What's On Your Plate for Dinner?

The Many Ways the Global Corporate Meat Regime Harms the Earth and Life

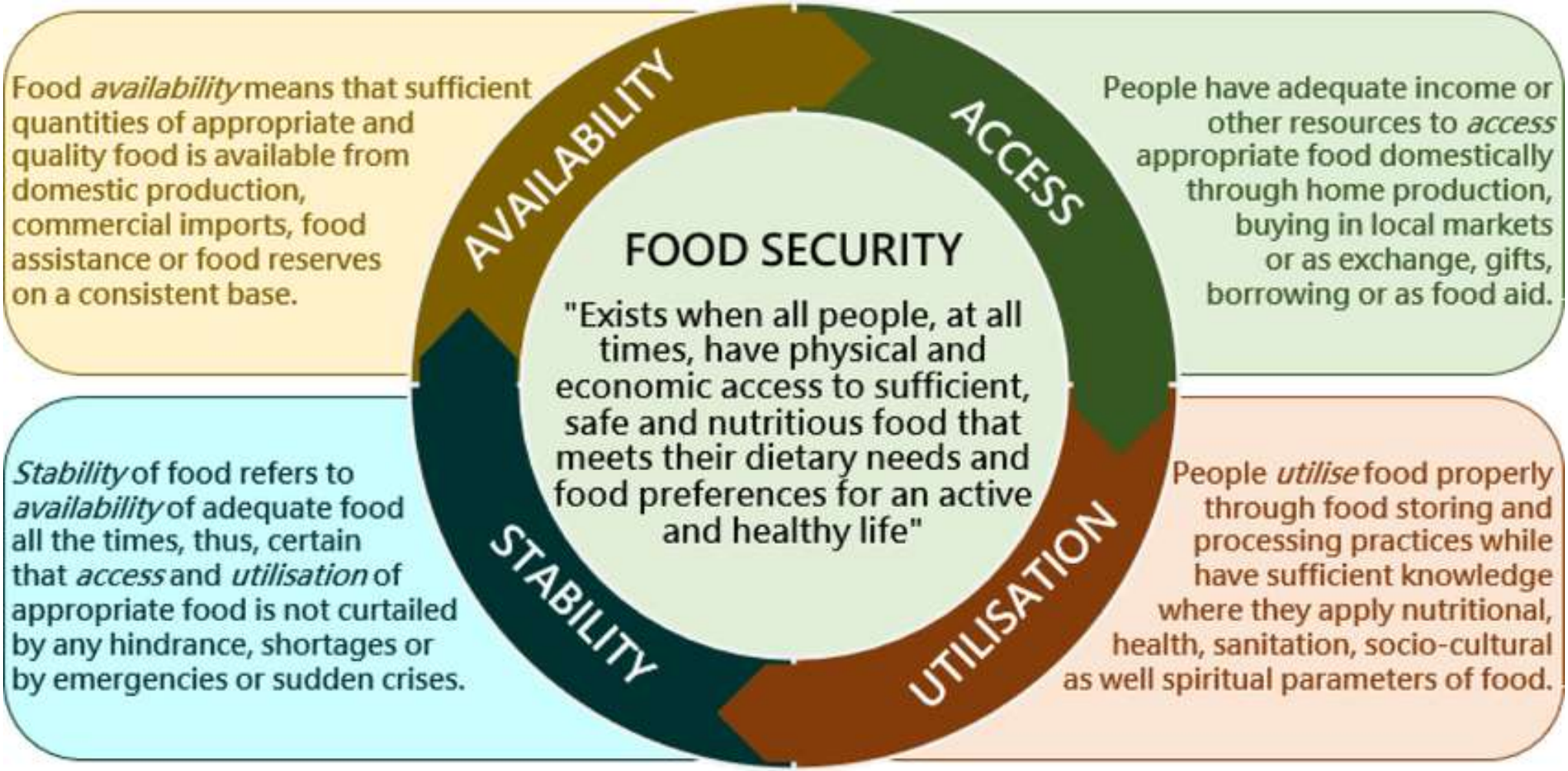
Meat, Complicity, and Thou

lgorenflo@gmail.com

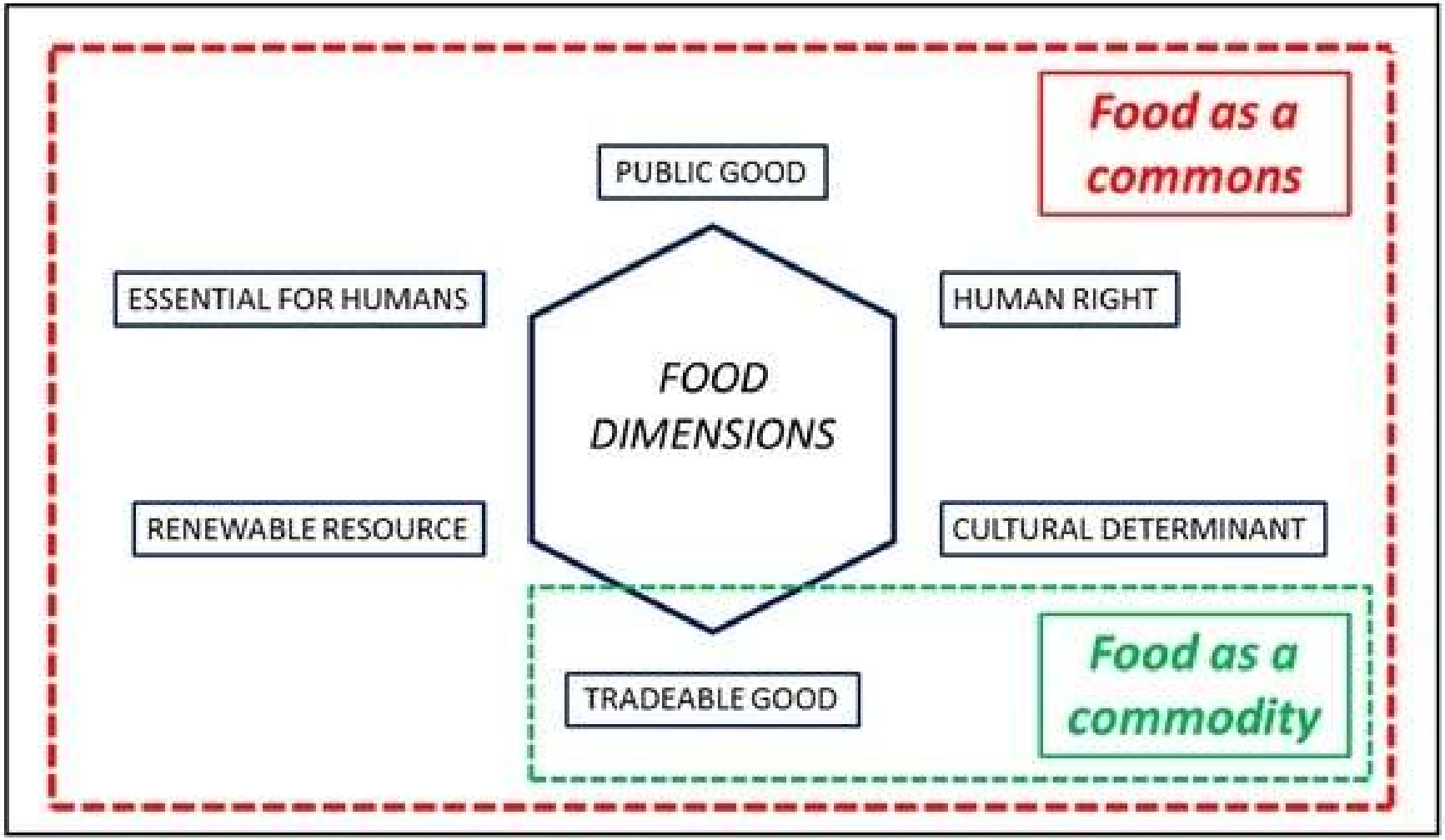
A Texas beef processing factory, with cattle about to be slaughtered

Index of Harms Generated from Eating Meat

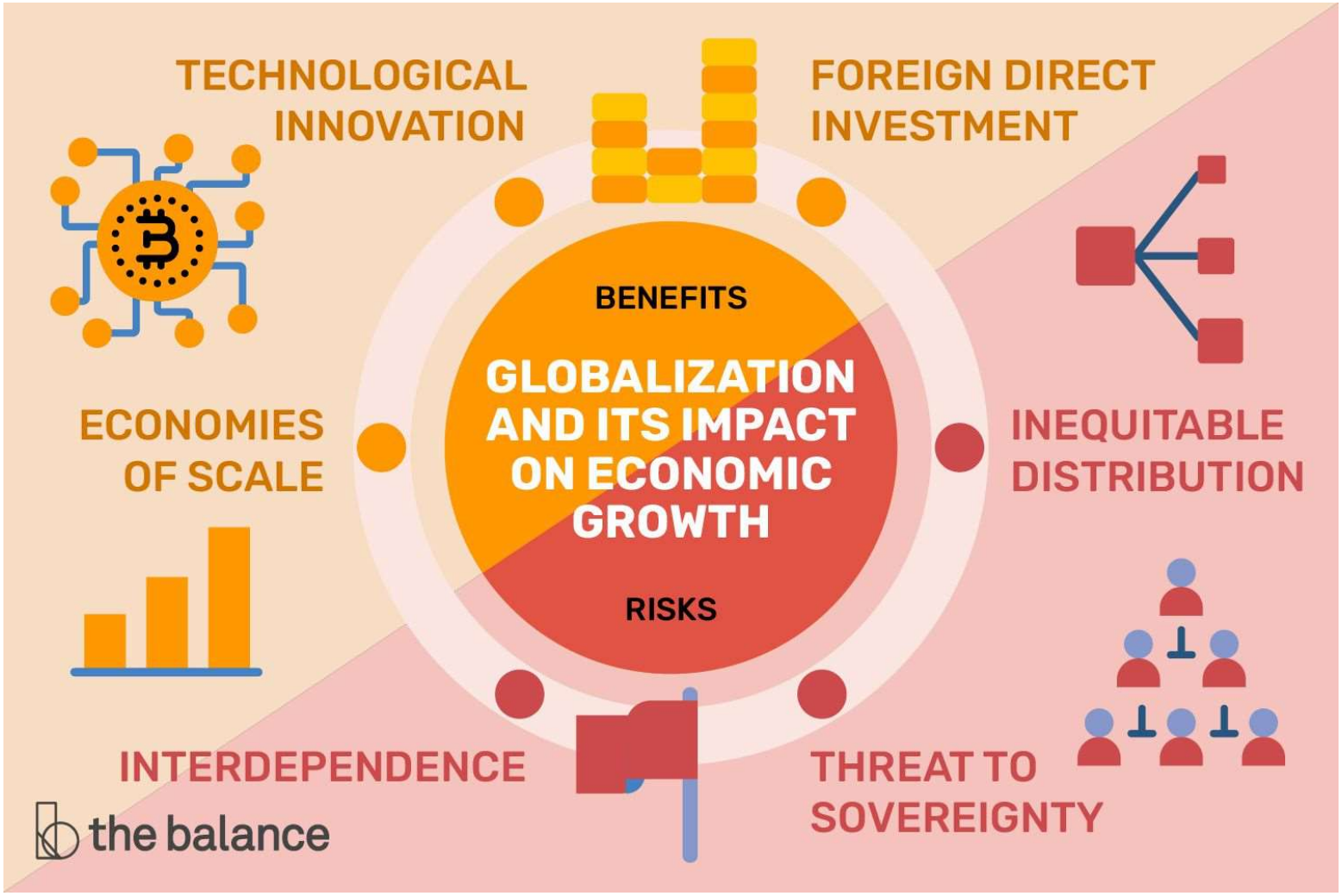
- Food Insecurity and Hunger
- Growing feed for livestock
- Land use
- Soil loss
- Fertilizer pollutions
- Pesticide use
- Climate Change
- Loss of Biodiversity
- Loss of Cultural Diversity and Indigenous Peoples
- Health
- Exceeding planetary boundaries
- Animal suffering



https://www.researchgate.net/figure/Four-dimensions-of-food-security-As-per-its-definition-food-security-has-four_fig1_355187464



https://www.mdpi.com/2071-1050/9/3/442



https://www.thebalancemoney.com/globalization-and-its-impact-on-economic-growth-1978843

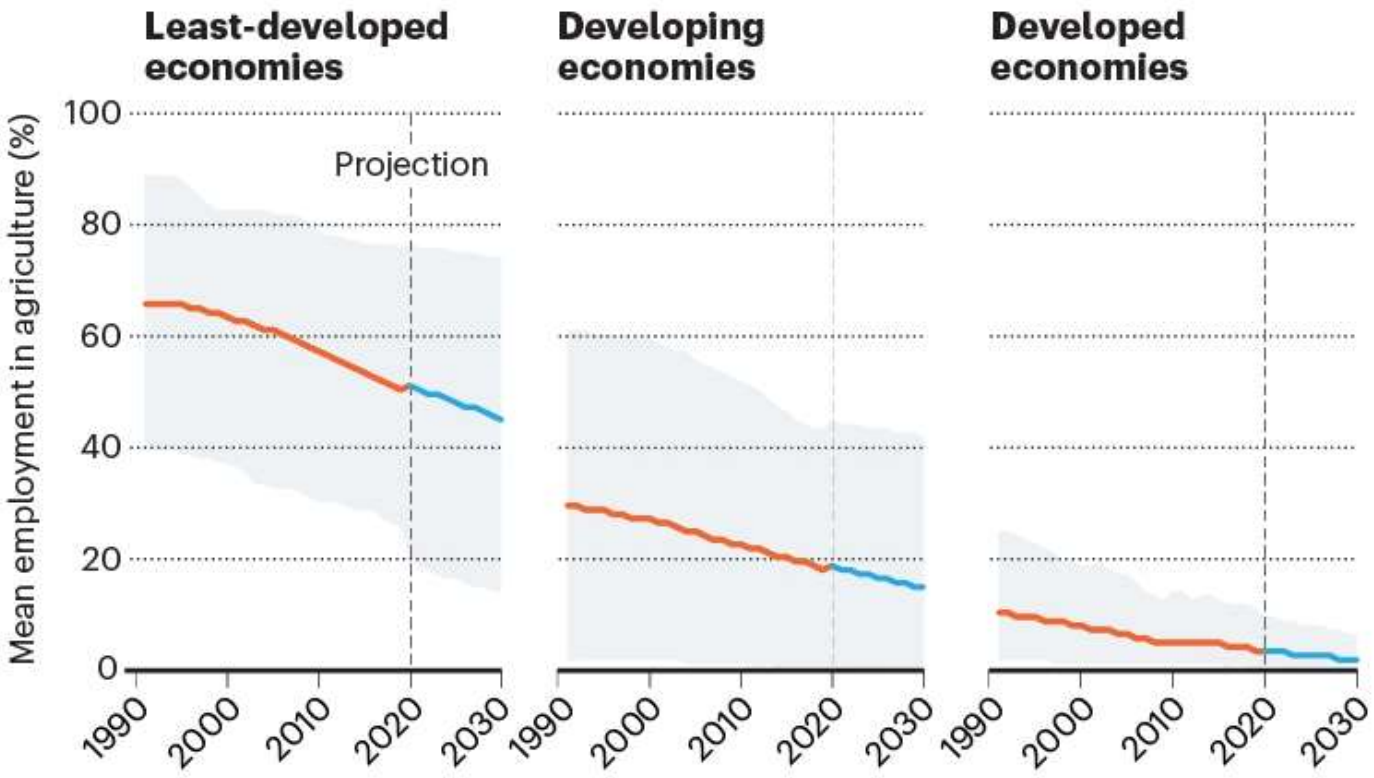
More than 866 million people support families and communities by working in agriculture, fisheries, pastoralism, forest management and other small- to mid-scale food-production systems. That's 26% of the workforce globally, and more than 80% of that in some countries, such as Burundi. Around 89% of these people live in rural areas and Indigenous territories, and nearly 500 million Indigenous people manage more than one-quarter of the global land surface.

Smallholder farms (those on less than 2 hectares) by themselves provide around 35% of the global food supply and a much larger share in Latin America, sub-Saharan Africa, and south and east Asia.

https://www.nature.com/articles/d41586-023-02447-2

THE DECLINE OF FOOD-PRODUCTION JOBS

Millions of jobs in food production have been lost globally in the past 30 years, and the trend is projected to continue. The problem is worse in least-developed economies, where many people depend on jobs in agriculture.

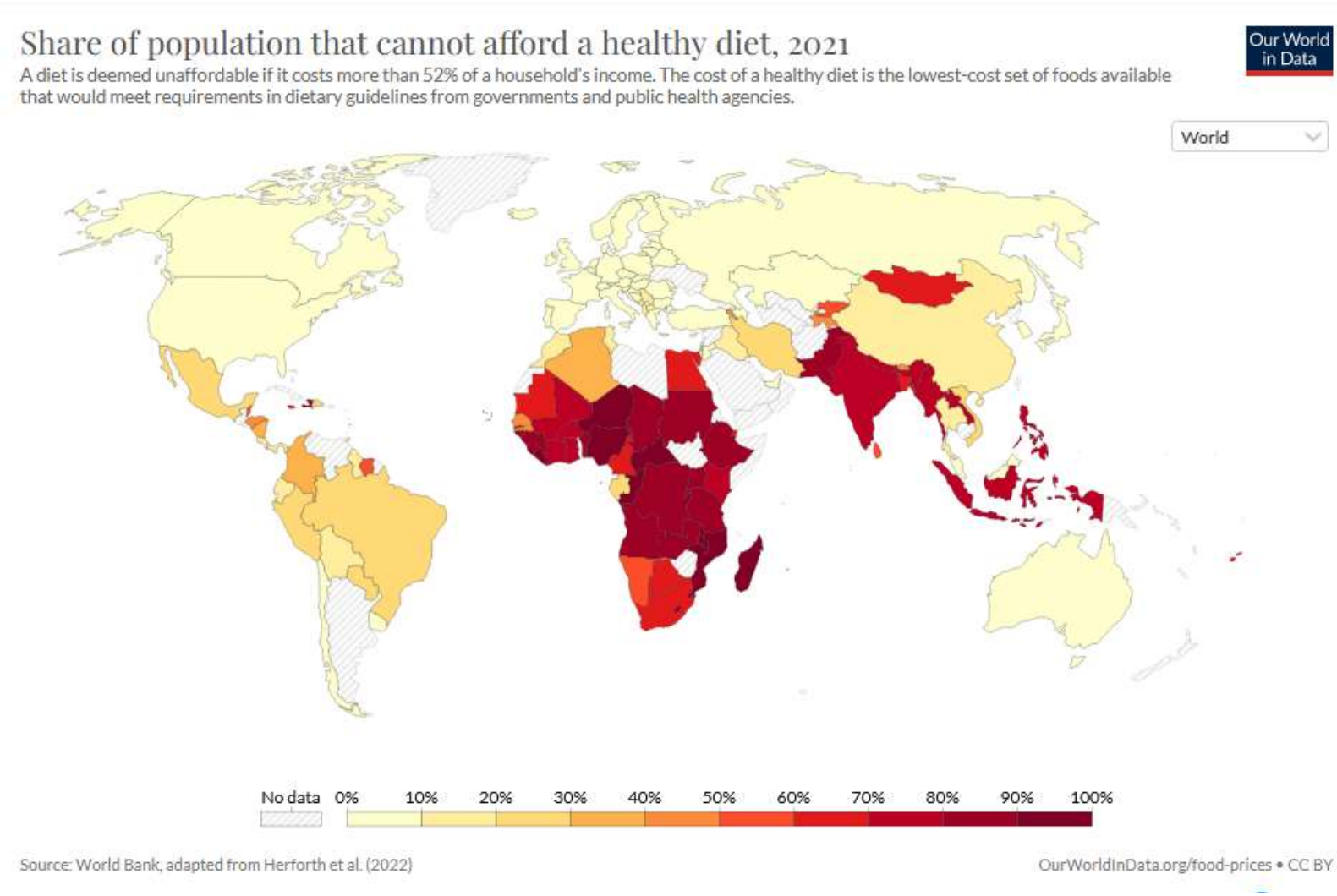


Grey shading shows variation in % employment among 180 countries in United Nations development categories; see Supplementary information. Country categorizations are as defined by the UN.

