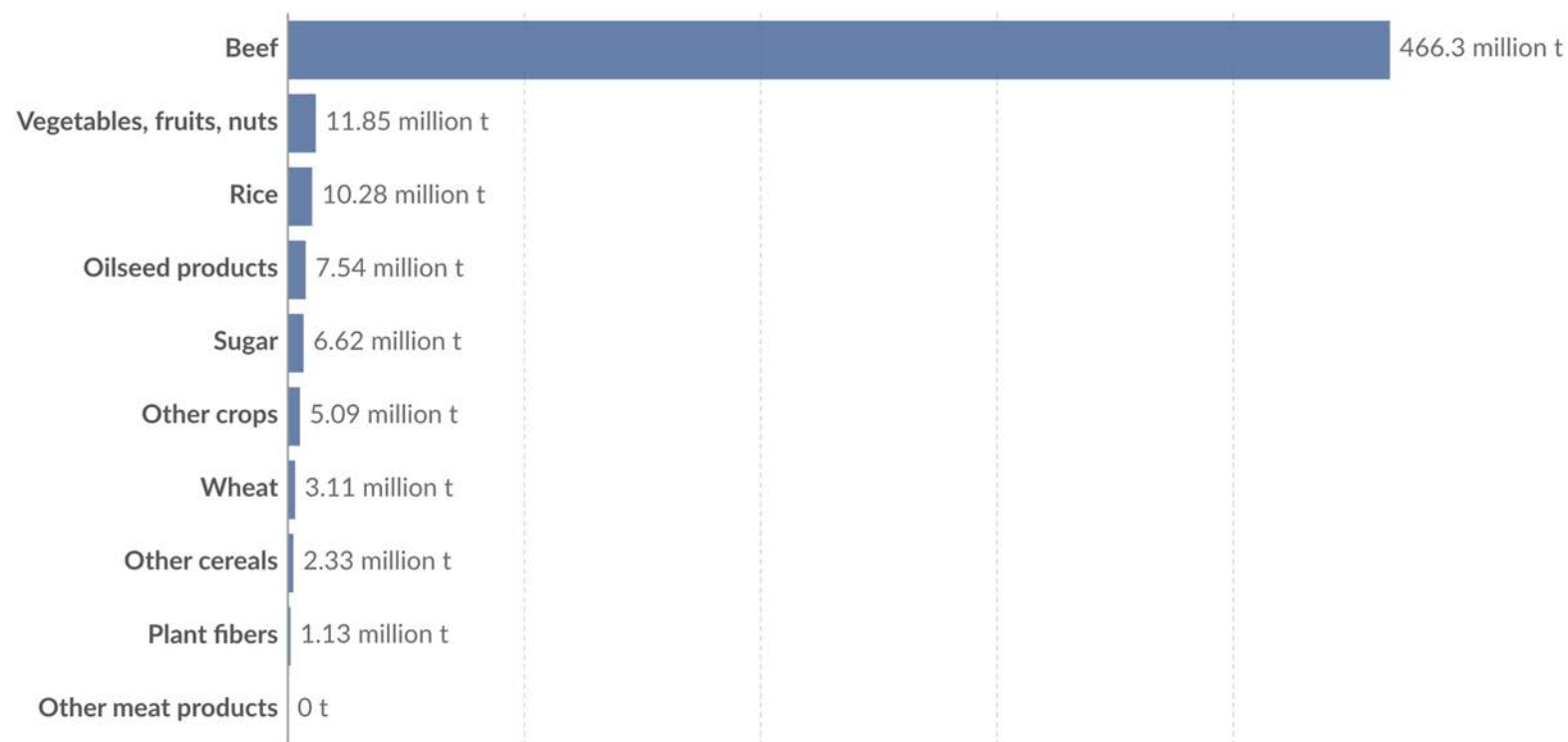


Data source: Pendrill et al. (2019). Agricultural and forestry trade drives large share of tropical deforestation emissions.
OurWorldInData.org/forests-and-deforestation | CC BY

Annual CO₂ emissions from deforestation by product, Brazil

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This measures the amount of CO₂ emissions linked to deforestation for food production – it is trade-adjusted so reflects the carbon footprint of diets within a given country. It is based on the annual average over the period from 2010 to 2014.