Source: ILO

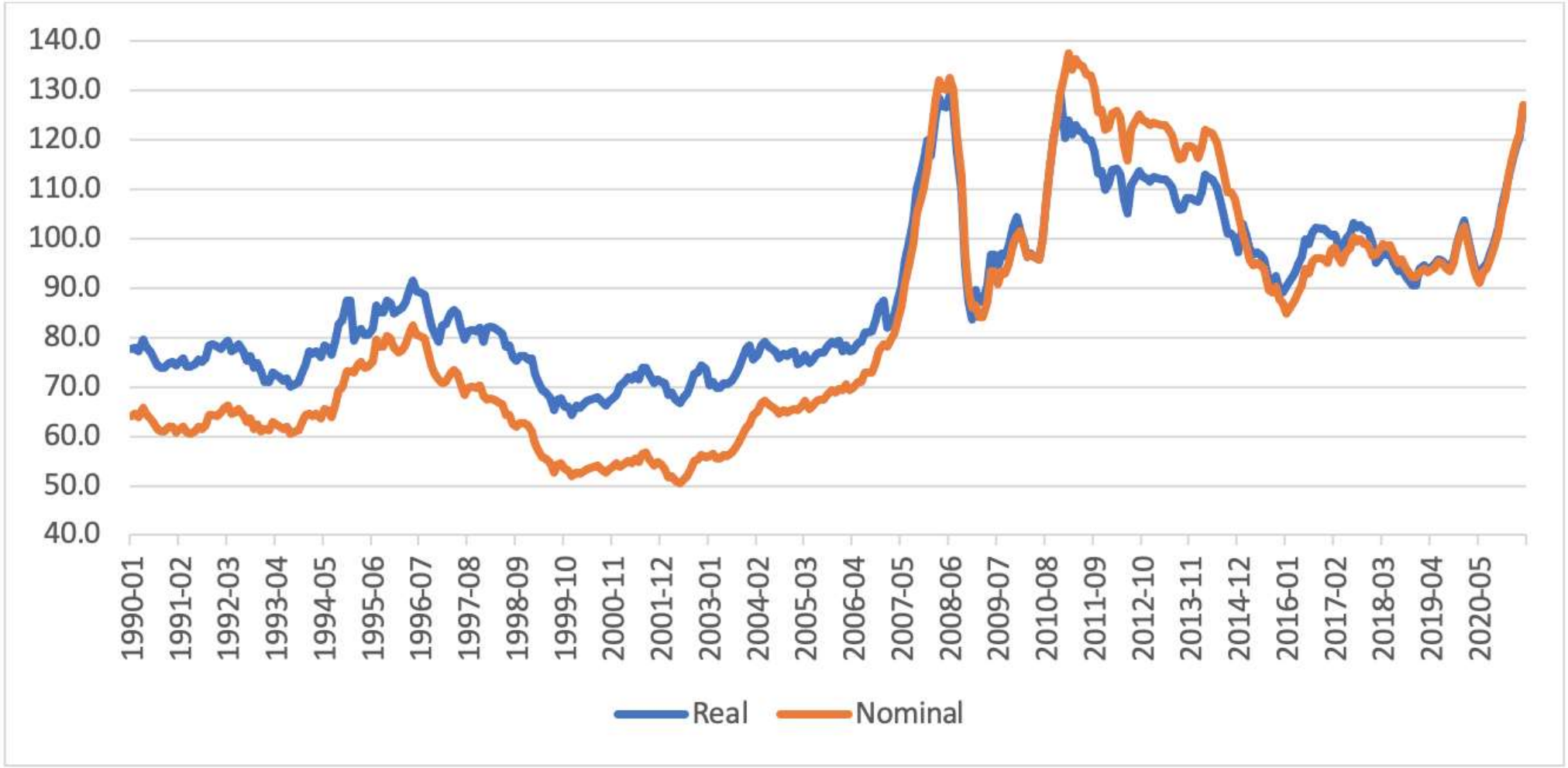
Small- to mid-scale food producers are among those most vulnerable to the effects of climate change; furthermore, this group includes 65% of the world's people living in extreme poverty. Smallholder farmers and Indigenous groups in particular are often pressured by commodity industries to sell their land, and might be exposed to violence in their efforts to protect their territories and resources from land and water grabbing, illegal logging, mining, fishing or hunting. They are vulnerable to food prices being dictated by powerful actors in highly consolidated supply chains. They also lack the protection of labor legislation and social entitlements, such as social-security benefits and health insurance.

https://www.nature.com/articles/d41586-023-02447-2



https://ourworldindata.org/explorers/food-prices?facet=none&country=NGA~BGD~IND~ETH~MEX~USA~BRA~GBR&Diet=Healthy+diet&Cost+or+Affordability=Affordability&Affordability+metric=Share+that+cannot+afford&utm_source=OWID+Newsletter&utm_campaign=976c4c560e-biweekly-digest-2023-08-11&utm_medium=email&utm_term=0_-eb78a3a726-%5BLIST_EMAIL_ID%5D

Figure 1 – FAO monthly food price index in nominal and real terms, January 1990 – May 2021



Source: FAO

https://www.ifpri.org/blog/rising-food-prices-are-concern-no-reason-panic-yet

Feed Conversion ($\frac{kg\ of\ feed}{kg\ edible\ weight}$)	Milk	Fish	Chicken	Pork	Beef
	0.7	2.3	4.2	10.7	31.7

Feed conversion ratios measure the efficiency of an animal in converting the food provided (feed mass) into a desired output

•Feed Conversion Ratio (FCR) = mass of feed ÷ mass of desired output

•The lower the feed conversion ratio the more efficient the method of food production

A low feed conversion ratio is obtained by minimising the potential losses of energy for the animal stock:

•Restricting animal movement (e.g. battery hens) will reduce energy lost to cell respiration

•Optimising feeding practices so that food is ingested and digested more effectively

•Slaughtering animals at a young age (older animals tend to grow more slowly and have a higher FCR)

While more efficient food production practices lower costs, there are a number of potential ethical issues that may be involved

https://ib.bioninja.com.au/options/option-c-ecology-and-conser/c2-communities-and-ecosyste/feed-conversion-ratio.html

Food Insecurity and Hunger

Food Insecurity

Unaffordability of food

Dispossession of land to grow food self-sufficiently

Former growers pushed into underpaid farm workers

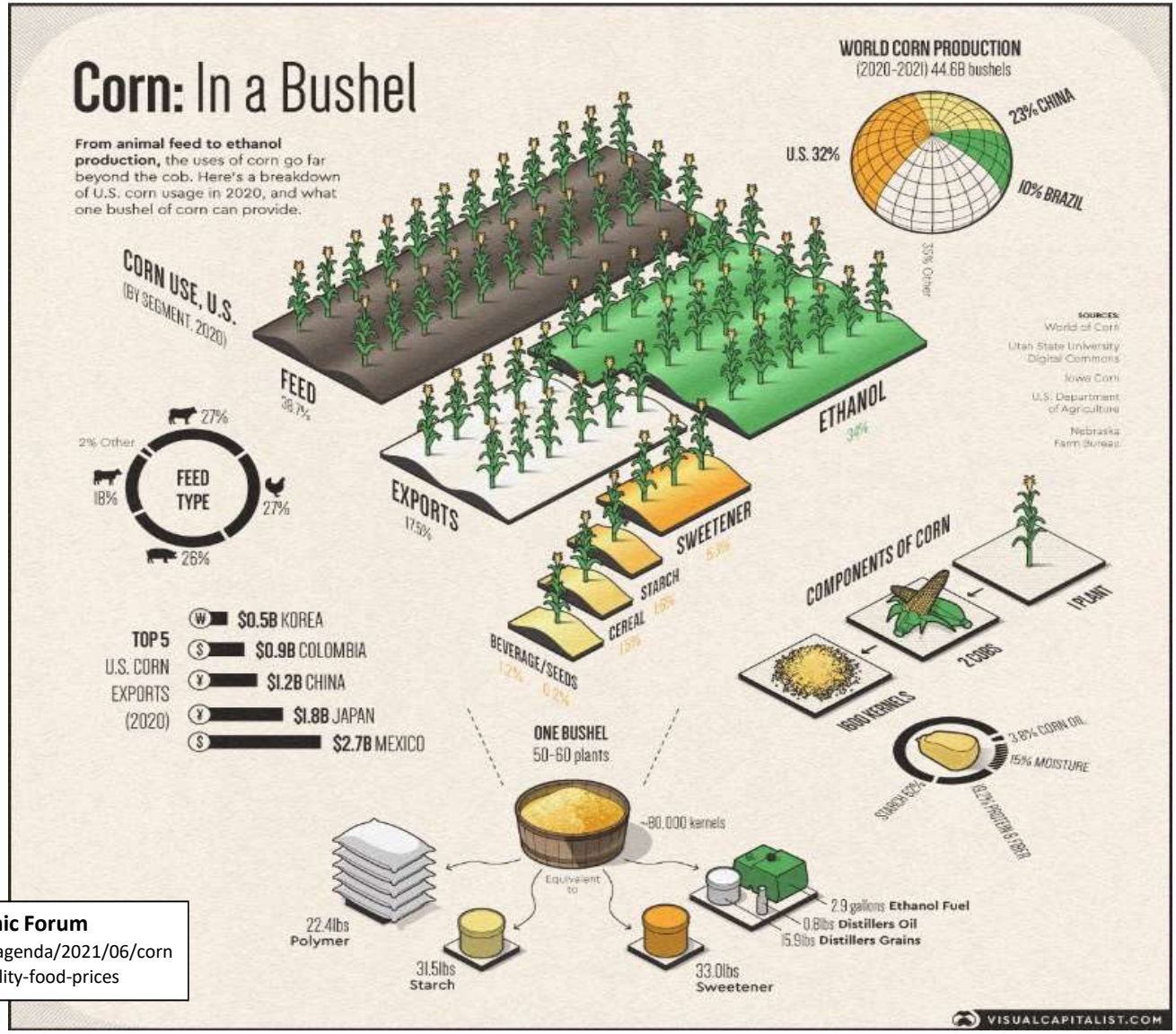
Loss of local markets

Loss of traditional ways of living

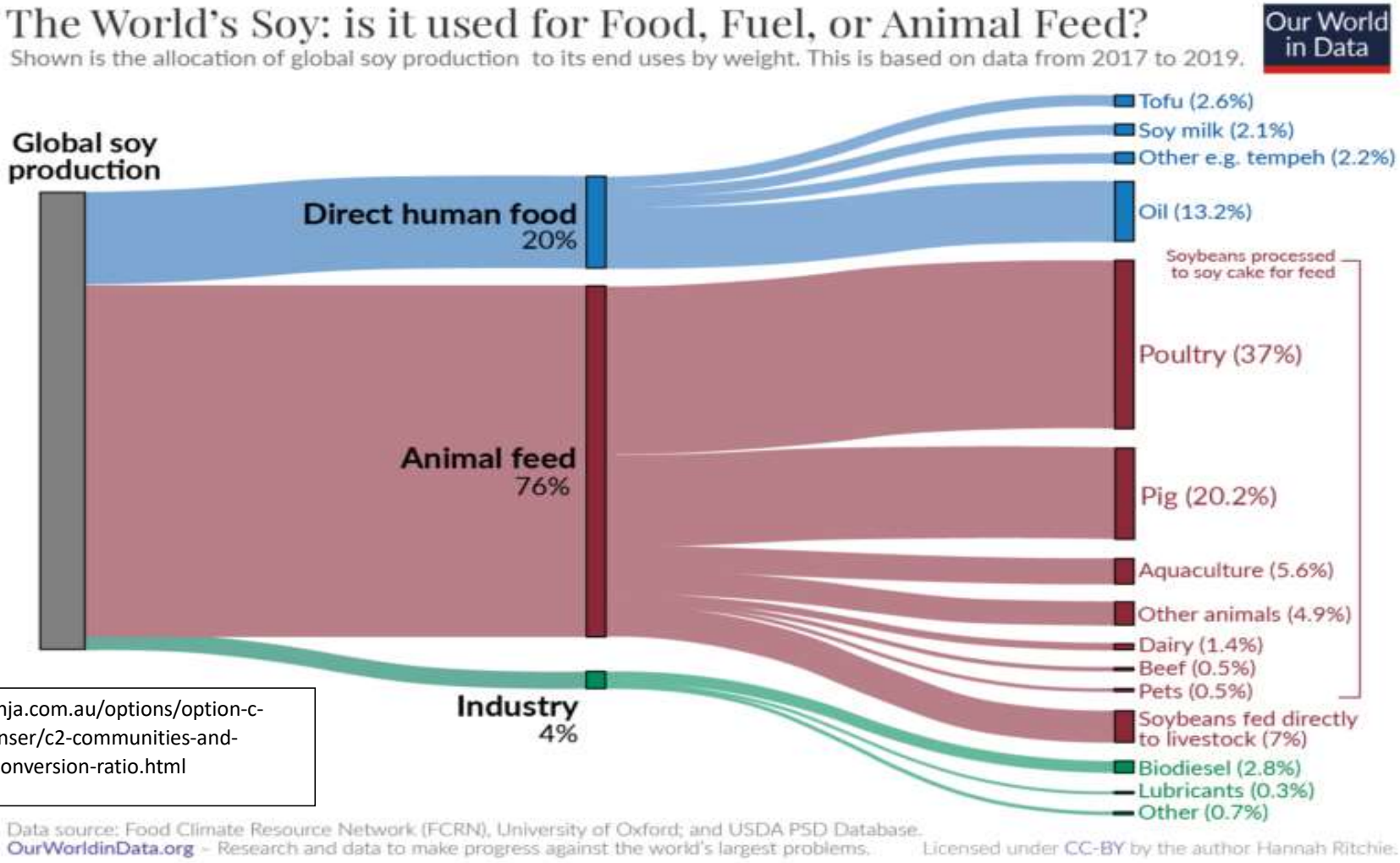
Increased jobless urbanization

No protection of women's right to land access.

Growing Feed for Livestock

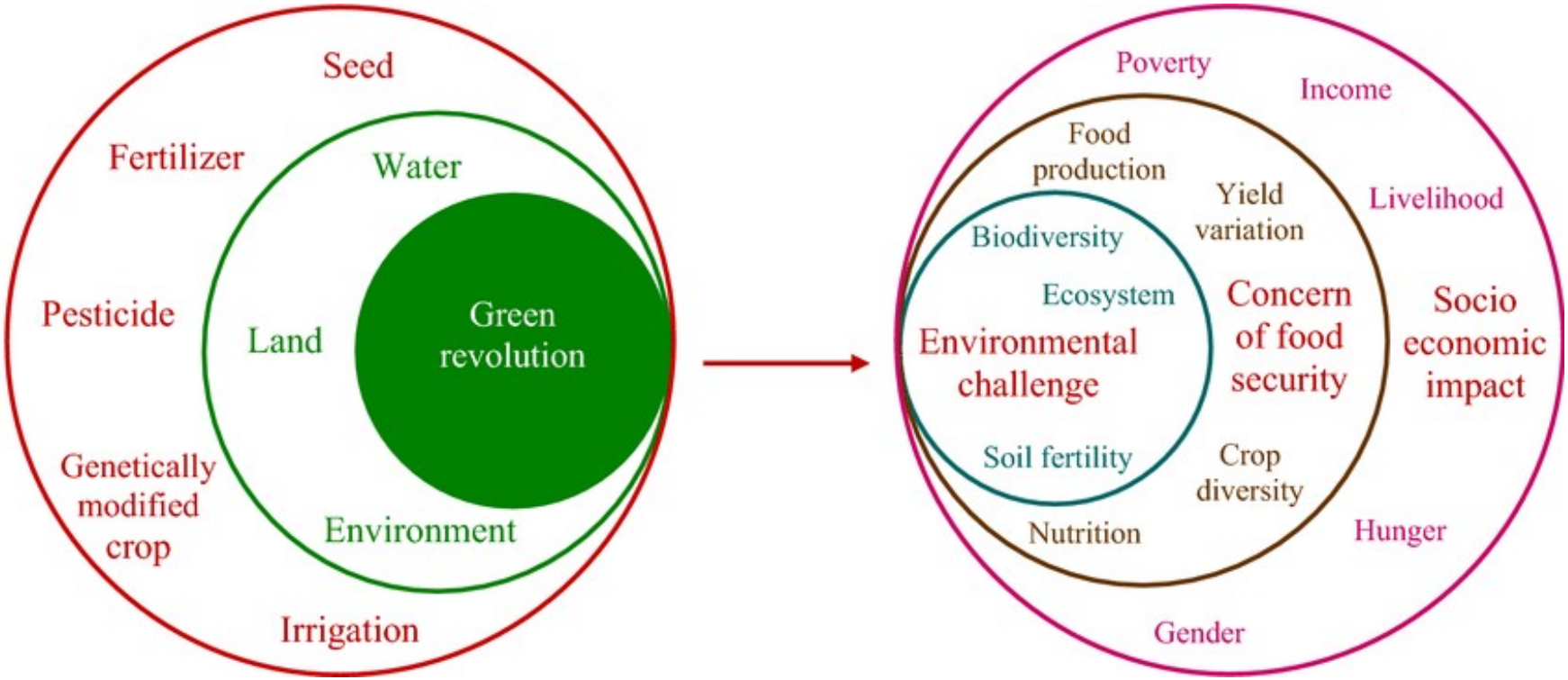


World Economic Forum
https://www.weforum.org/agenda/2021/06/corn-industries-sustainability-food-prices



https://ib.bioninja.com.au/options/option-c-ecology-and-conser/c2-communities-and-ecosyste/feed-conversion-ratio.html

Social and Environmental Challenges of the Green Revolution

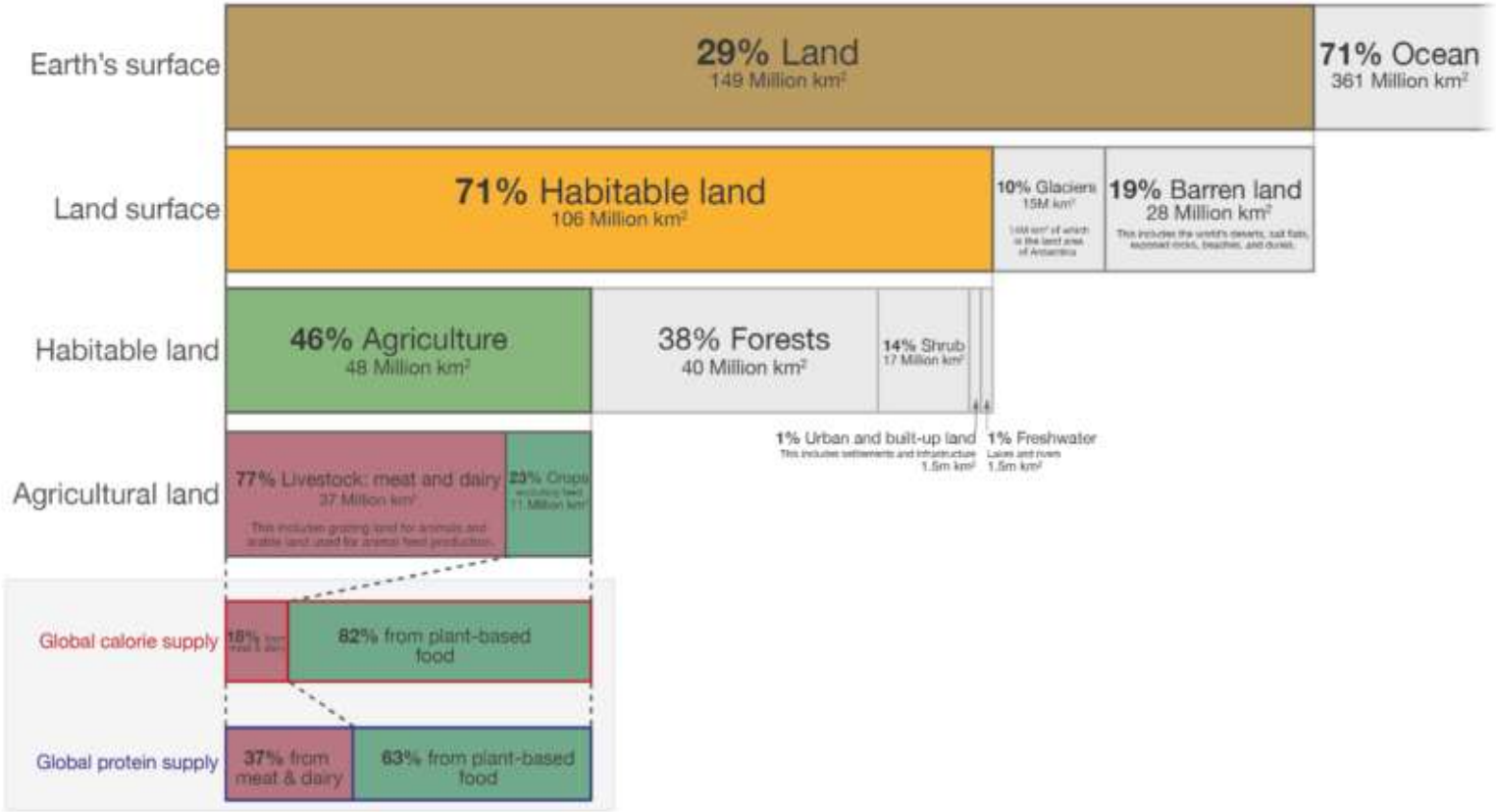


https://www.researchgate.net/publication/349499078_The_evolution_of_the_blue-green_revolution_of_rice-fish_cultivation_for_sustainable_food_production

Land Use

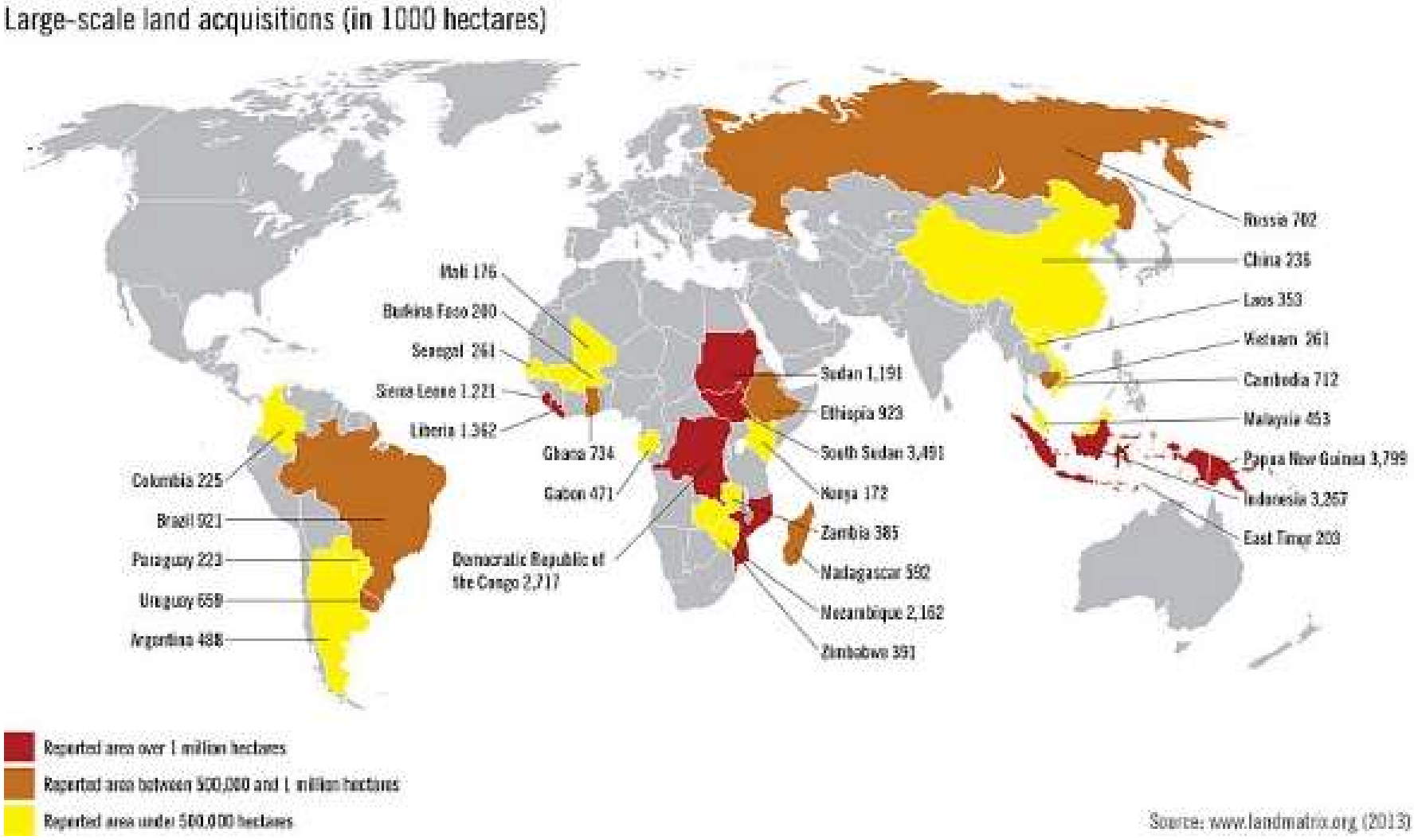
Global land use for food production

Our World in Data



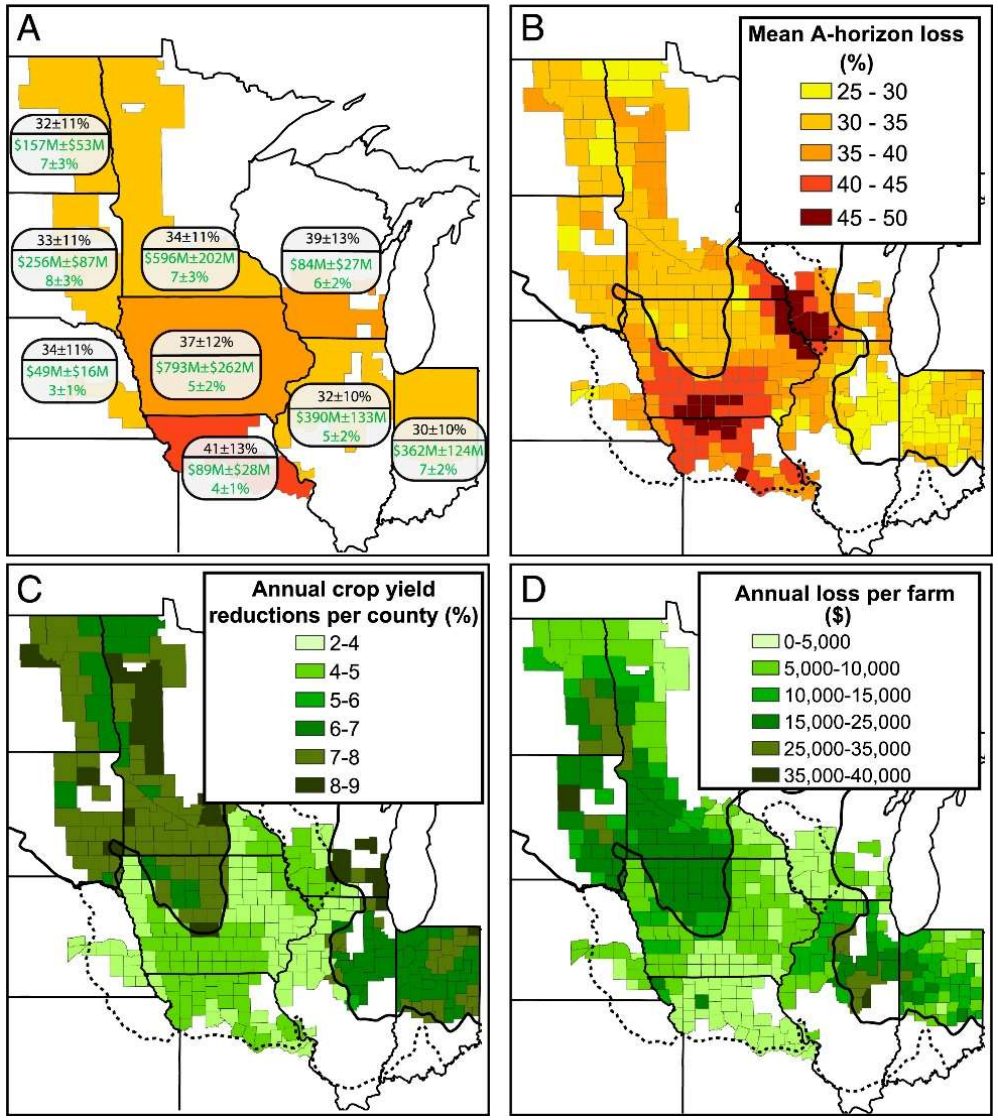
Data source: UN Food and Agriculture Organization (FAO)
OurWorldinData.org – Research and data to make progress against the world's largest problems.

Date published: November 2019.



https://www.globalagriculture.org/report-topics/land-grabbing.html

Soil Loss



Extent of soil loss across US Cornbelt (2021 study)

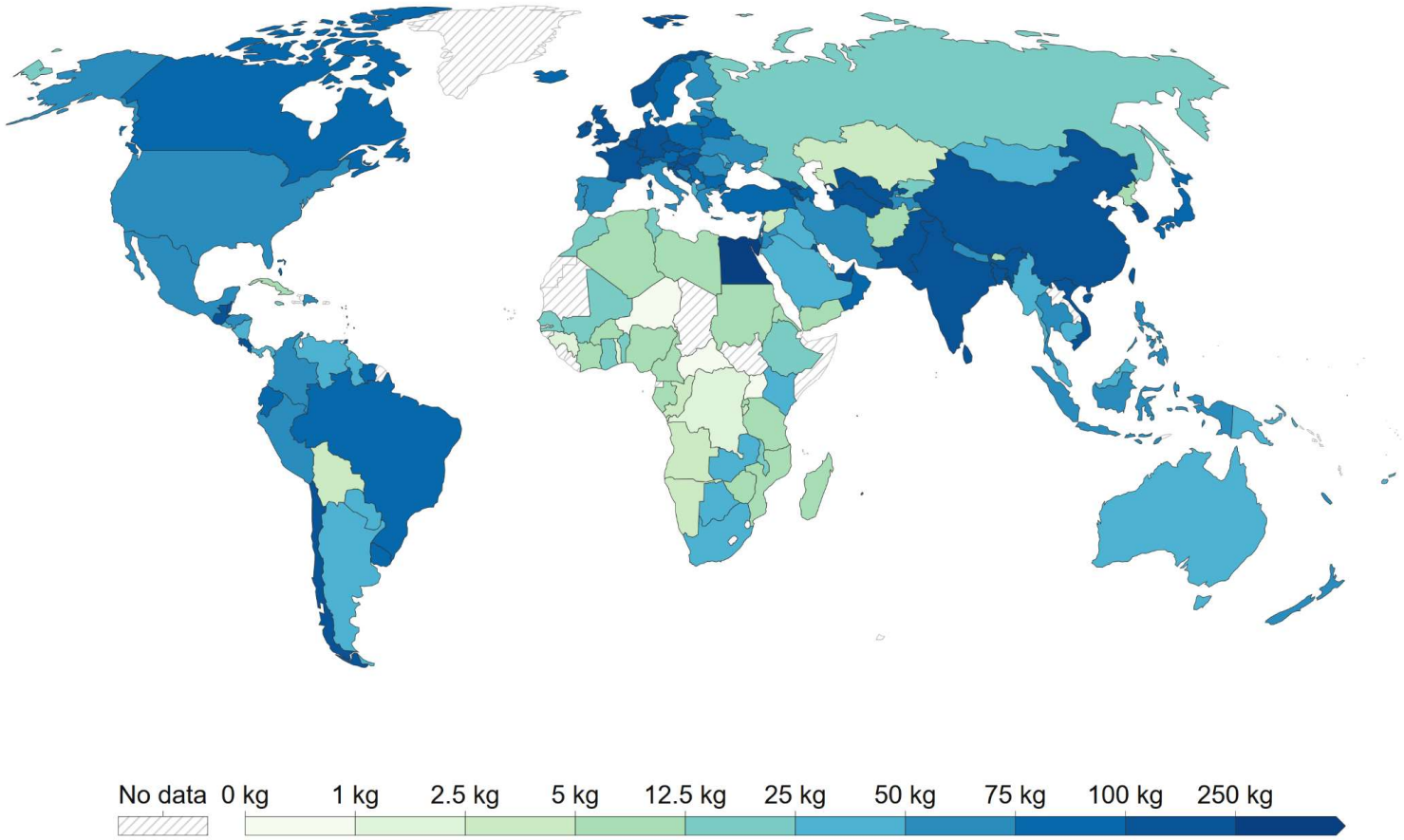
https://www.pnas.org/doi/10.1073/pnas.1922375118

Fertilizer Pollution

Nitrogen fertilizer use per hectare of cropland, 2020

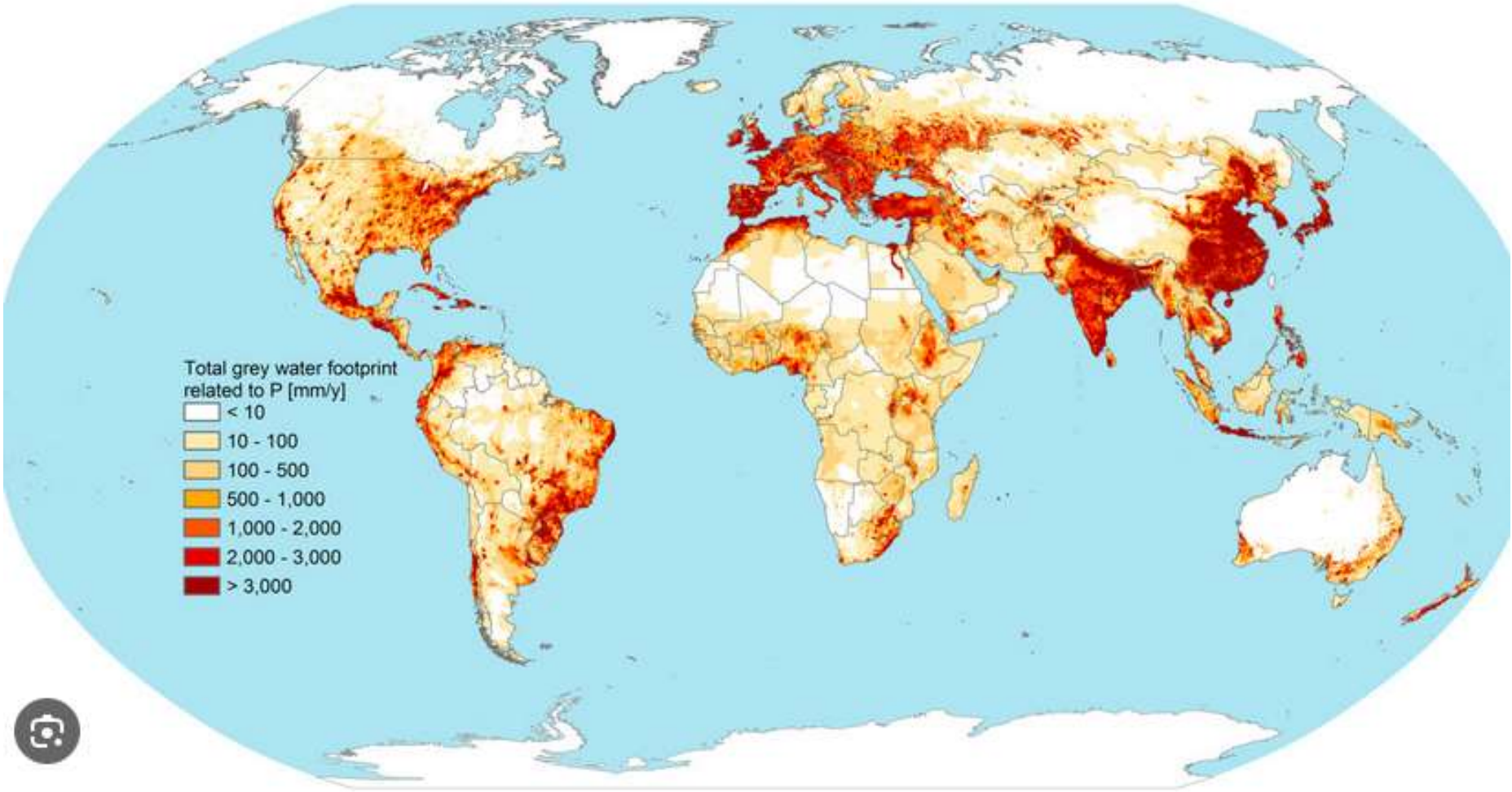
Application of nitrogen fertilizer, measured in kilograms of total nutrient per hectare of cropland.

Our World in Data



Source: Food and Agriculture Organization of the United Nations

OurWorldInData.org/fertilizers • CC BY



Global Anthropogenic Phosphorus Loads to Freshwater and Associated Grey Water Footprints and Water Pollution Levels: A High-Resolution Global Study - Mekonnen - 2018 - Water Resources...