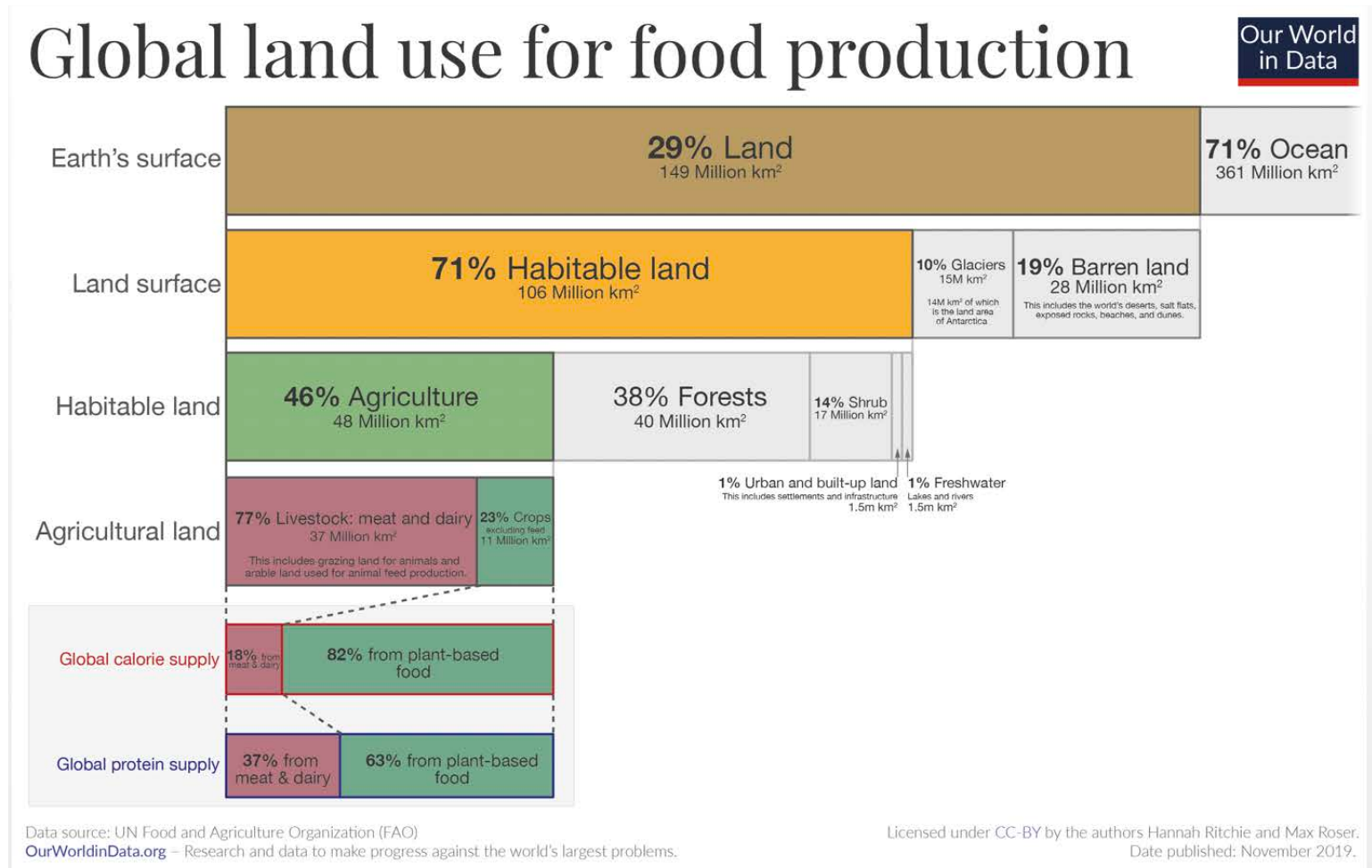


Data source: Pendrill et al. (2019). Agricultural and forestry trade drives large share of tropical deforestation emissions.

Note: Trade adjustment means that deforestation linked to the production of imported food products is added to a country's total; exported emissions are subtracted from its total.

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Raising animals takes much more land than growing plants for food.

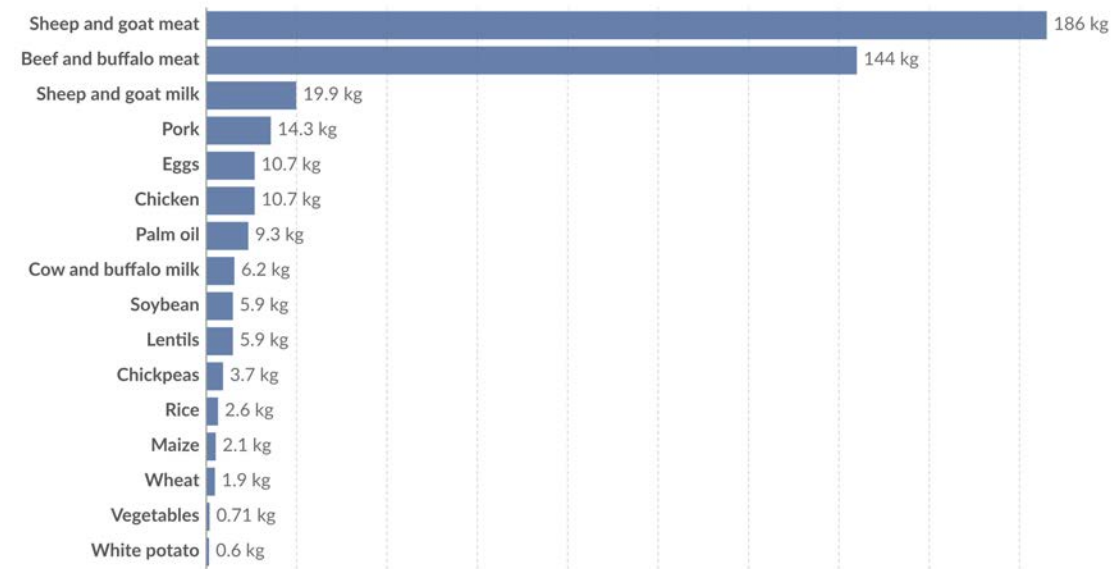


This land could be used for sequestering carbon.