Visit

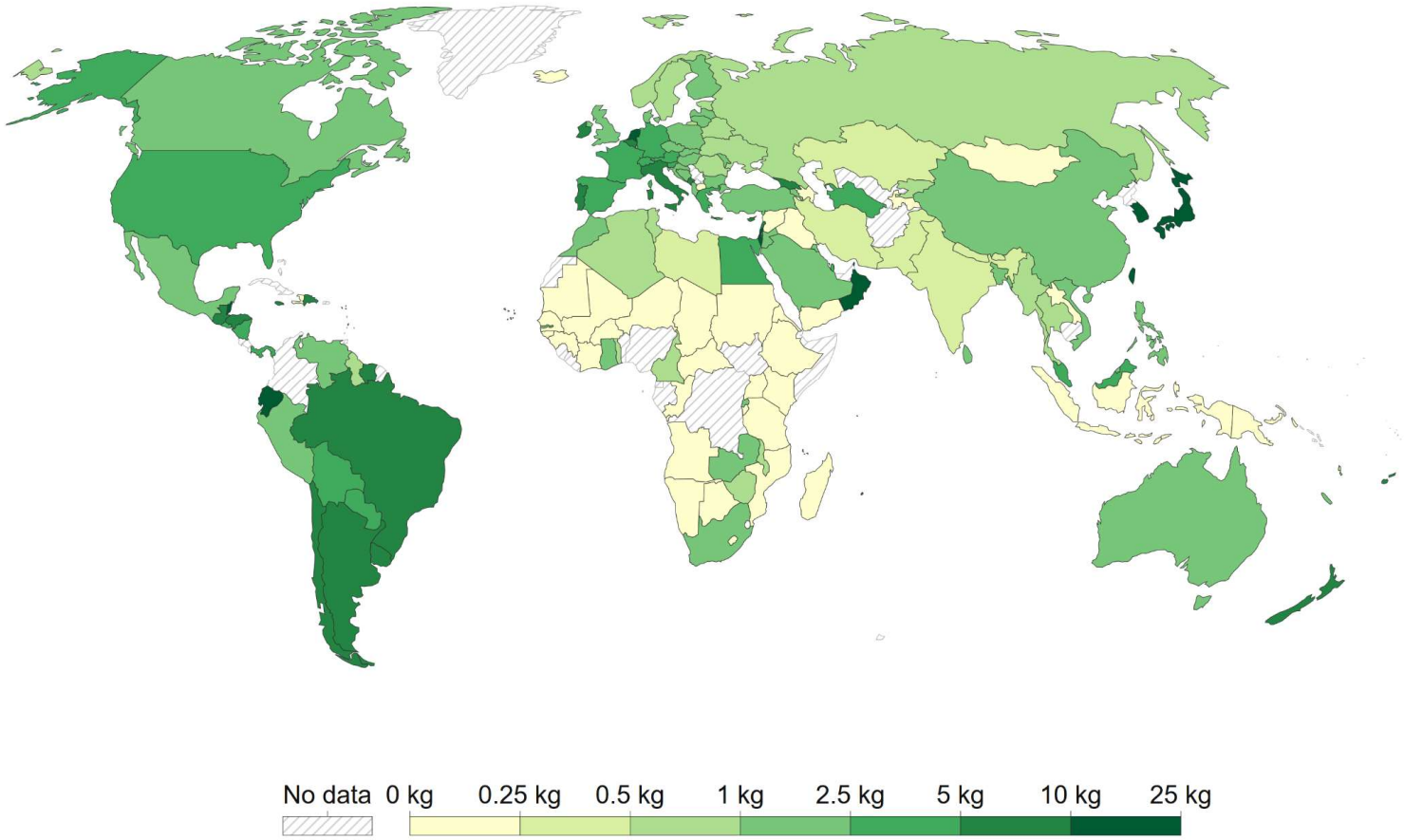
https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2017WR020448

Pesticide Use

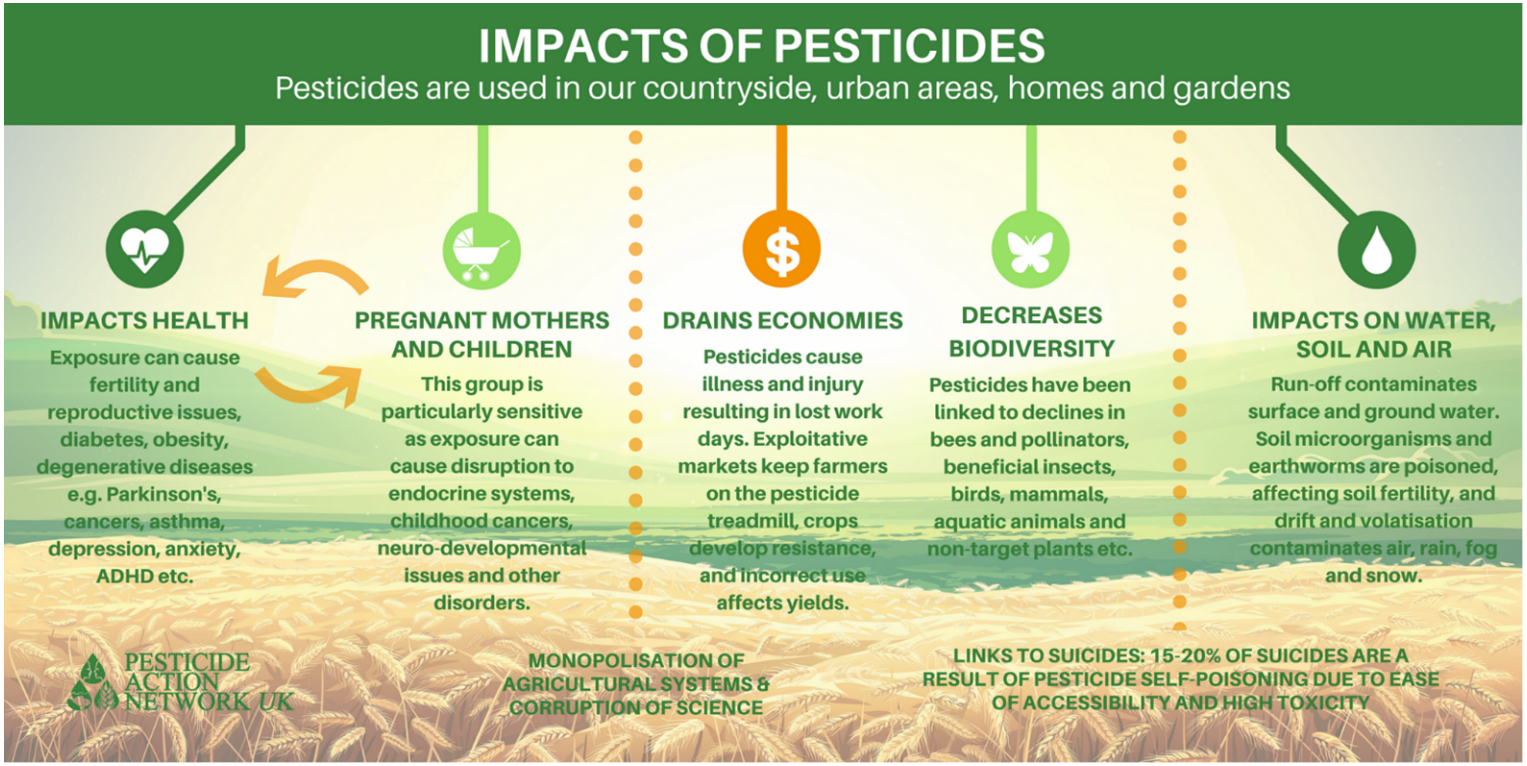
Pesticide use per hectare of cropland, 2020

Average pesticide application per unit of cropland, measured in kilograms per hectare.

Our World in Data

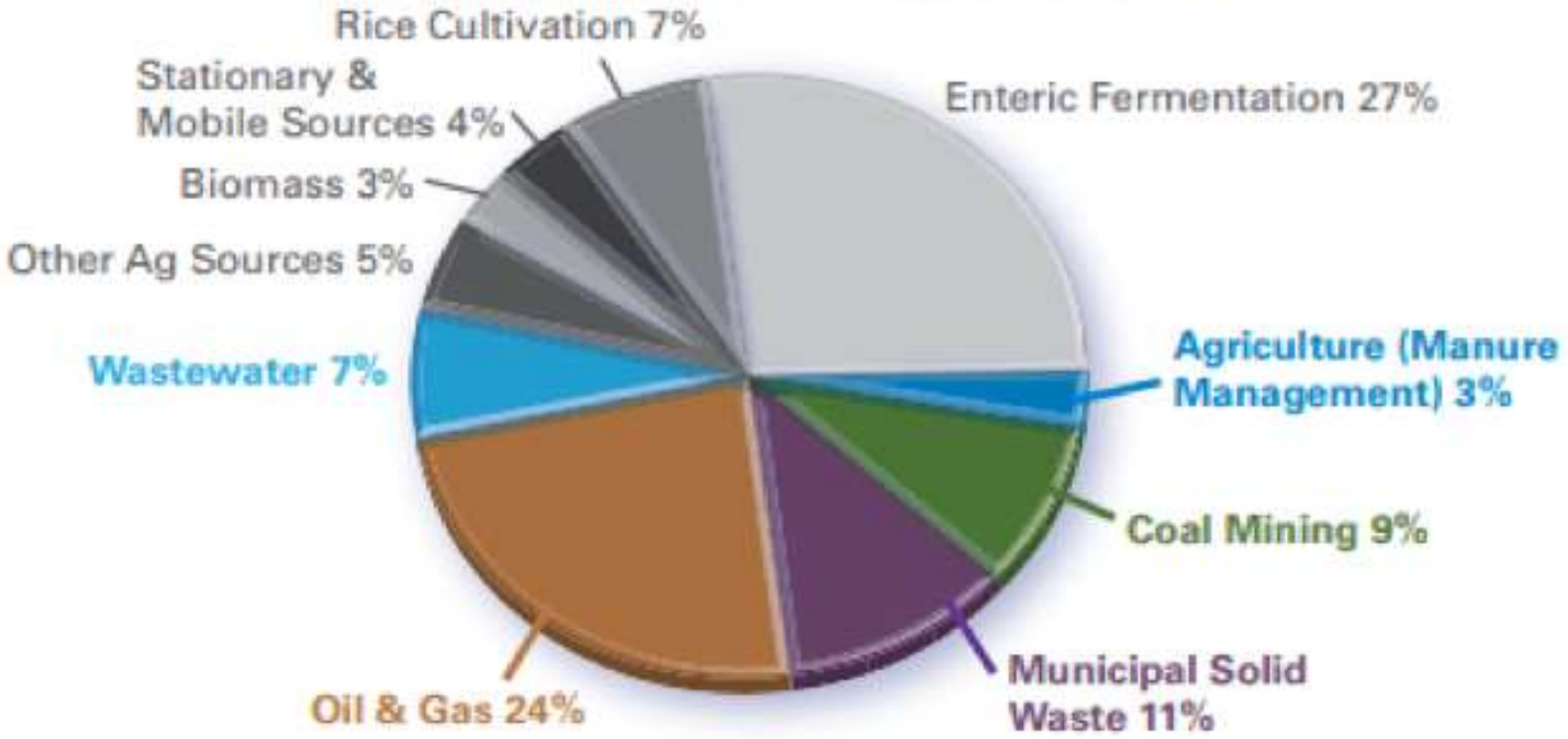


Source: Food and Agriculture Organization of the United Nations


IMPACTS OF PESTICIDES
Pesticides are used in our countryside, urban areas, homes and gardens
IMPACTS HEALTH
Exposure can cause fertility and reproductive issues, diabetes, obesity, degenerative diseases e.g. Parkinson's, cancers, asthma, depression, anxiety, ADHD etc.
PREGNANT MOTHERS AND CHILDREN
This group is particularly sensitive as exposure can cause disruption to endocrine systems, childhood cancers, neuro-developmental issues and other disorders.
DRAINS ECONOMIES
Pesticides cause illness and injury resulting in lost work days. Exploitative markets keep farmers on the pesticide treadmill, crops develop resistance, and incorrect use affects yields.
DECREASES BIODIVERSITY
Pesticides have been linked to declines in bees and pollinators, beneficial insects, birds, mammals, aquatic animals and non-target plants etc.
IMPACTS ON WATER, SOIL AND AIR
Run-off contaminates surface and ground water. Soil microorganisms and earthworms are poisoned, affecting soil fertility, and drift and volatisation contaminates air, rain, fog and snow.
PESTICIDE ACTION NETWORK UK
MONOPOLISATION OF AGRICULTURAL SYSTEMS & CORRUPTION OF SCIENCE
LINKS TO SUICIDES: 15-20% OF SUICIDES ARE A RESULT OF PESTICIDE SELF-POISONING DUE TO EASE OF ACCESSIBILITY AND HIGH TOXICITY

Climate Change

Figure 1: Estimated Global Anthropogenic Methane Emissions by Source, 2020

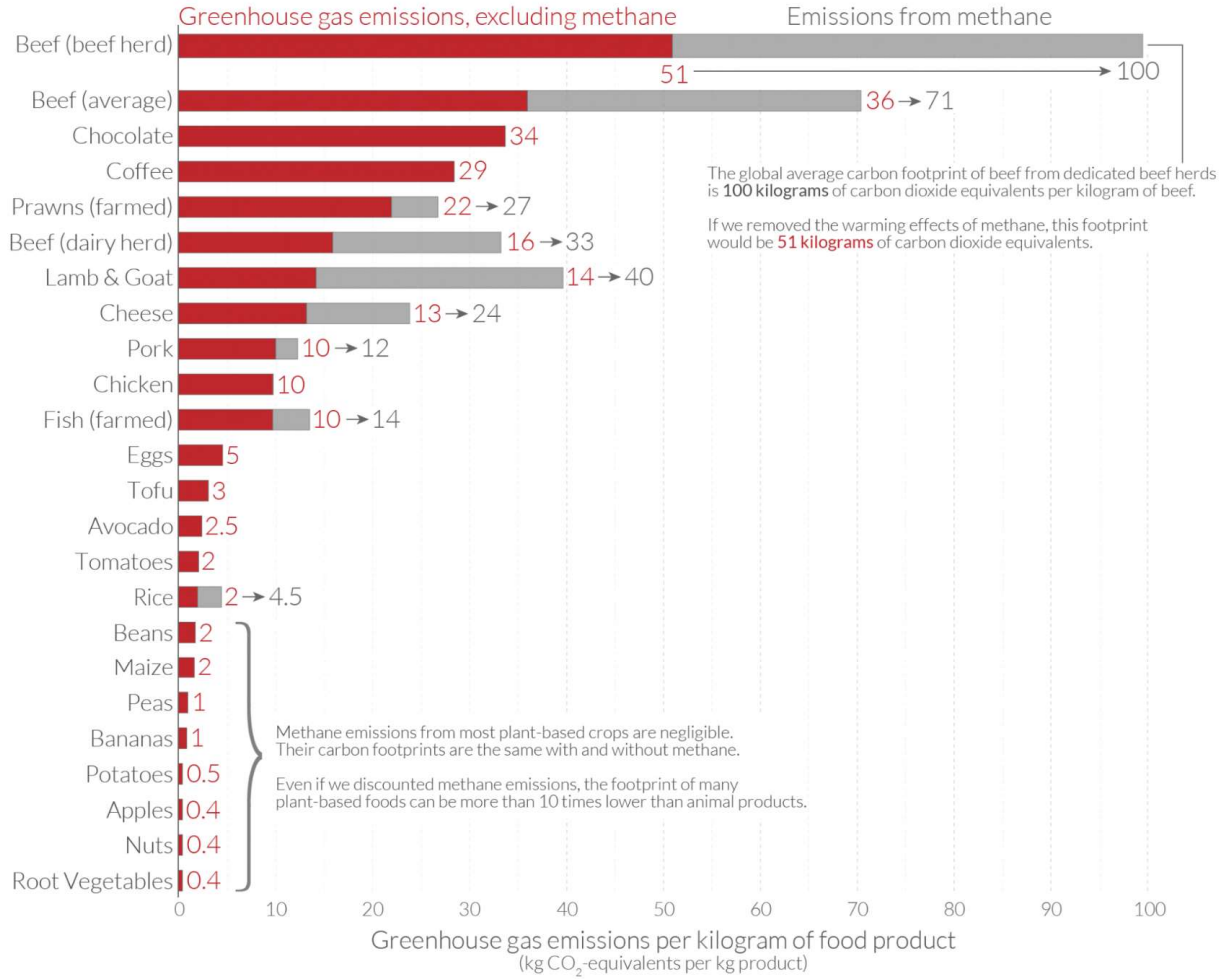


https://blog.nems.eco/blog/methane

Greenhouse gas emissions from food, short vs. long-lived gases

Our World in Data

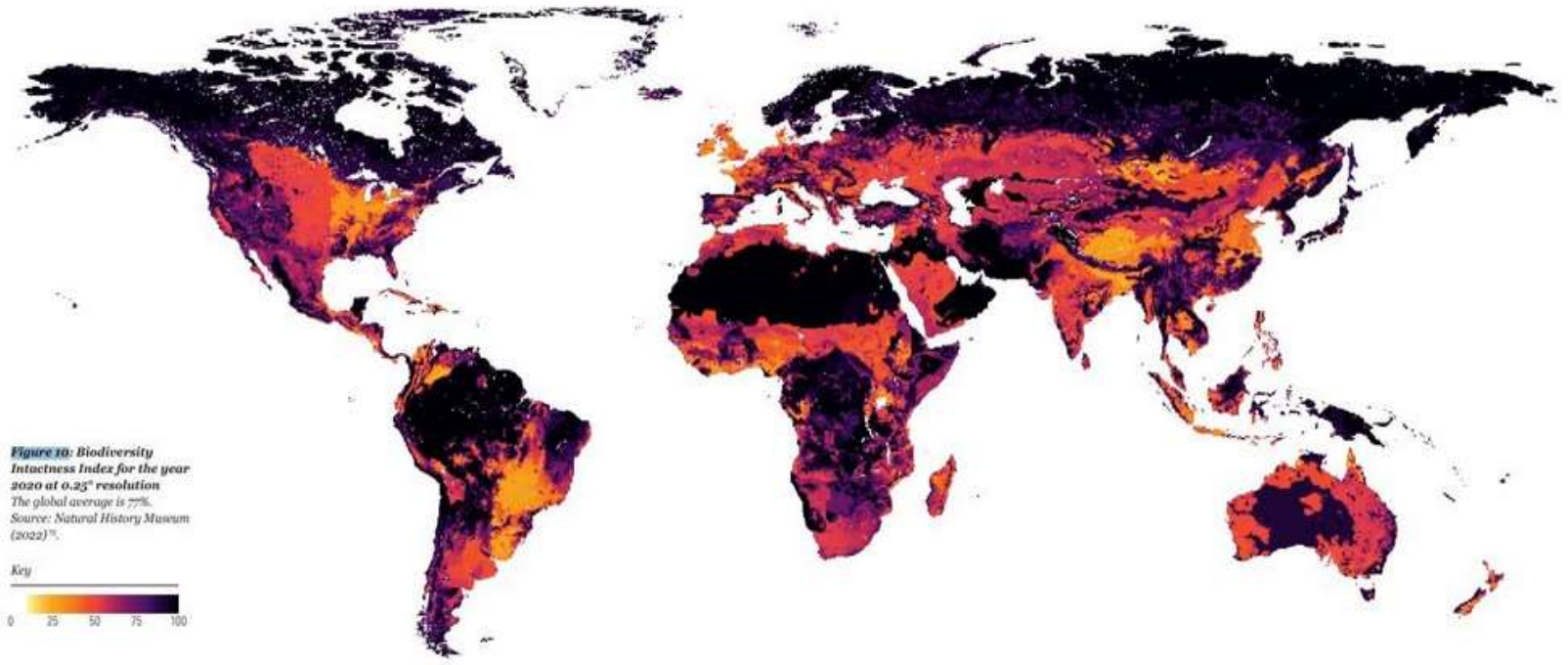
Greenhouse gas emissions are measured in carbon dioxide-equivalents (CO_2eq) based on their 100-year global warming potential (GWP).
Global mean emissions for each food are shown with and without the inclusion of methane – a short-lived but potent greenhouse gas.