Carbon opportunity costs per kilogram of food

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The carbon opportunity cost, measured in kilograms of carbon dioxide-equivalents¹ per kilogram of food, is the amount of carbon lost from native vegetation and soils in order to produce each food. If a specific food was not produced on a given plot of land, this land could be used to restore native vegetation and sequester carbon.



Data source: Searchinger, T. D., Wiersenius, S., Beringer, T., & Dumas, P. (2018).

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

1. Carbon dioxide-equivalents (CO₂eq): Carbon dioxide is the most important greenhouse gas, but not the only one. To capture all greenhouse gas emissions, researchers express them in 'carbon dioxide-equivalents' (CO₂eq). This takes all greenhouse gases into account, not just CO₂. To express all greenhouse gases in carbon dioxide-equivalents (CO₂eq), each one is weighted by its global warming potential (GWP) value. GWP measures the amount of warming a gas creates compared to CO₂. CO₂ is given a GWP value of one. If a gas had a GWP of 10 then one kilogram of that gas would generate ten times the warming effect as one kilogram of CO₂. Carbon dioxide-equivalents are calculated for each gas by multiplying the mass of emissions of a specific greenhouse gas by its GWP factor. This warming can be stated over different timescales. To calculate CO₂eq over 100 years, we'd multiply each gas by its GWP over a 100-year timescale (GWP100). Total greenhouse gas emissions – measured in CO₂eq – are then calculated by summing each gas' CO₂eq value.

Industrial farming releases lots of GHS - nitrous oxide and carbon dioxide



Photo by [James Baltz](#) on [Unsplash](#)

Factory farming of animals releases GHG nitrous oxide

99% of US meat is raised on factory farms



CAFO (Concentrated Animal Feeding Operations) farms in North Carolina, USA.

Photo by [Jo-Anne McArthur](#) on [Unsplash](#)

Cattle and sheep release methane in ruminant digestion



Photo by [Sergio Arteaga](#) on [Unsplash](#)



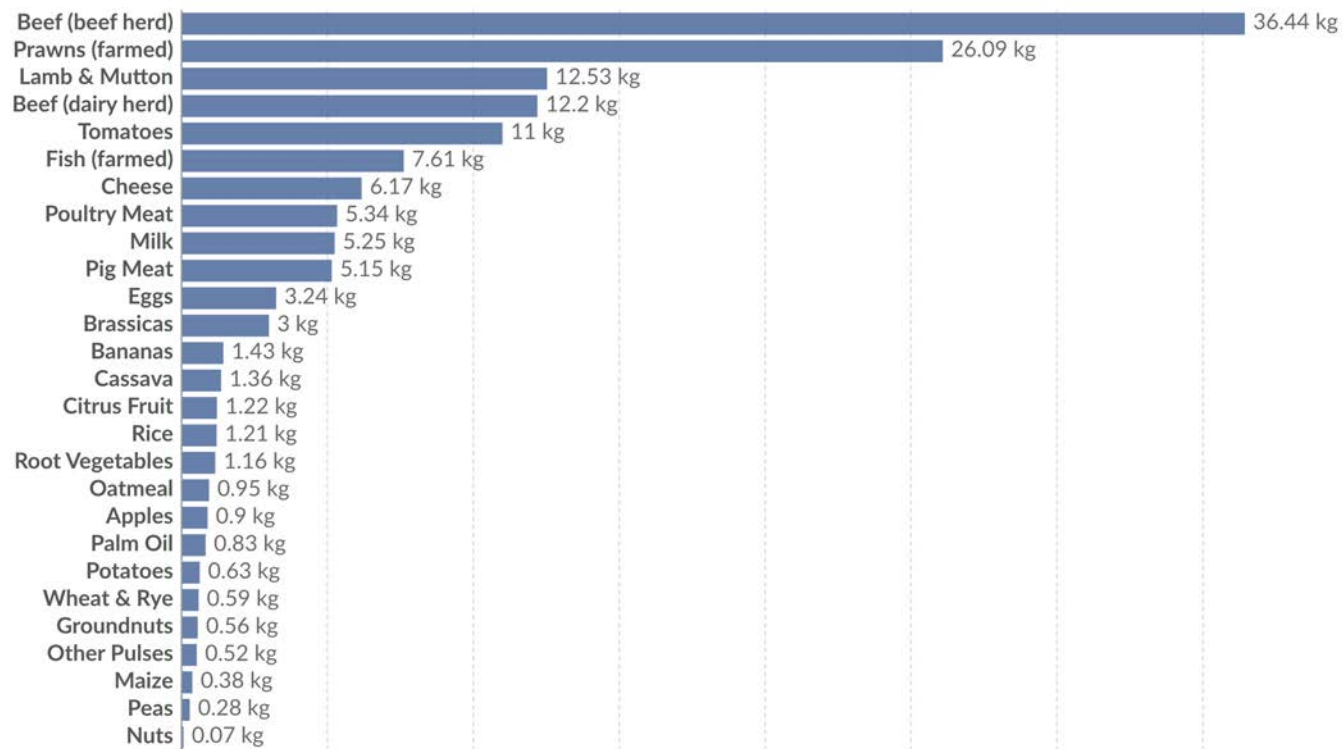
Photo by [Sam Carter](#) on [Unsplash](#)

Raising animals for food emits far more GHG than growing plants.

Greenhouse gas emissions per 1000 kilocalories

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Greenhouse gas emissions¹ are measured in carbon dioxide-equivalents (CO₂eq)².



Data source: Joseph Poore and Thomas Nemecek (2018). Additional calculations by Our World in Data.

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<https://www.ucdavis.edu/news/diet-helps-fight-climate-change>

Raising livestock for food emits significant levels of GHG.



Photo by [Lomig](#) on [Unsplash](#)

- Estimated 18 to 20 percent of all greenhouse gases each year
- Second only to fossil fuels
- “If cattle were their own nation, they would be the third-largest emitter of greenhouse gases.” (Paul Hawken, *Drawdown*, 39)

Americans especially love eating meat.

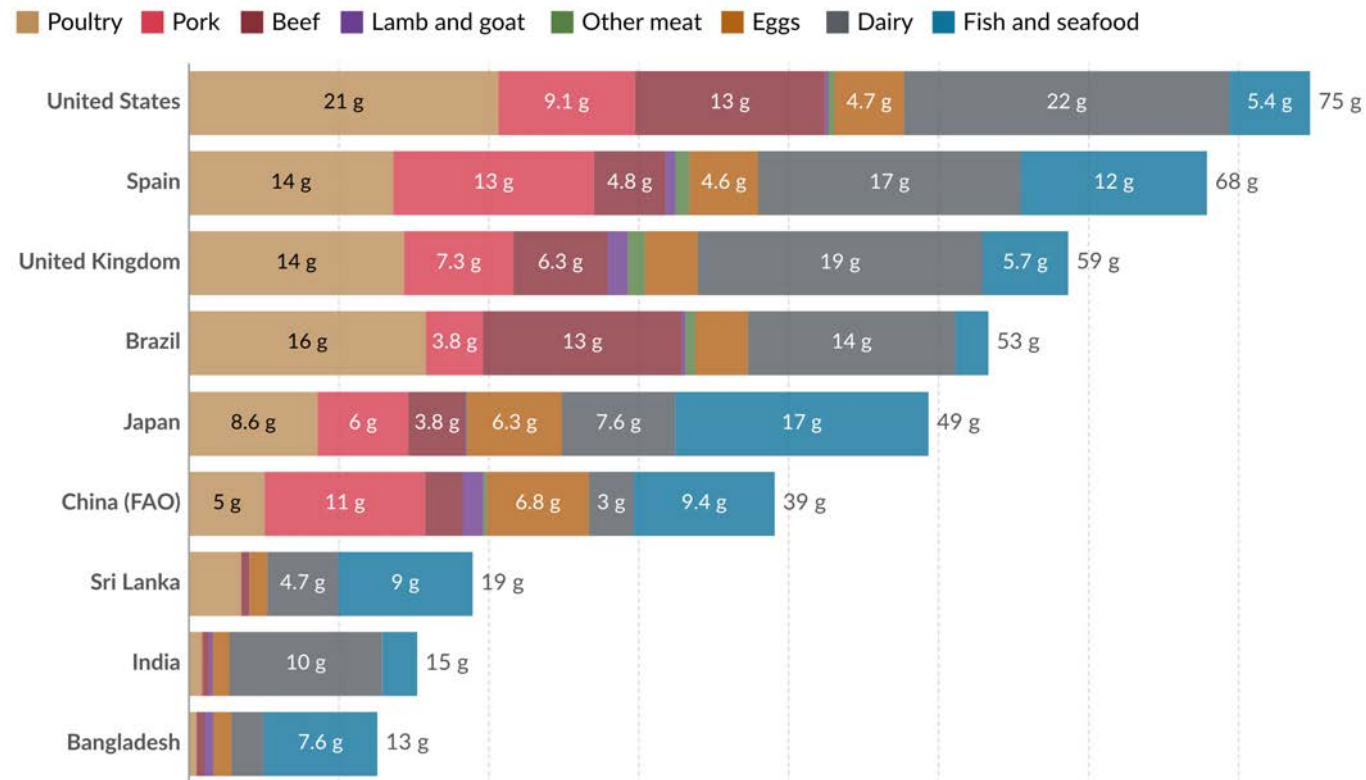


Americans eat the most animal protein.

Animal protein consumption, 2020

This is measured as the average daily supply per person.

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Data source: Food and Agriculture Organization of the United Nations

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What is a plant-rich diet?

- Focus is on lots of vegetables and fruits for nutrients.
- Reduction in amount of meat and animal products.
- Utilizes more plant proteins.