Note: Greenhouse gas emissions are given as global average values based on data across 38,700 commercially viable farms in 119 countries.
Data source: Poore & Nemecek (2018). Reducing food's environmental impacts through producers and consumers. *Science*.

Loss of Biodiversity

3. Where biodiversity is most intact



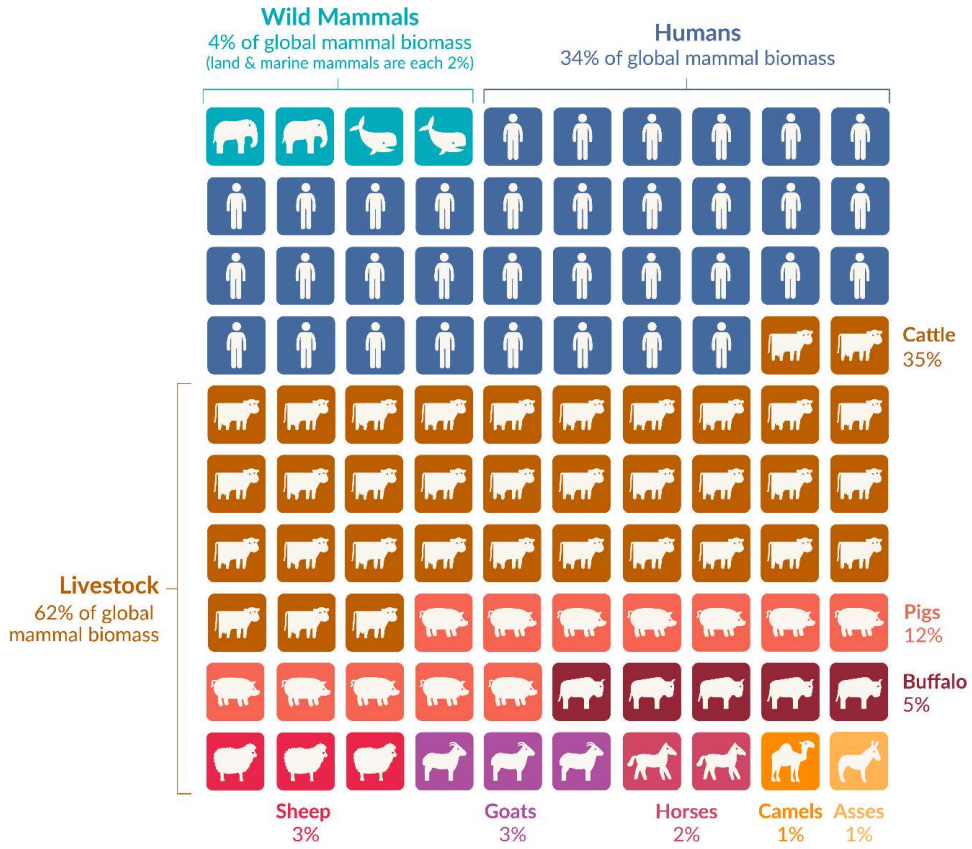
Understanding changes in biodiversity is vital to its future protection. Image: WWF

https://www.weforum.org/agenda/2022/10/nature-loss-biodiversity-wwf/

Distribution of mammals on Earth

Our World in Data

Mammal biomass is measured in tonnes of carbon, and is shown for the year 2015. Each square corresponds to 1% of global mammal biomass.

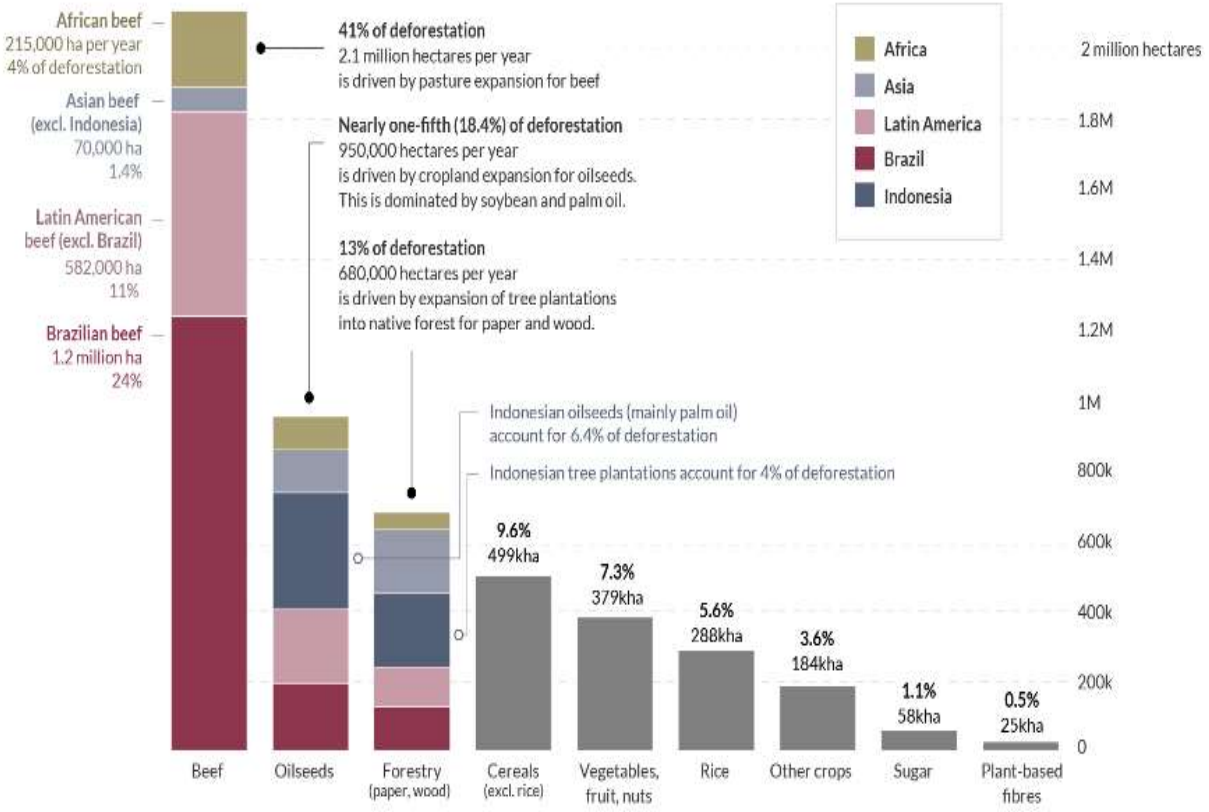


Note: An estimate for pets has been included in the total biomass figures, but is not shown on the visualization because it makes up less than 1% of the total.

What are the drivers of tropical deforestation?

Our World in Data

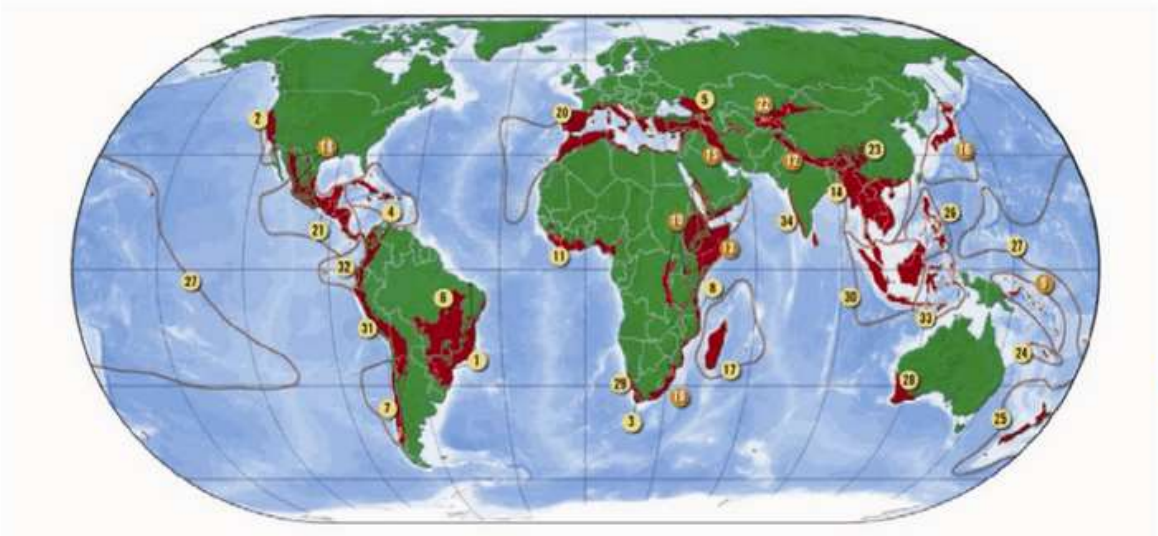
Nearly all of global deforestation occurs in tropical and subtropical countries. 70% to 80% is driven by conversion of primary forest to agriculture or tree plantations. Shown is the breakdown of these drivers averaged over the years 2005 to 2013. Further observations since 2013 suggest that drivers have not changed substantially over this period.



Data source: Florence Pendrill et al. (2019). Deforestation displaced: trade in forest-risk commodities and the prospects for a global forest transition.

OurWorldinData.org – Research and data to make progress against the world's largest problems.

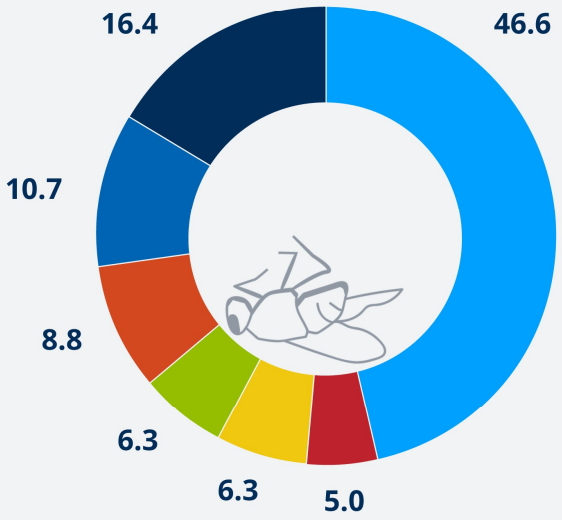
Biodiversity Loss Hotspots



https://www.researchgate.net/figure/Thirty-four-different-biodiversity-hotspots-in-the-world-the-four-boxed-hotspots-are_fig1_295088151

Main drivers of insect decline

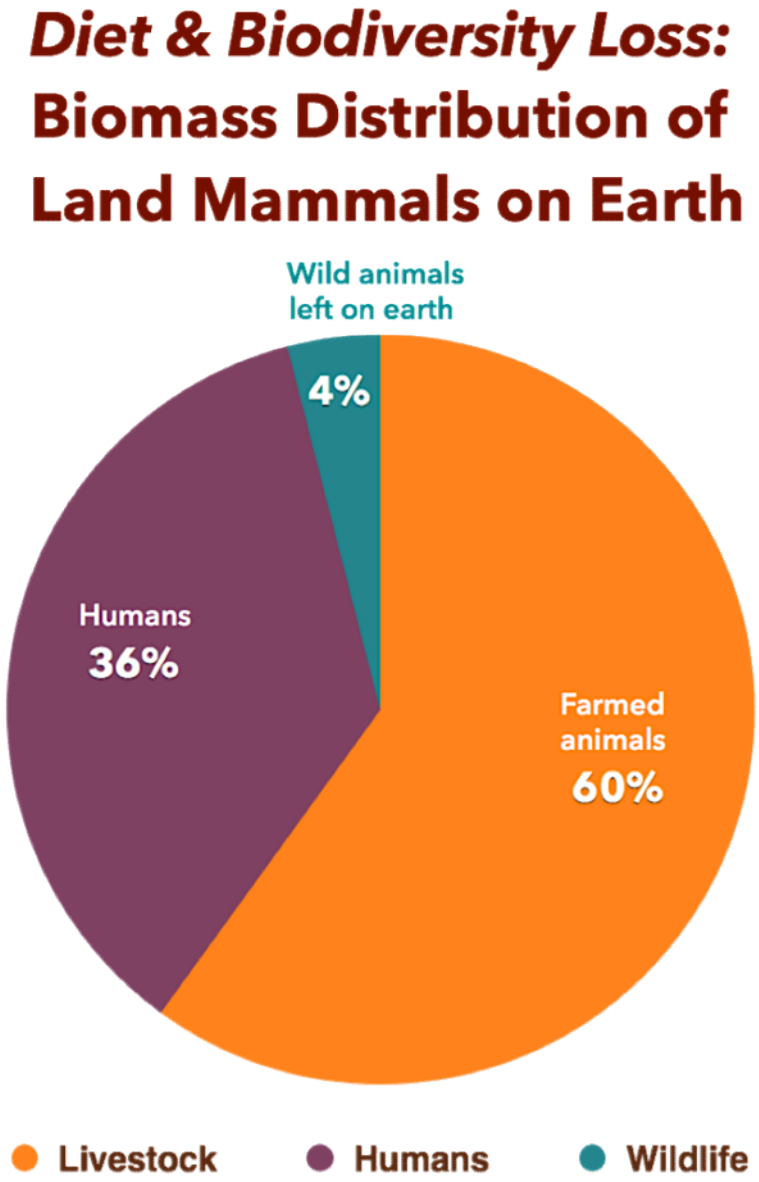
Worldwide, in percent



- Intensive agriculture with pesticides and fertilizer
- Biological factors, introduced species and pathogens
- Urbanization
- Deforestation
- Wetlands and river alteration
- Others
- Global warming

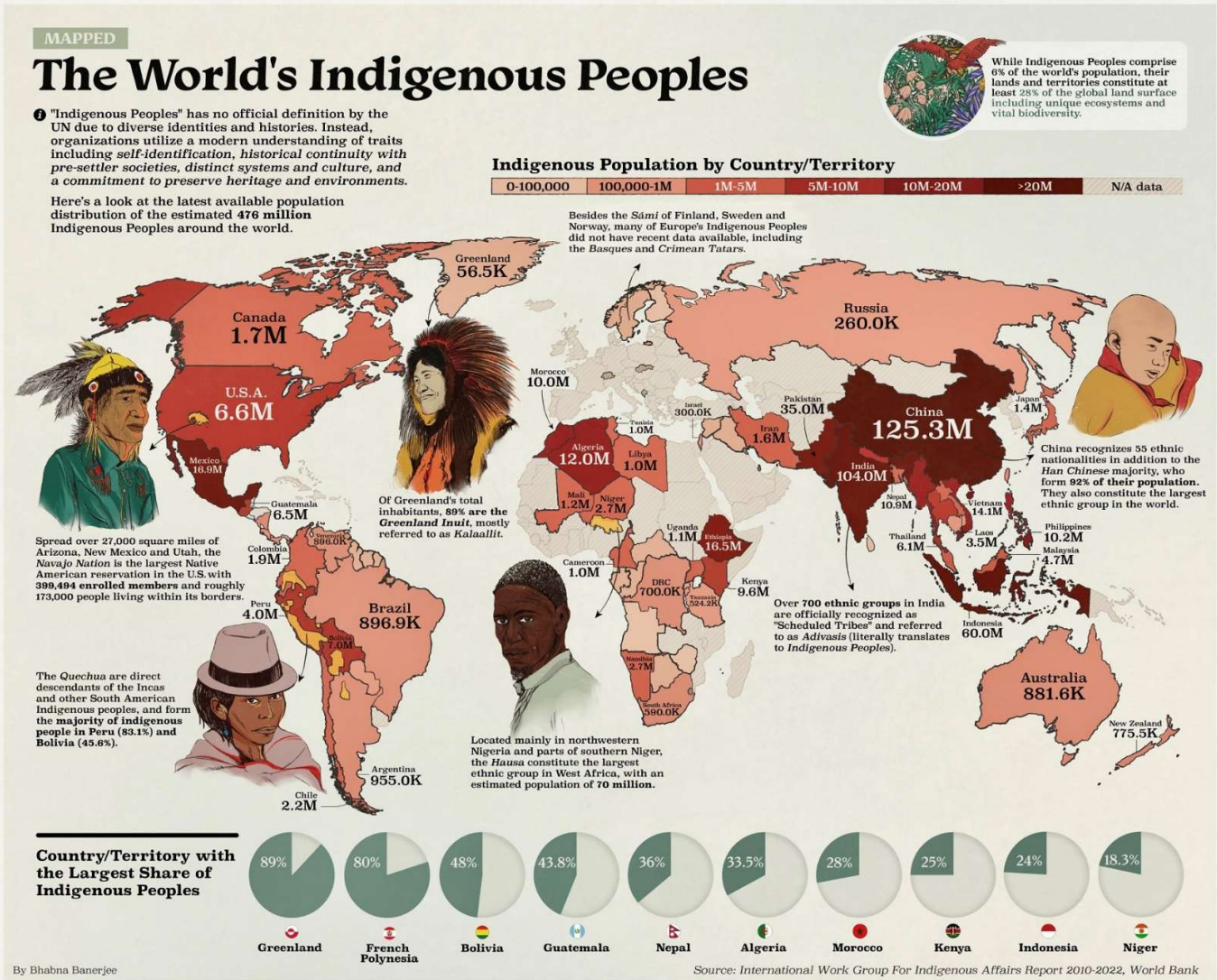
Source: Sanchez-Bayo & Wyckhuys, Biological Conservation, 2019