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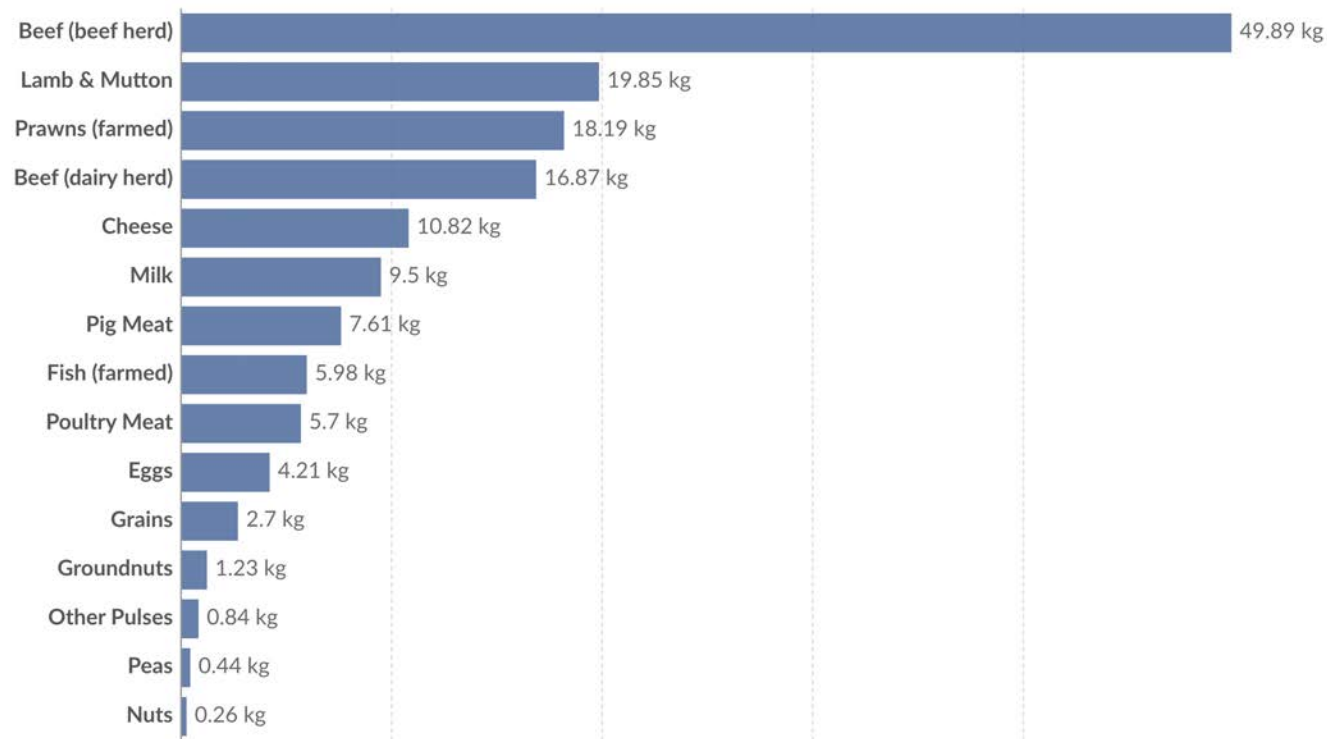
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Producing plant proteins emits far less GHG

Greenhouse gas emissions per 100 grams of protein

Emissions are measured in carbon dioxide-equivalents¹.

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Data source: Joseph Poore and Thomas Nemecek (2018). Additional calculations by Our World in Data.
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Getting Started

- Reduce amount of beef and work toward eliminating it.
- Reduce other high carbon meats and animal products.
- Focus on eating lots of fruits, vegetables, beans, legumes, & nuts



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Photo by [Christina Rumpf](#) on [Unsplash](#)

- “Small swaps” of poultry or plant protein for beef can make a difference:
 - 50% reduction in individual’s daily carbon footprint if all the time.
 - 35% reduction of US dietary carbon if all Americans did this once a day.
- Half of American adults saying they are willing to replace beef with poultry or plant-based proteins.

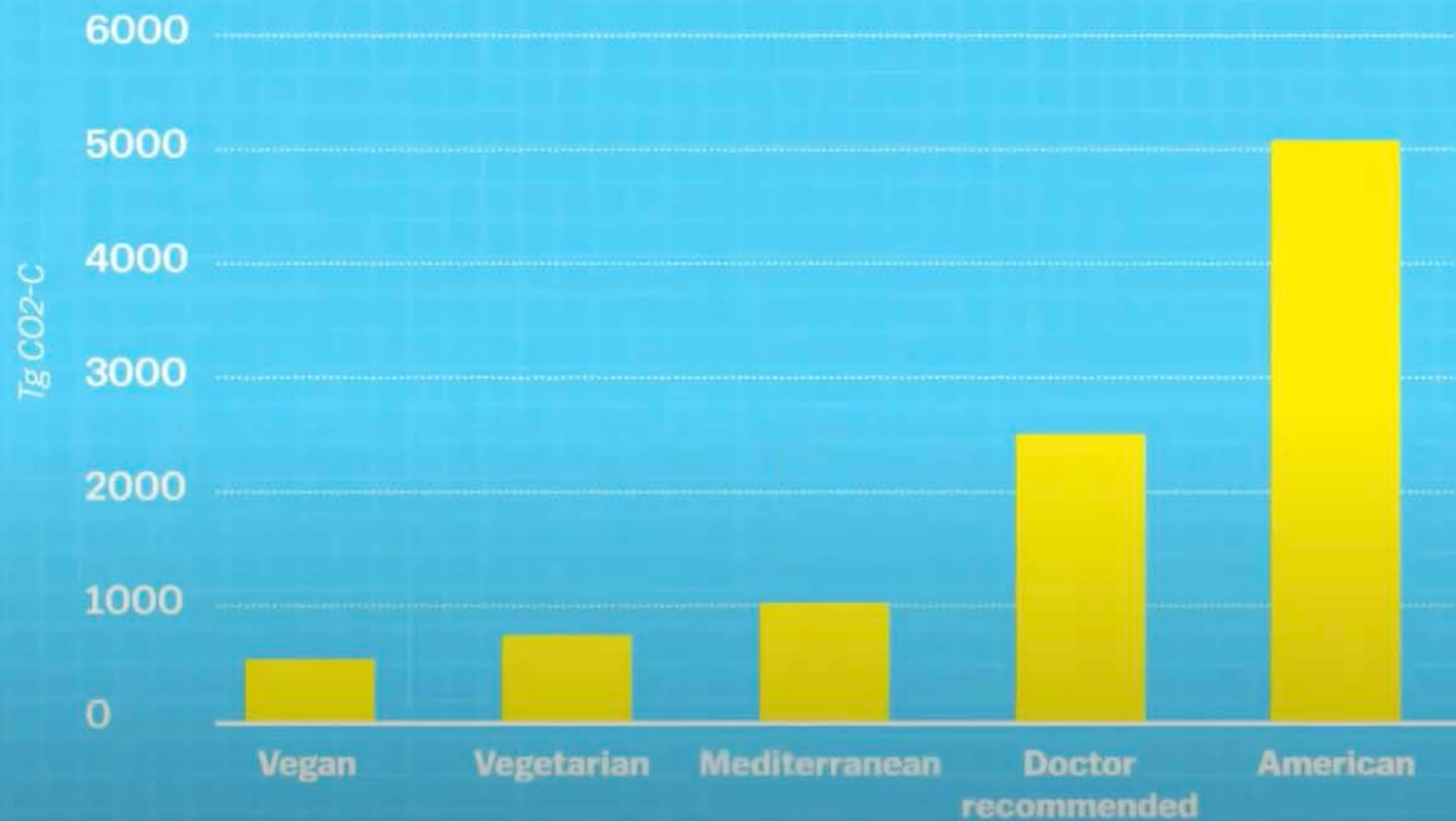
(Grummon, Lee, Robinson, Rimm, & Rose, “Simple Dietary Substitutions Reduce Carbon Footprints...” *Nature Food*, Oct. 2023)

Photo by [Theo Crazzolar](#) on [Unsplash](#)



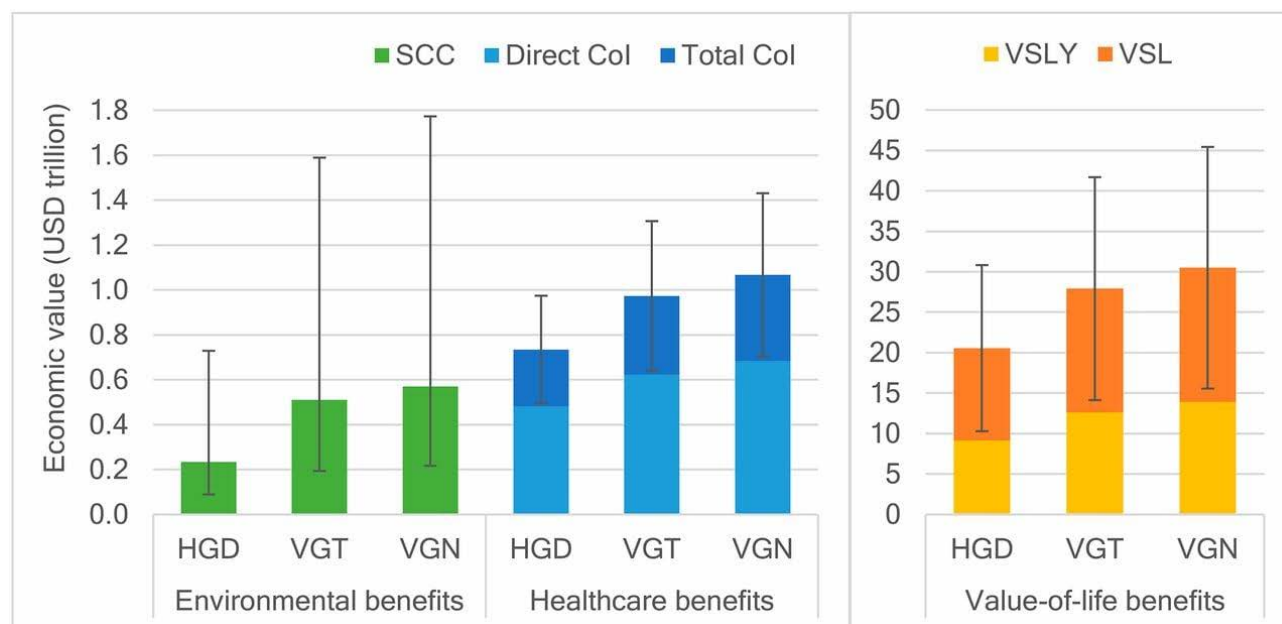
Annual dietary greenhouse gas emissions

Houlton Lab, UC Davis, 2017



University of Oxford study (2016) projections

- Dietary changes reduce GHG and increase health
 - “Business as usual” diet – high in red and processed meat, low in fruits and vegetables
 - Global Dietary Guidelines diet – limits red meat, sugar, total calories and includes minimum amounts of fruits and vegetables – GHG decreased 29%
 - Vegetarian diet – includes eggs and dairy – GHG decreased 63%
 - Vegan – GHG decreased 70%



What about getting enough protein and nutrients?