https://www.dw.com/en/biodiversity-loss-is-humanitys-greatest-threat/a-62113416



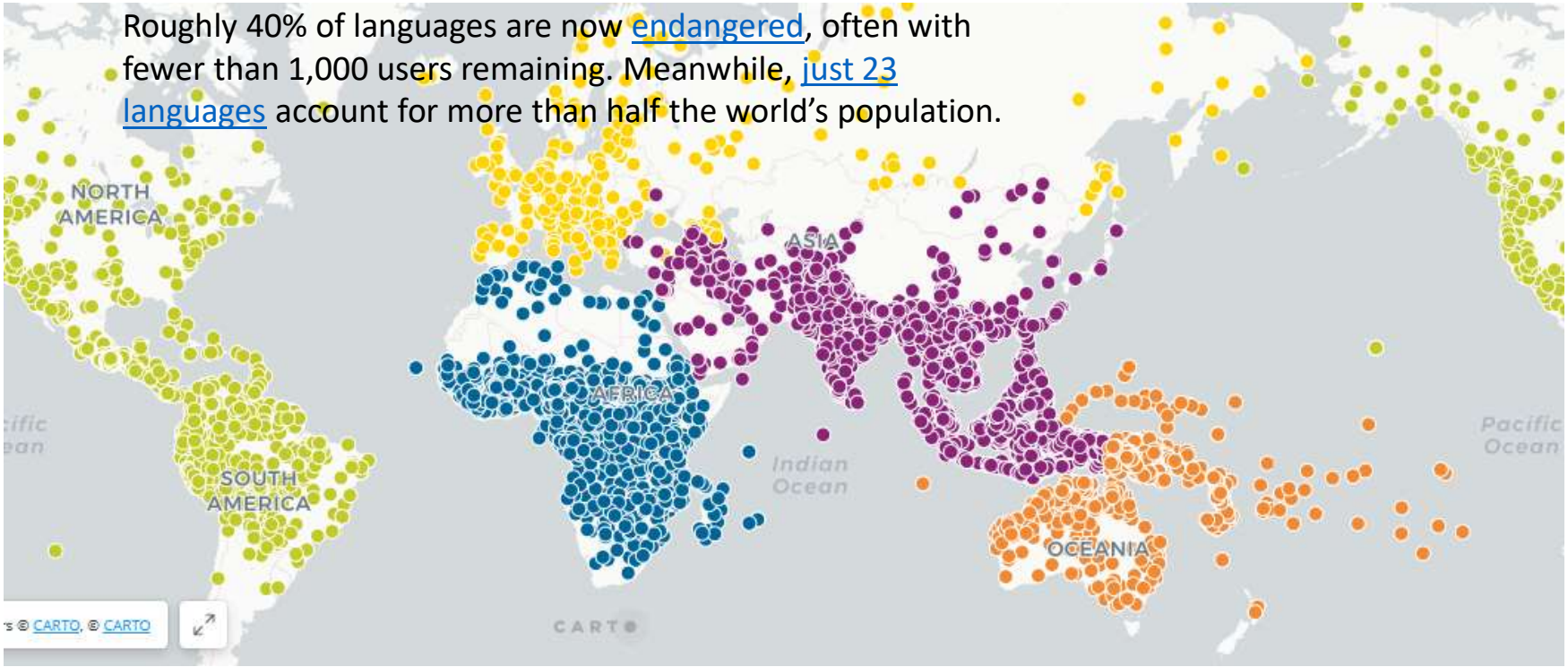
https://awellfedworld.org/biodiversity/

Loss of Cultural Diversity and Indigenous Peoples

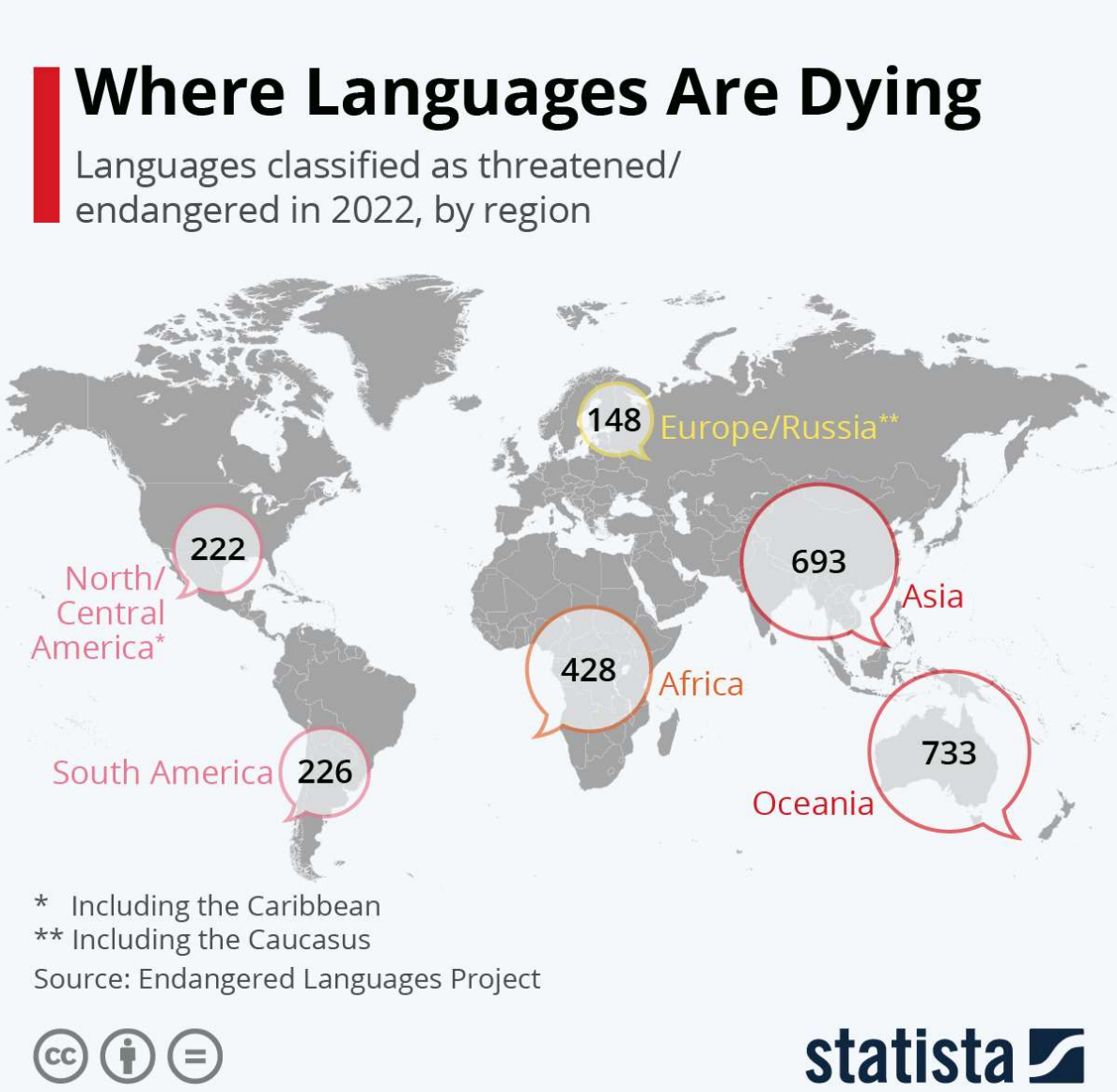


https://www.visualcapitalist.com/cp/mapped-the-worlds-indigenous-peoples/

7,168 languages are in use today.



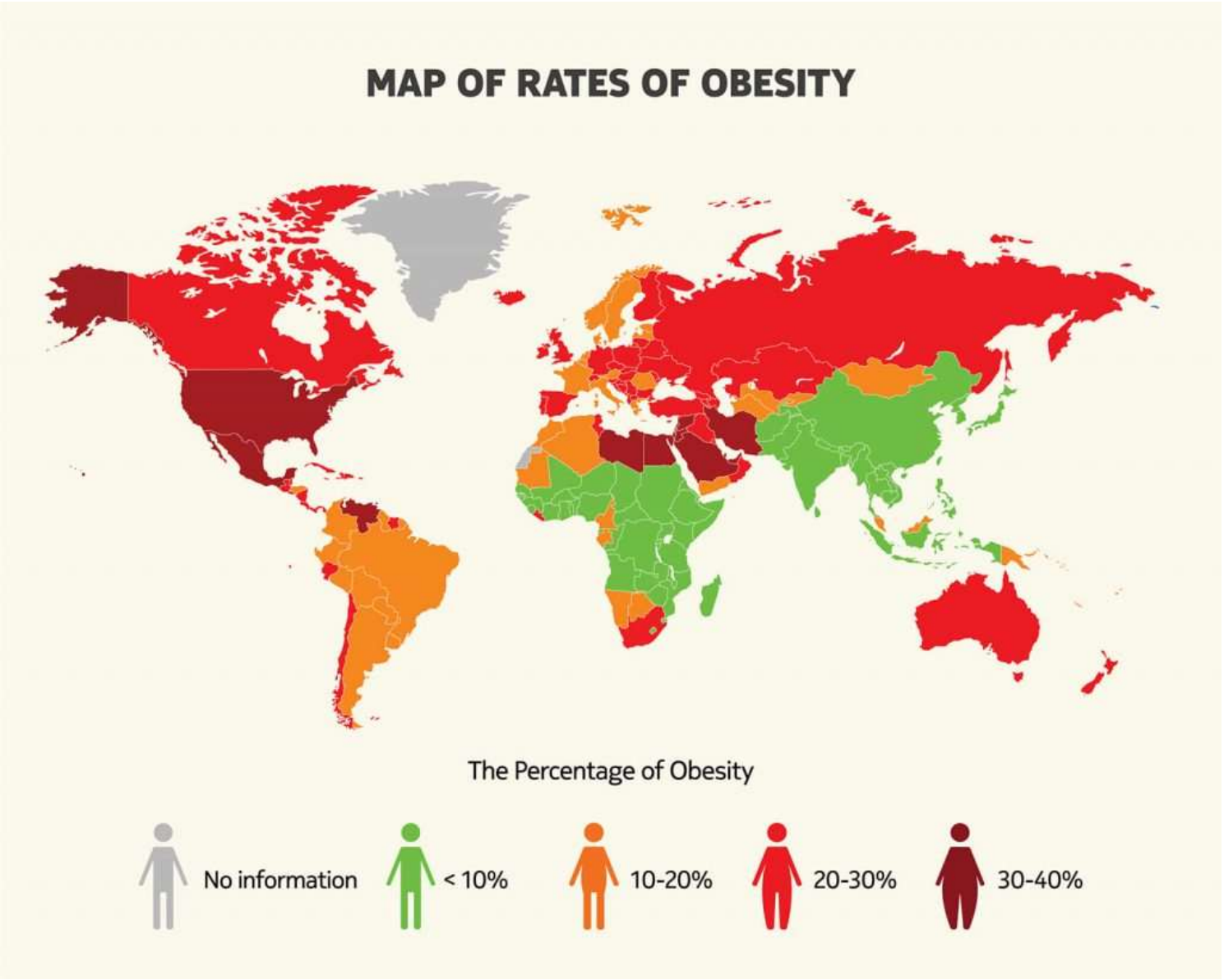
https://www.ethnologue.com/insights/how-many-languages/



economic growth and globalization are primary drivers of recent language speaker declines

https://www.statista.com/chart/26867/endangered-threatened-languages-by-world-region/

Health

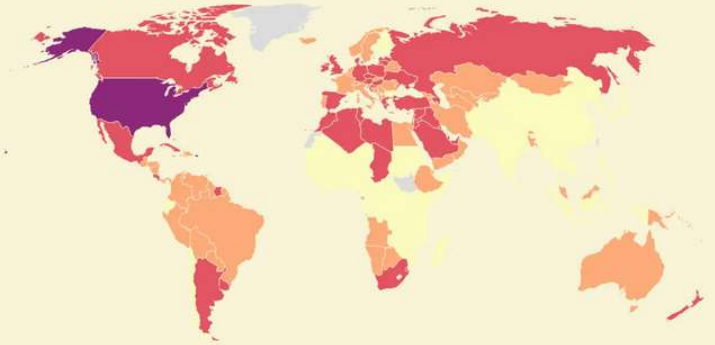


https://dojomanagementsoftware.com/2020/08/07/covid-19-obesity/

Obesity rates were lower 7 years ago

Percentage of adults with obesity in 2016.

< 14% 14%–26% 26%–37% 37%–49% ≥ 49%



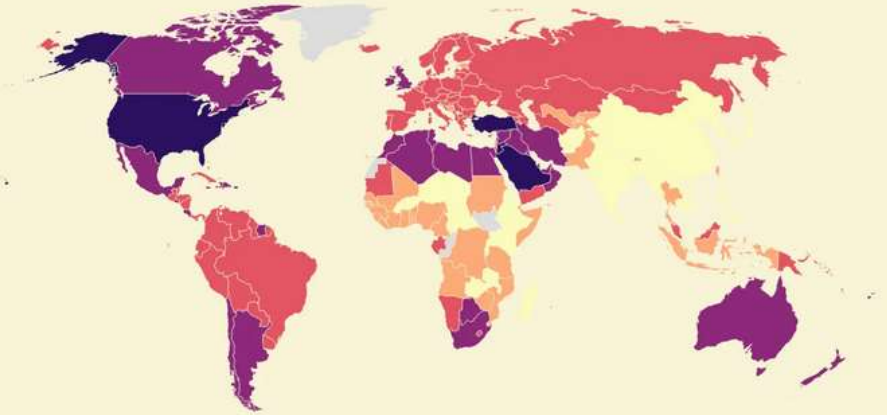
Map: Semafor/Jenna Moon • Source: Our World in Data

Globally, obesity has emerged as a leading cause of death. In data from 2019, obesity was attributed as a cause for as many as 22% of deaths in some countries.

Obesity rates are expected to rise

Percentage of the adult population projected to be obese by 2035.

< 19% 19%–31% 31%–43% 43%–55% ≥ 55%

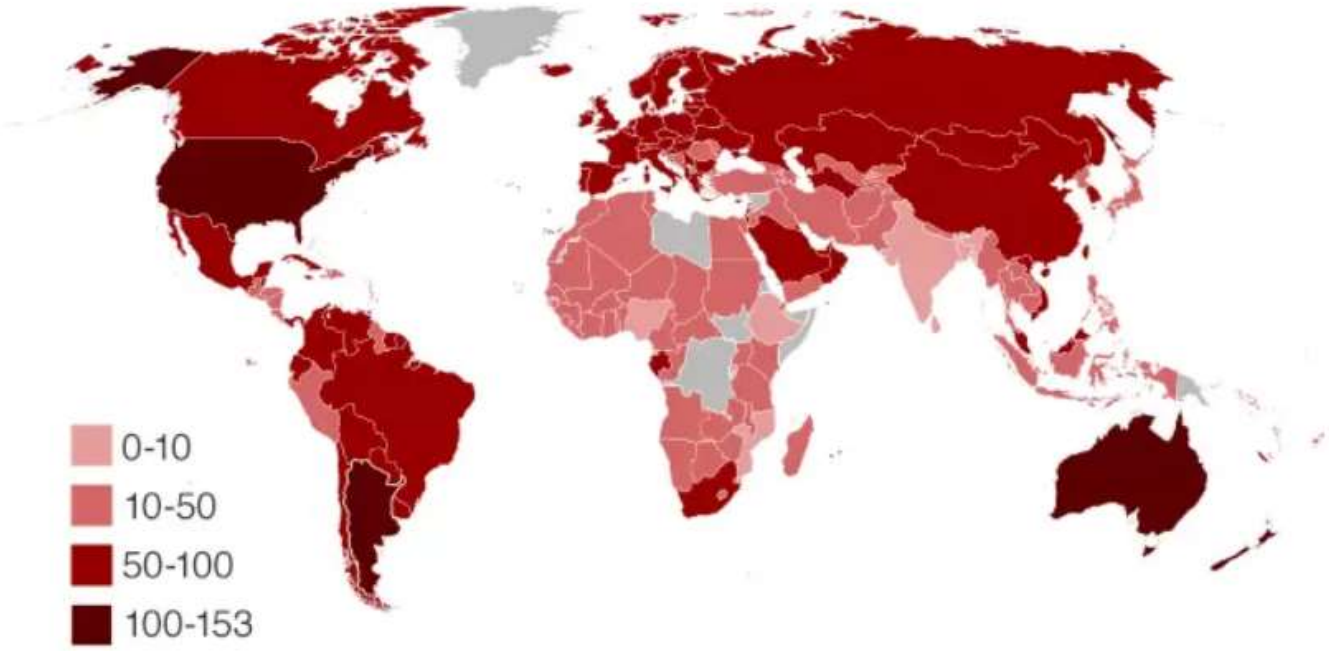


Map: Semafor/Jenna Moon • Source: World Obesity

https://www.semafor.com/article/03/03/2023/the-global-obesity-crisis-explained-in-three-maps

Who eats the most meat?

Meat consumption (kg per person per year)

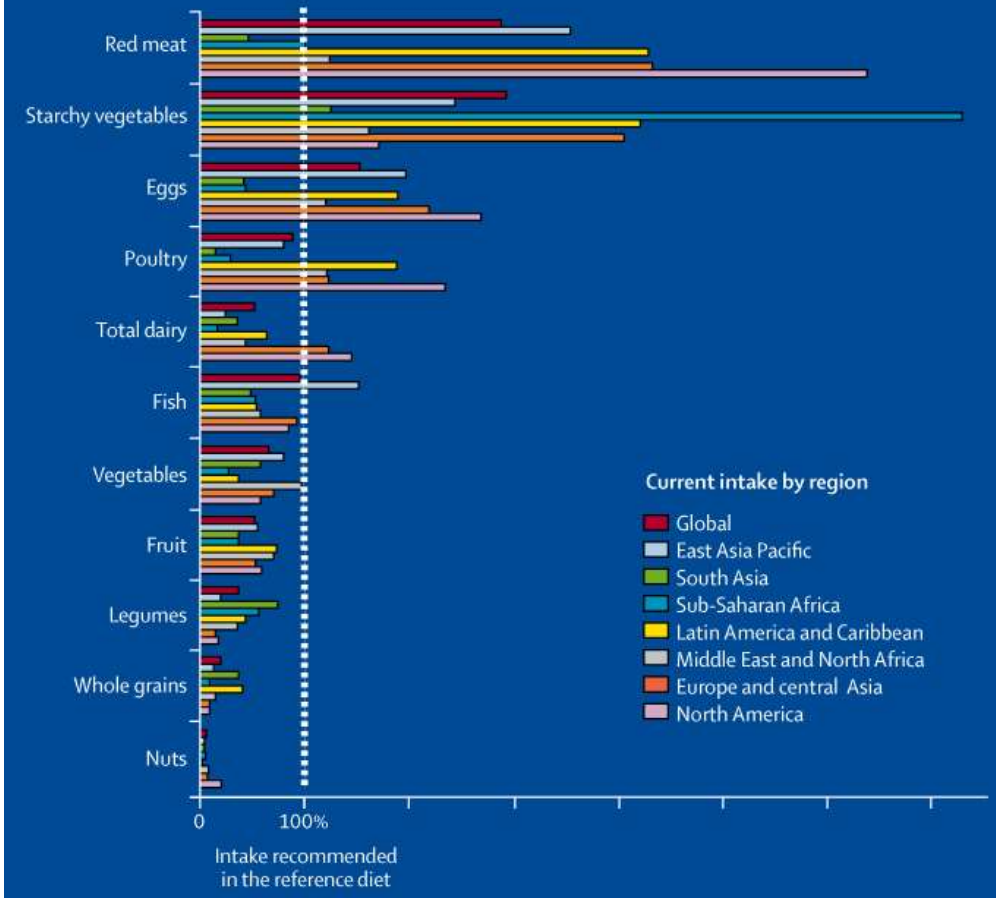


Source: UN Food and Agriculture Organization / Our World in Data

BBC

https://www.bbc.com/news/health-47057341

The great food transformation

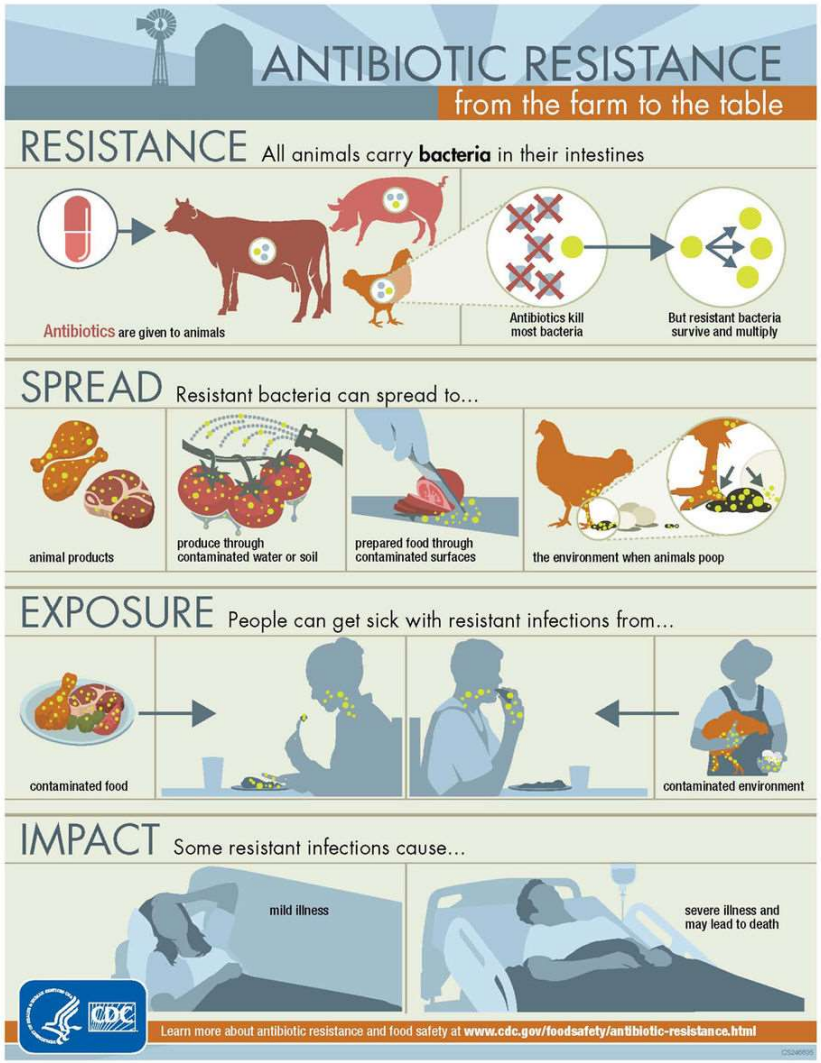


The EAT–*Lancet* Commission defines a reference diet that **meets nutritional requirements, within planetary boundaries** to minimise damage to Earth's systems.