- Recommended Dietary Allowance for protein is a 0.36 grams per pound.
- DRI Calculator for Healthcare Professionals
 - <https://www.nal.usda.gov/human-nutrition-and-food-safety/dri-calculator>
- Proteins are made up of 20 amino acids:
 - Our bodies can make 11
 - Our bodies cannot make 9 – essential amino acids
- Complete proteins: meat, poultry, fish, eggs, dairy, some plant-based

Plant Proteins

Complete Plant Proteins:

Soy (tofu, edamame, tempeh)

Soy milk

Quinoa

Amaranth

Buckwheat

Chia Seeds

Nutritional yeast



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Plant Proteins

Complementary Plant Proteins – Grains and Legumes:

Peanut butter sandwich with whole wheat bread

Rice and beans

Bean soup and crackers

Pasta and peas

Pita and hummus



Photo by [Riddhi K](#) on [Unsplash](#)

Plant Proteins

Popular plant proteins (although incomplete alone):

Lentils

Beans – black, kidney, pinto, garbanzo

Peas

Oats

Nuts, nut butters, and seeds

Ezekiel bread from sprouted grains

Vegetables – broccoli, spinach, asparagus, artichokes,
potatoes, sweet potatoes, and Brussel sprouts



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Eating as a Spiritual Practice

- Living out our faith by caring for creation
- Living out now our hope for the Peaceable Kingdom
- An expression of love toward all living things
- A personal choice and commitment
- A practice to share in faith community



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Reduce Food Waste

- Over a third of food is wasted in the USA.
- 48% is wasted in our homes (refed.org)
- Wasted food means wasted GHG, energy, water, and land.
- In landfills, food waste produces methane.
- Globally, food waste accounts for 12% of GHG emissions.



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Compost

- Compost raw foods and organic materials.
- Avoids producing methane in landfills.
- Enriches soil.



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Photo by [Seth Cottle](#) on [Unsplash](#)

Avoid plastic and styrofoam packaging

- Made from fossil fuel
- Only 9% recycled, while much is incinerated

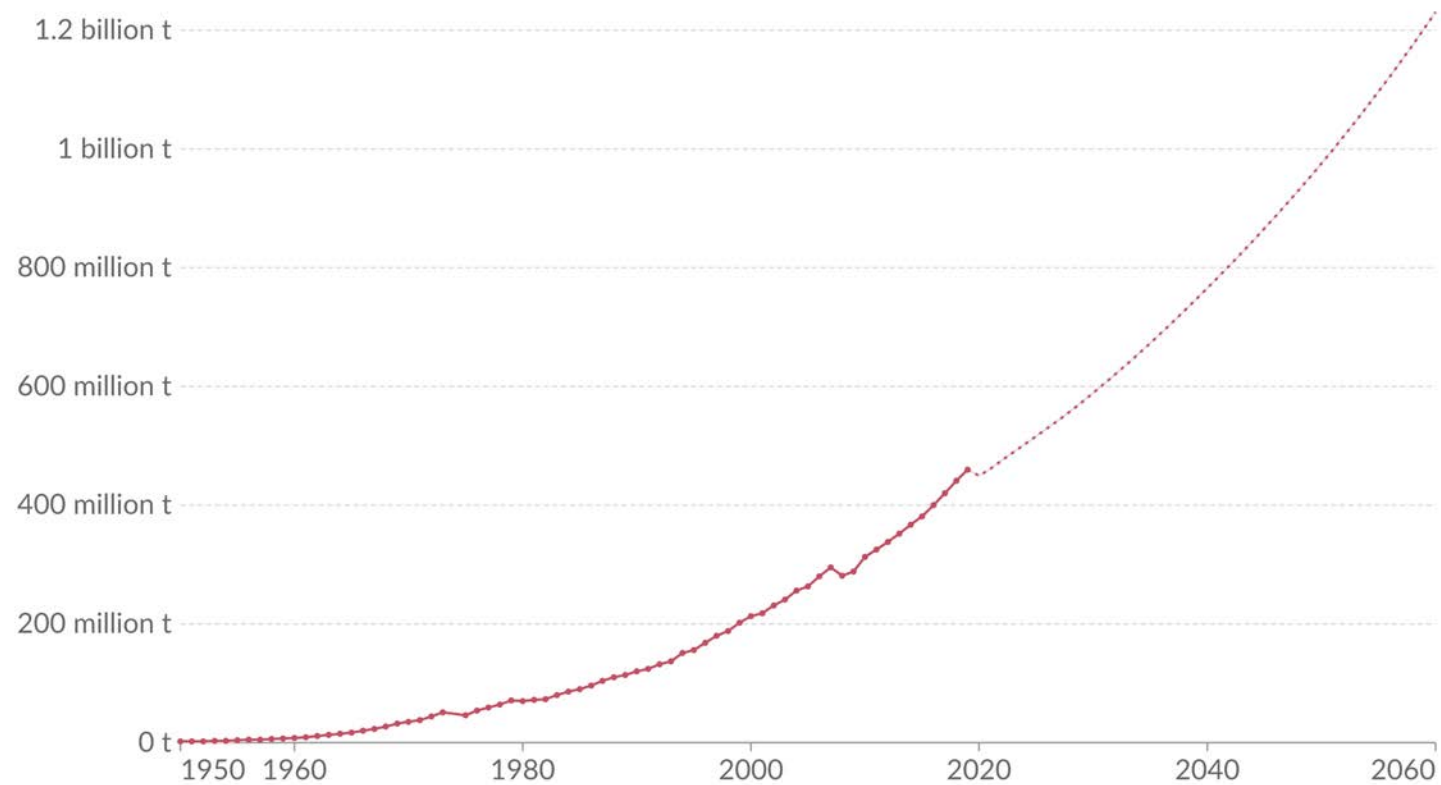


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Global plastic production with projections, 1950 to 2060

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Plastic production refers to the annual production of polymer resin and fibers. Projections are based on the "business-as-usual" scenario which assumes that current policies remain unchanged in the foreseeable future.