Global adoption of the reference diet by 2050 will require worldwide consumption of red meat and sugar to reduce by more than 50%, and consumption of nuts, fruits, vegetables, and legumes to increase by 100%, accommodating significant regional differences and needs.

Read the Commission:
www.thelancet.com/commissions/EAT

https://www.thelancet.com/commissions/EAT



https://stonepierpress.org/goodfoodnews/factory-farms-public-health

Planetary Boundaries

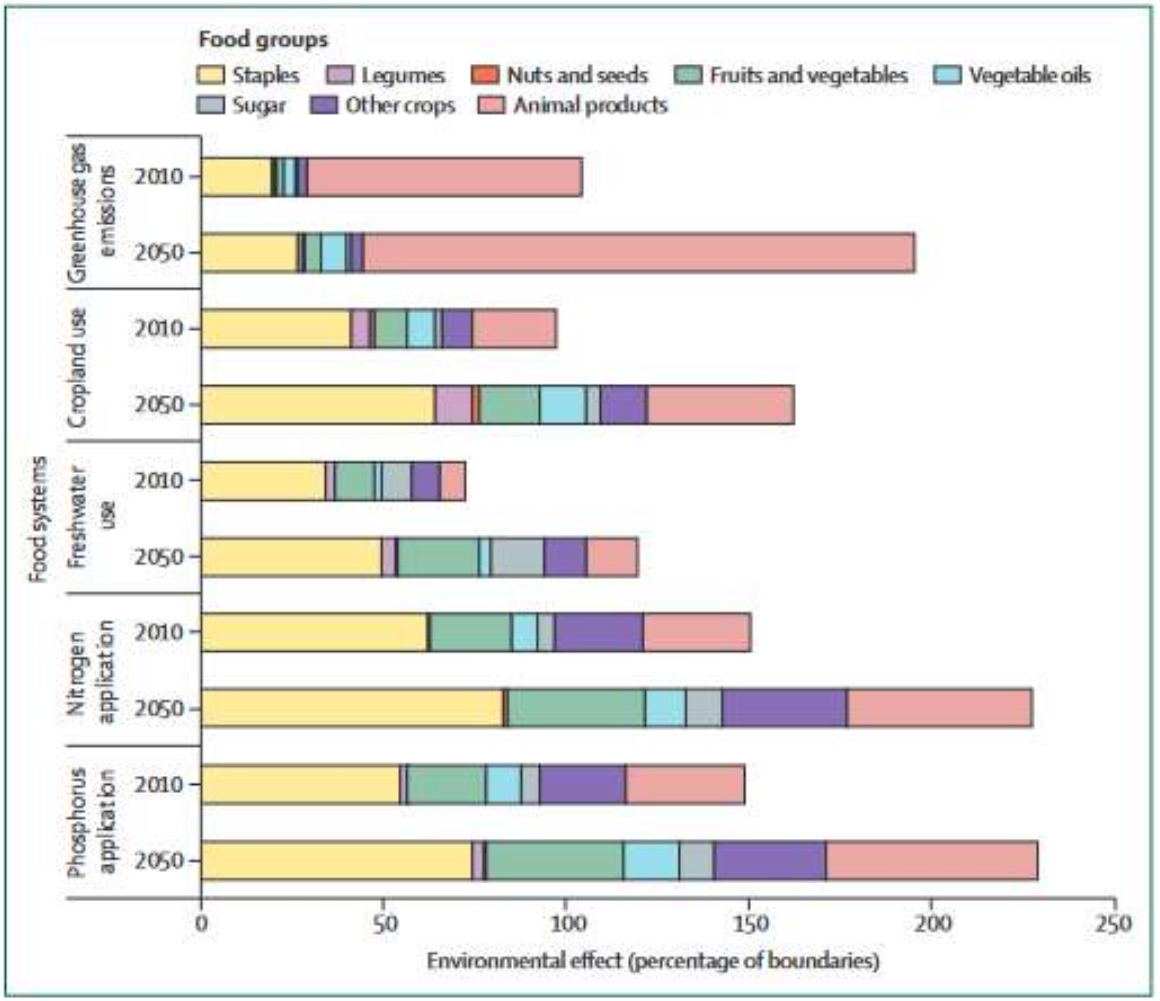


Figure 5: **Environmental effects in 2010 and 2050 by food groups on various Earth systems based on business-as-usual projections for consumption and production**

Environmental effects by food groups on various Earth systems based on BAU projections for consumption and production

https://www.thelancet.com/commissions/EAT

Environmental Effects per Serving of Food Produced

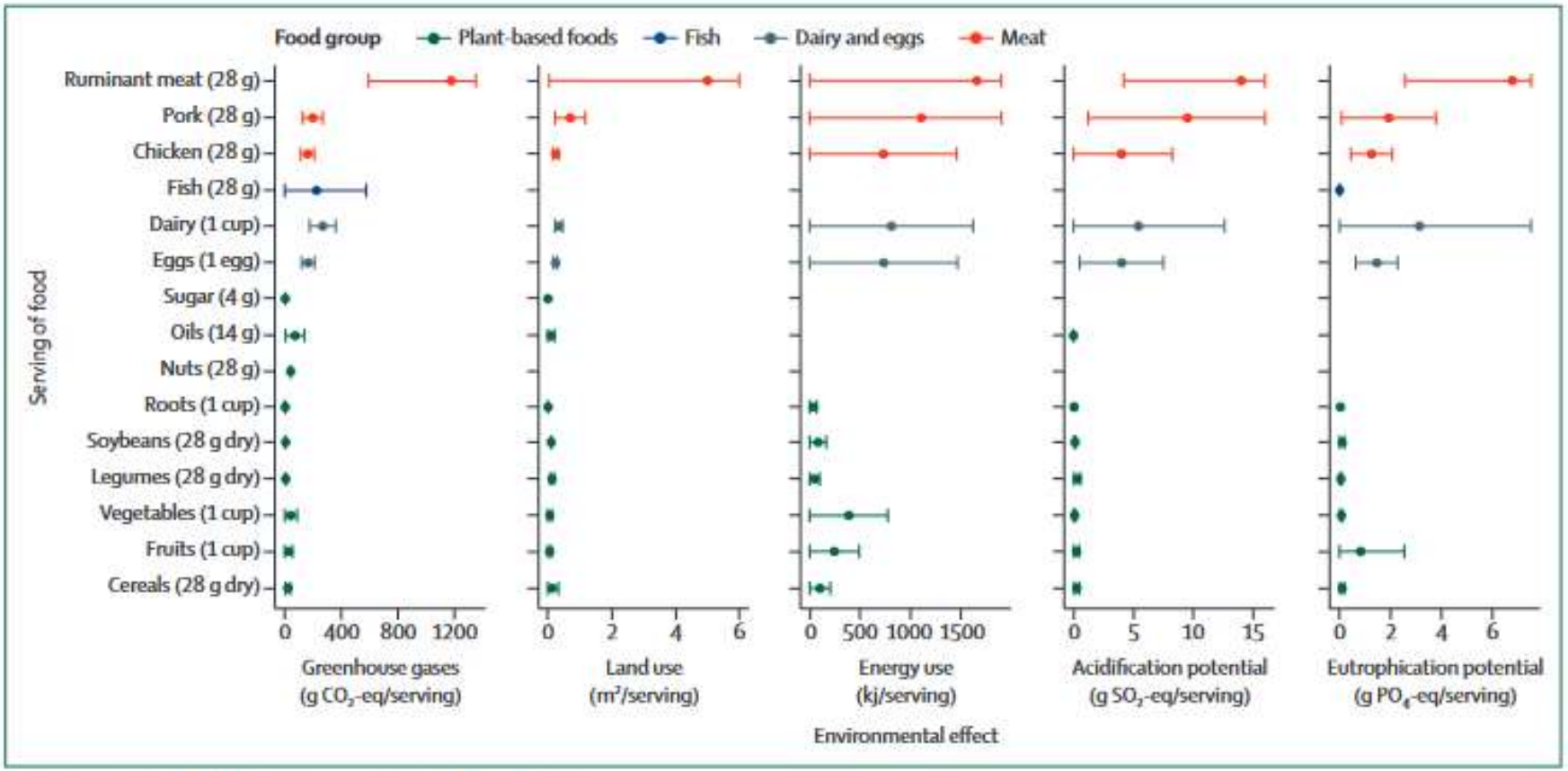
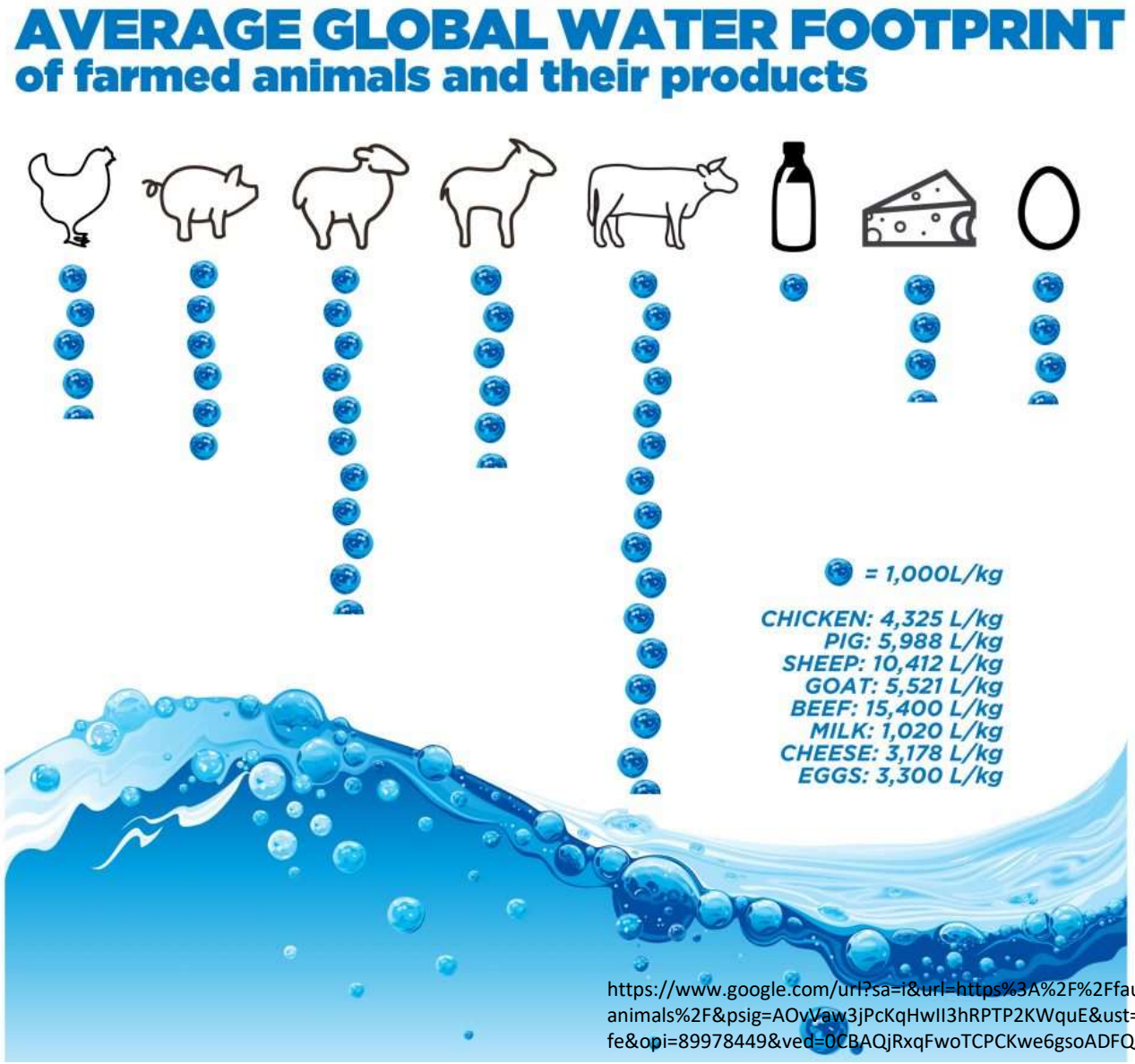


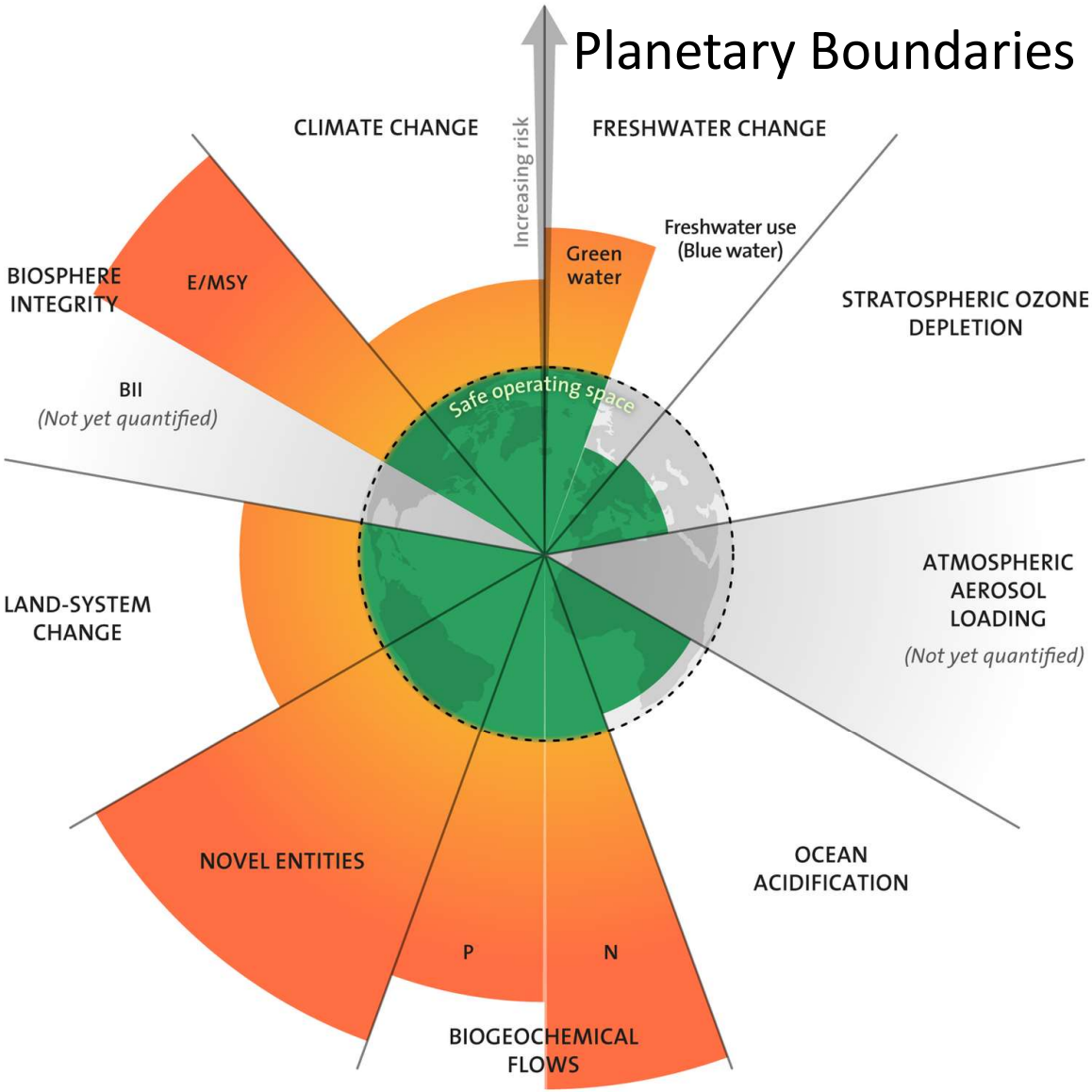
Figure 4: **Environmental effects per serving of food produced**
Bars are mean (SD).[5,216] Some results are missing for fish due to lack of data for some impact categories (eg, land use stemming from plant-based feeds in aquaculture). This was, however, accounted for in the global food systems modeling framework used in Section 3. CO_2=carbon dioxide. Eq=equivalent. PO_4=phosphate. SO_2=sulphur dioxide.

https://www.thelancet.com/action/showPdf?pii=S0140-6736%2818%2931788-4



https://www.google.com/url?sa=i&url=https%3A%2F%2Ffaunalytics.org%2Ffundamentals-farmed-animals%2F&psig=AOvVaw3jPcKqHwII3hRPTP2KWquE&ust=1690663058349000&source=images&cd=vfe&opi=89978449&ved=0CBAQjRxqFwoTCPCKwe6gsoADFQAAAAAdAAAAABAI

Planetary Boundaries



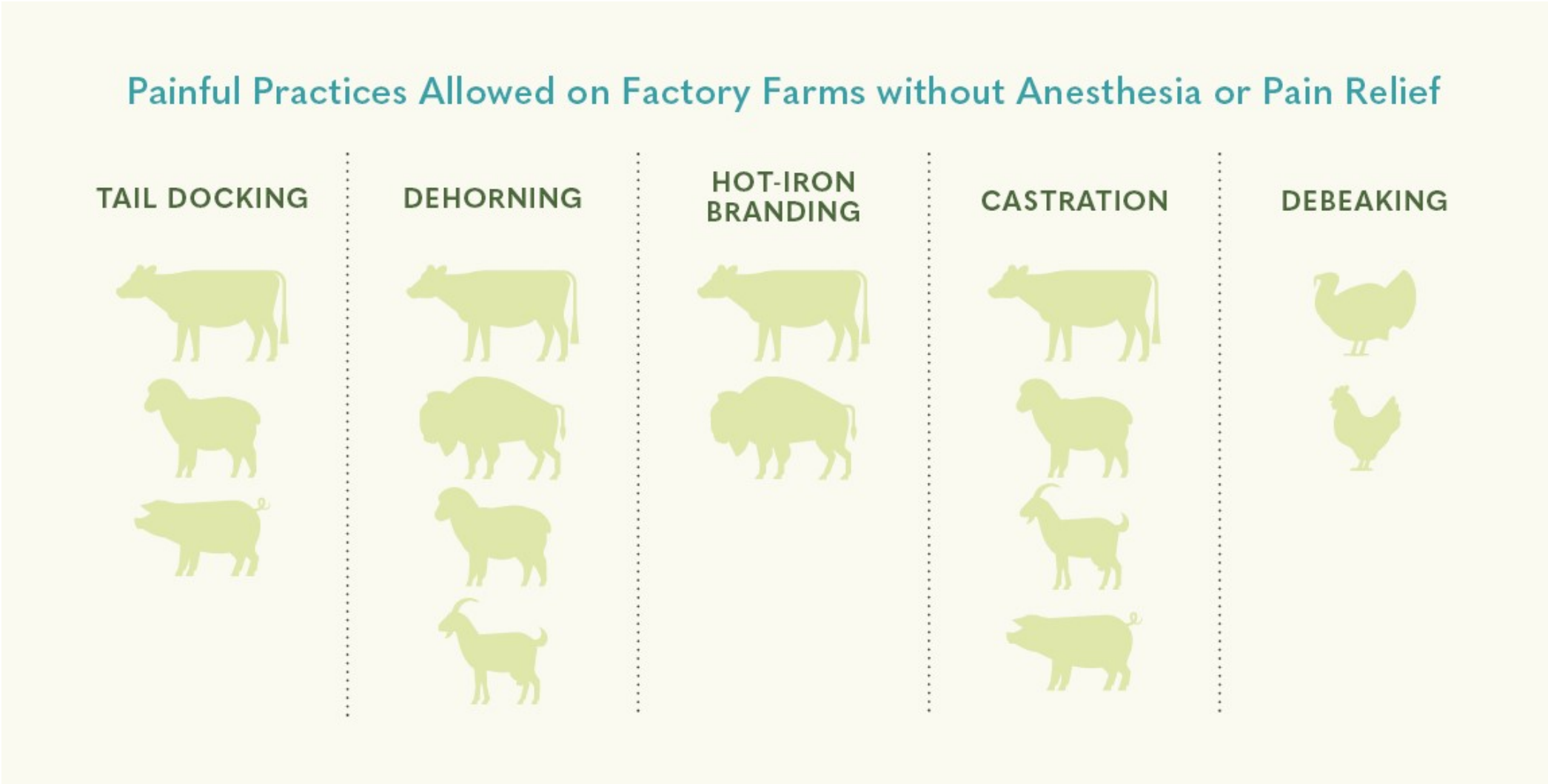
Emissions of toxic and long-lived substances such as synthetic organic pollutants, heavy metal compounds and radioactive materials represent some of the key human-driven changes to the planetary environment. These compounds can have potentially irreversible effects on living organisms and on the physical environment. At present, we are unable to quantify a single chemical pollution boundary, although the risk of crossing Earth system thresholds is considered sufficiently well-defined for it to be included in the list.