Data source: Geyer et al. (2017); OECD (2022)

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Buy Local



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Grow Church and Family Gardens



Photo by [Markus Spiske](#) on [Unsplash](#)

Reduce Overconsumption of Food



Photo by [Di Weng](#) on [Unsplash](#)

Reduce Consumption

- USA is largest historic GHG emitter
 - 4% of global population
 - Has produced 25% of total GHG



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Buy clothing with care

- Fashion industry accounts for 10% of global GHG emissions.
- Most clothes are made from polyester-based materials, which are made from fossil fuels.

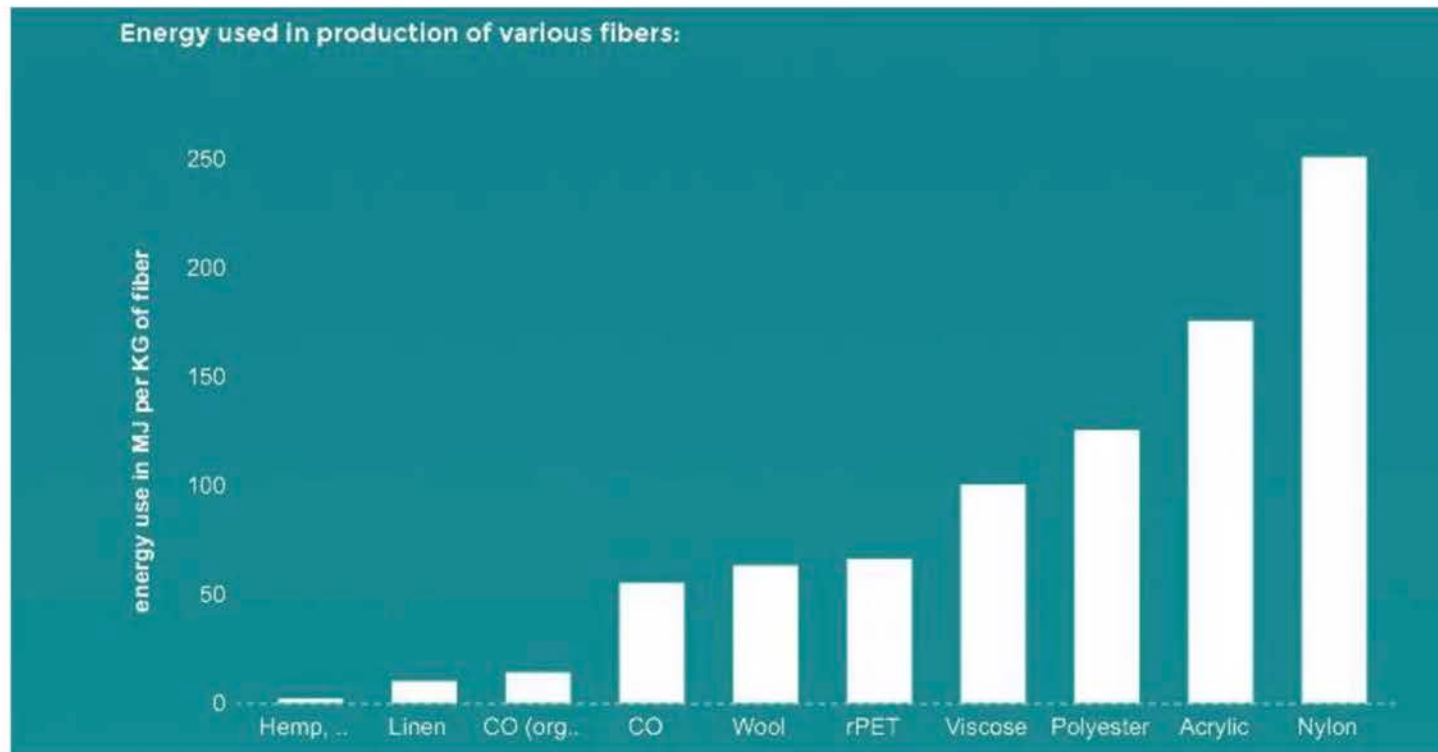


Sustainable Fashion

Ecological Footprint and Water Analysis of Cotton, Hemp and Polyester
(Stockholm Environment Institute, 2005)



Bob Grove



Bob Grove,
*Grove's Field
Guide
to Climate
Change,*
2023.

Transportation

- Active transportation – walking, biking
- Public transportation
- Electric or high mpg car
- Restricted air travel



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Doing our part to reduce Greenhouse gases

- Then share with others and invite them to do the same.
- When our individual actions are joined with large numbers of others, it makes a difference.
- Advocate for local, state, and national policies and regulations that reduce GHG
- Vote for leaders who are committed to climate action.



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