"green water" – the water available to plants - into the boundary assessment for the first time.

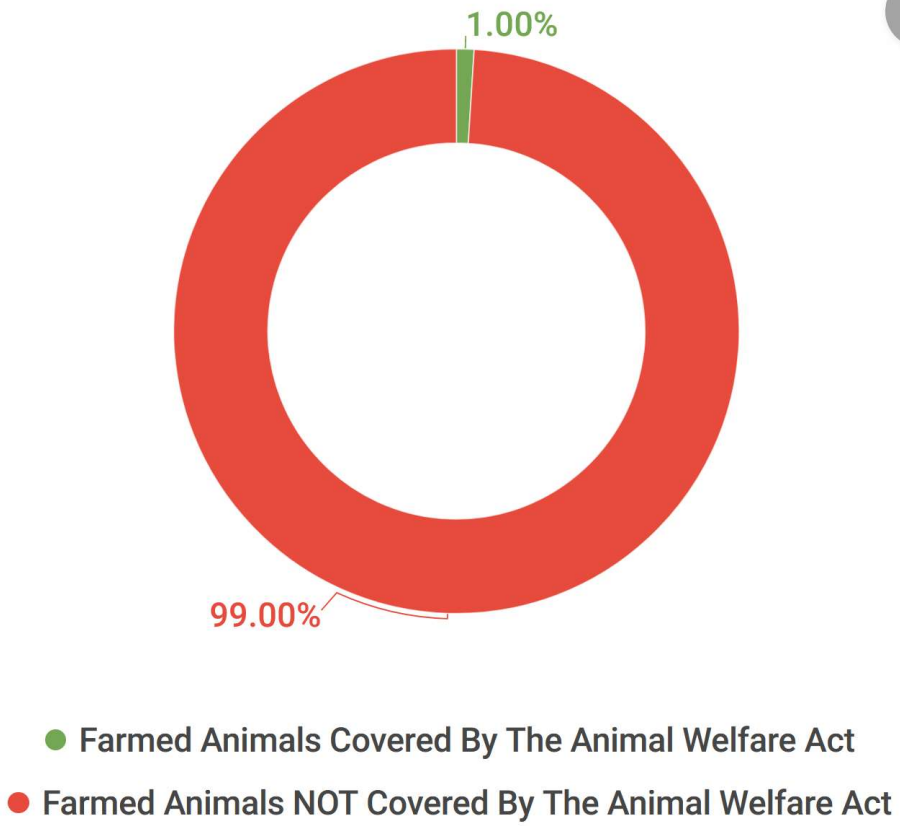
climate change (CO_2 concentration in the atmosphere < 350 ppm and/or a maximum change of +1 W/m² in radiative forcing);
ocean acidification (mean surface seawater saturation state with respect to aragonite ≥ 80% of pre-industrial levels);
stratospheric ozone depletion (less than 5% reduction in total atmospheric O_3 from a pre-industrial level of 290 Dobson Units);
biogeochemical flows in the nitrogen (N) cycle (limit industrial and agricultural fixation of N_2 to 35 Tg N/yr) and phosphorus (P) cycle (annual P inflow to oceans not to exceed 10 times the natural background weathering of P);
global freshwater use (< 4000 km³/yr of consumptive use of runoff resources);
land system change (< 15% of the ice-free land surface under cropland);
the erosion of biosphere integrity (an annual rate of loss of biological diversity of < 10 extinctions per million species).
chemical pollution (introduction of novel entities in the environment).
For one process in the planetary boundaries framework, the scientists have not specified a global boundary quantification:
atmospheric aerosol loading;

https://www.stockholmresilience.org/research/planetary-boundaries.html

Animal Suffering



https://awionline.org/content/inhumane-practices-factory-farms

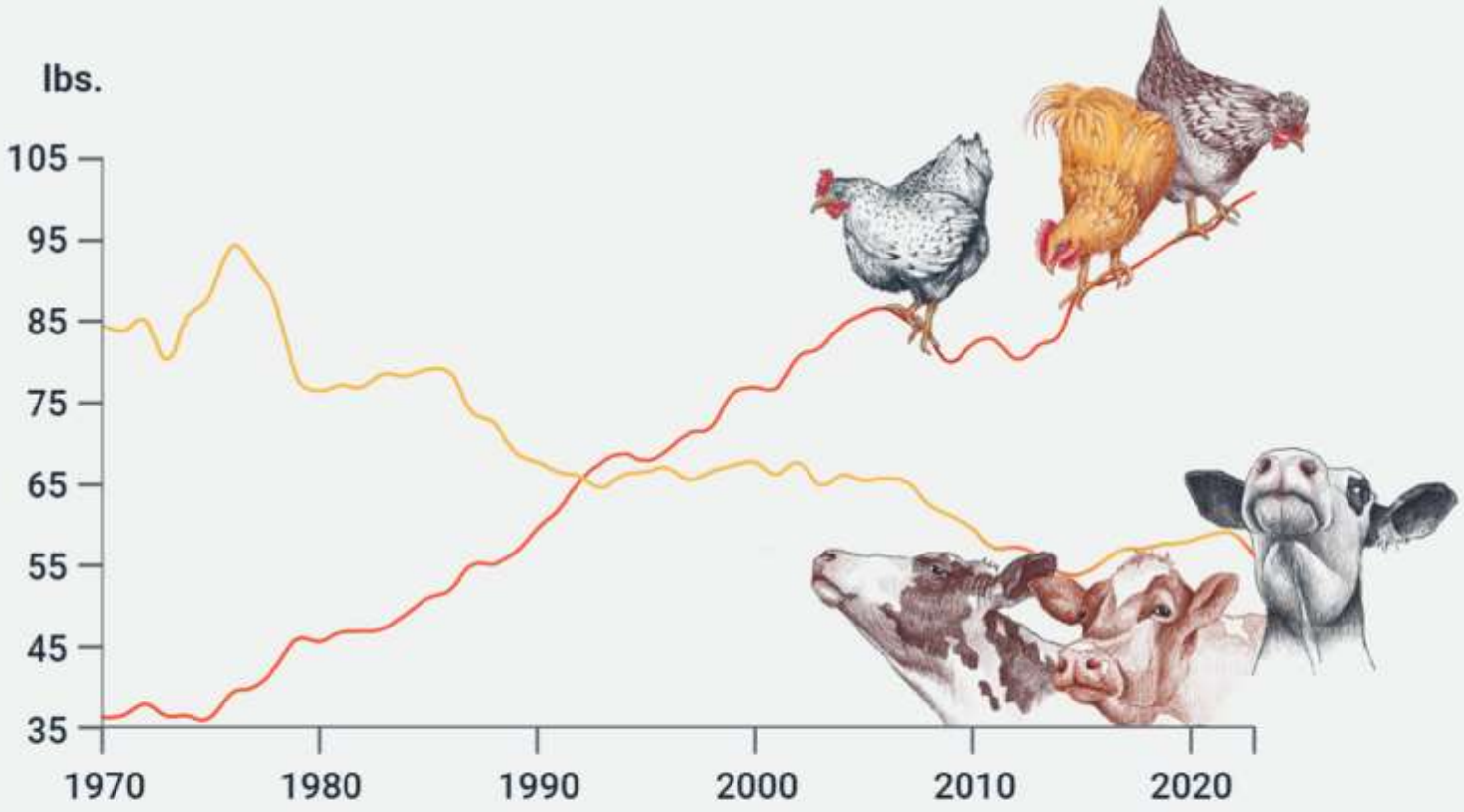


It's hard to imagine slaughtering an animal could ever be considered "humane." But in a cruel twist of irony, the animals we most commonly use for food are exempt from being protected, whether during farming or at the time of slaughter. In the U.S., for instance, chickens and fishes are exempt from the Humane Methods of Slaughter Act, which otherwise covers animals like cows, pigs, goats, and sheep. The vast majority of animals we eat have no protection from cruel slaughter practices.

https://www.google.com/url?sa=i&url=https%3A%2F%2Ffaunalytics.org%2Ffundamentals-farmed-animals%2F&psig=AOvVaw3jPcKqHwII3hRPTP2KWquE&ust=1690663058349000&source=images&cd=vfe&opi=89978449&ved=0CBAQjRxqFwoTCPCKwe6gsoADFQAAAAAdAAAAABAI

Americans are increasingly winging it

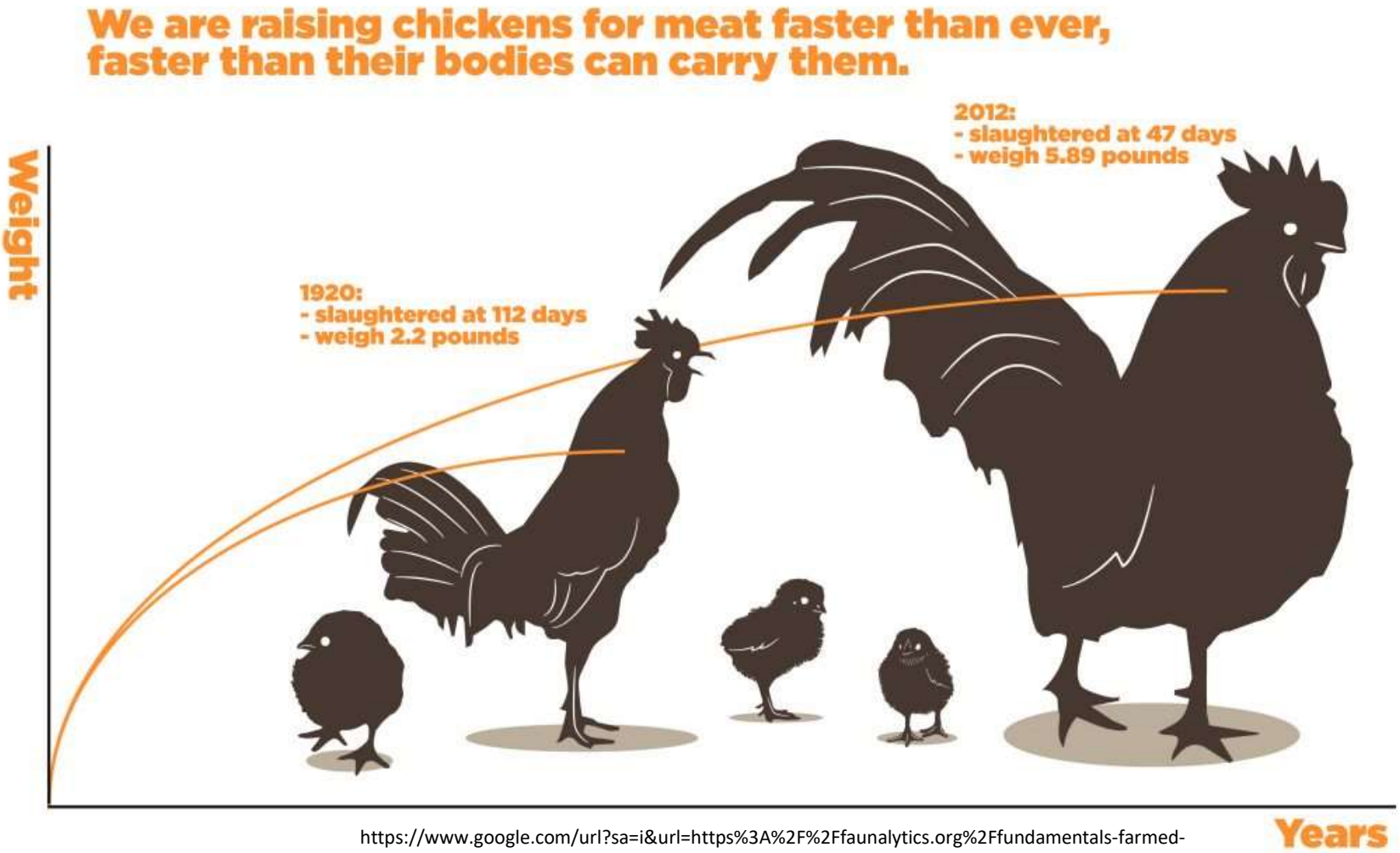
Per capita consumption of chicken and beef in the US (lbs).



DATA: Bloomberg, US Department of Agriculture
NOTE: 2023 numbers are estimated

the HUSTLE

https://thehustle.co/holy-cow-we-re-eating-a-lot-of-chicken/



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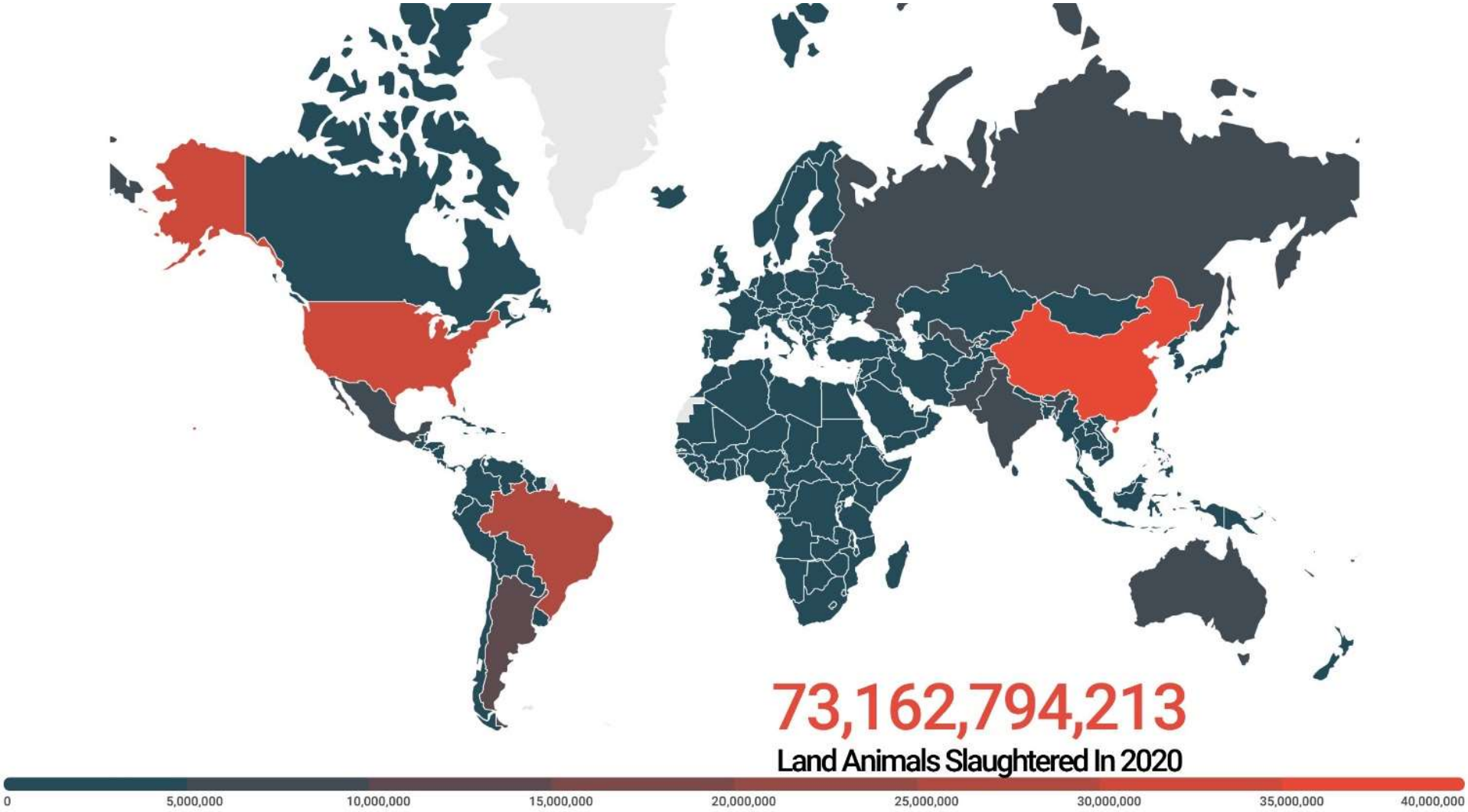

https://faunalytics.org/fundamentals-farmed-animals/

Number Of Animals Slaughtered In The United States

Fishes:	46,906,004,154	(83.4%)
Chickens:	8,909,014,000	(15.8%)
Turkeys:	243,255,000	(0.4%)
Pigs:	118,303,900	(0.2%)
Cows:	31,188,800	(0.06%)
Ducks:	27,268,000	(0.05%)
Sheep:	2,332,600	(0.004%)
Goats:	1,135,000	(0.001%)

Total Number Of Animals Slaughtered:

56,238,501,454

https://www.google.com/url?sa=i&url=https%3A%2F%2Ffaunalytics.org%2Ffundamentals-farmed-animals%2F&psig=AOvVaw3jPcKqHwII3hRPTP2KWquE&ust=1690663058349000&source=images&cd=vfe&opi=89978449&ved=0CBAQjRxqFwoTCPCKwe6gsoADFQAAAAAdAAAAABAI