Diet and the Environment

The Biggest Personal Contribution you Can Make to Help Combat Climate Catastrophe

“??????????? diet is probably the single biggest way to reduce your impact on planet Earth, not just greenhouse gases, but global acidification, eutrophication, land use, and water use.”

Reducing food’s environmental impacts through producers and consumers

Poore & Nemecek

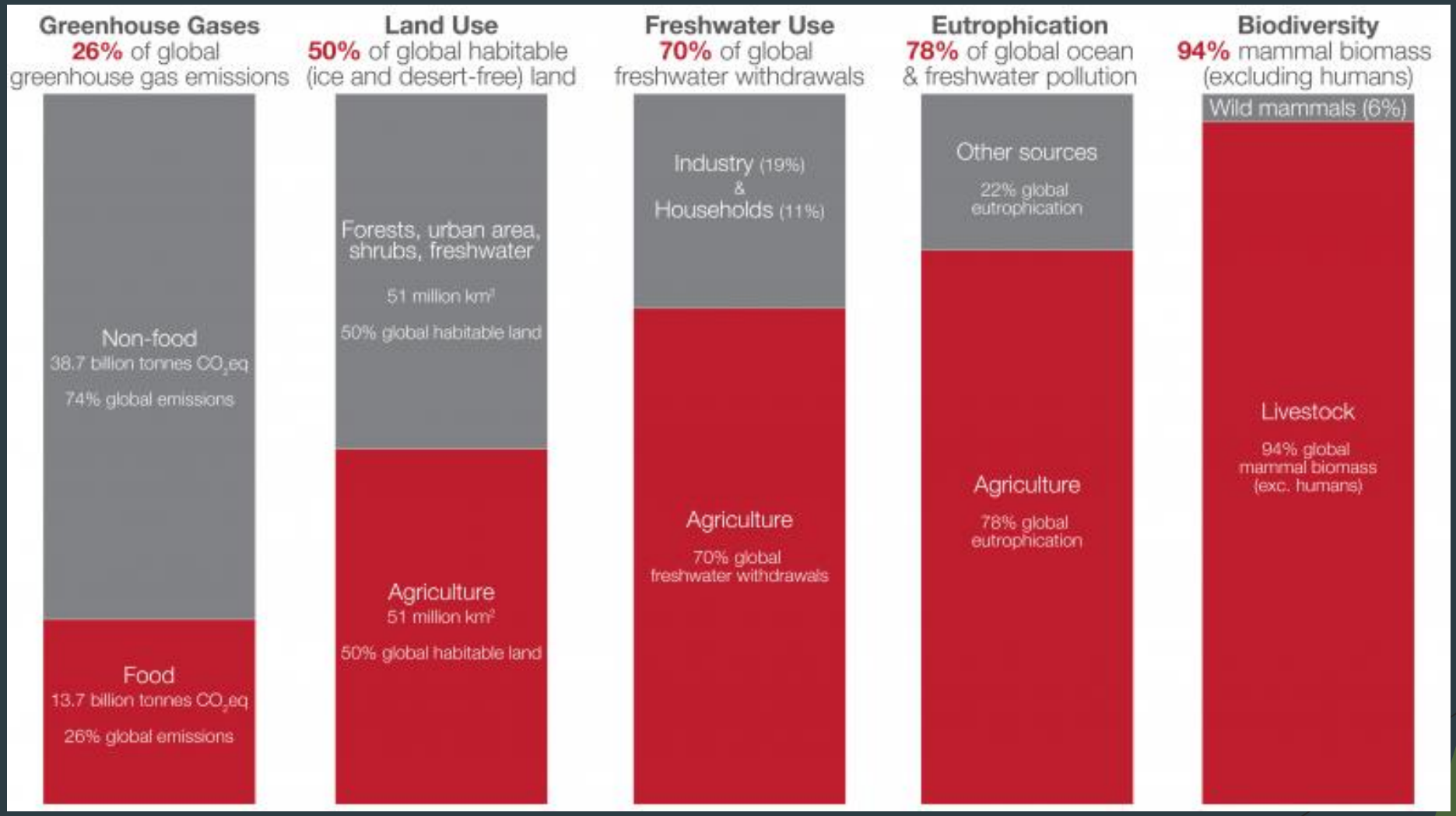
Plan

1. Farming Facts
2. What Can You Do?

Farming Facts

1. Greenhouse gas emissions
2. From water pollution to ocean dead zones
3. Land use, deforestation and biodiversity loss

Environmental impacts of food and agriculture



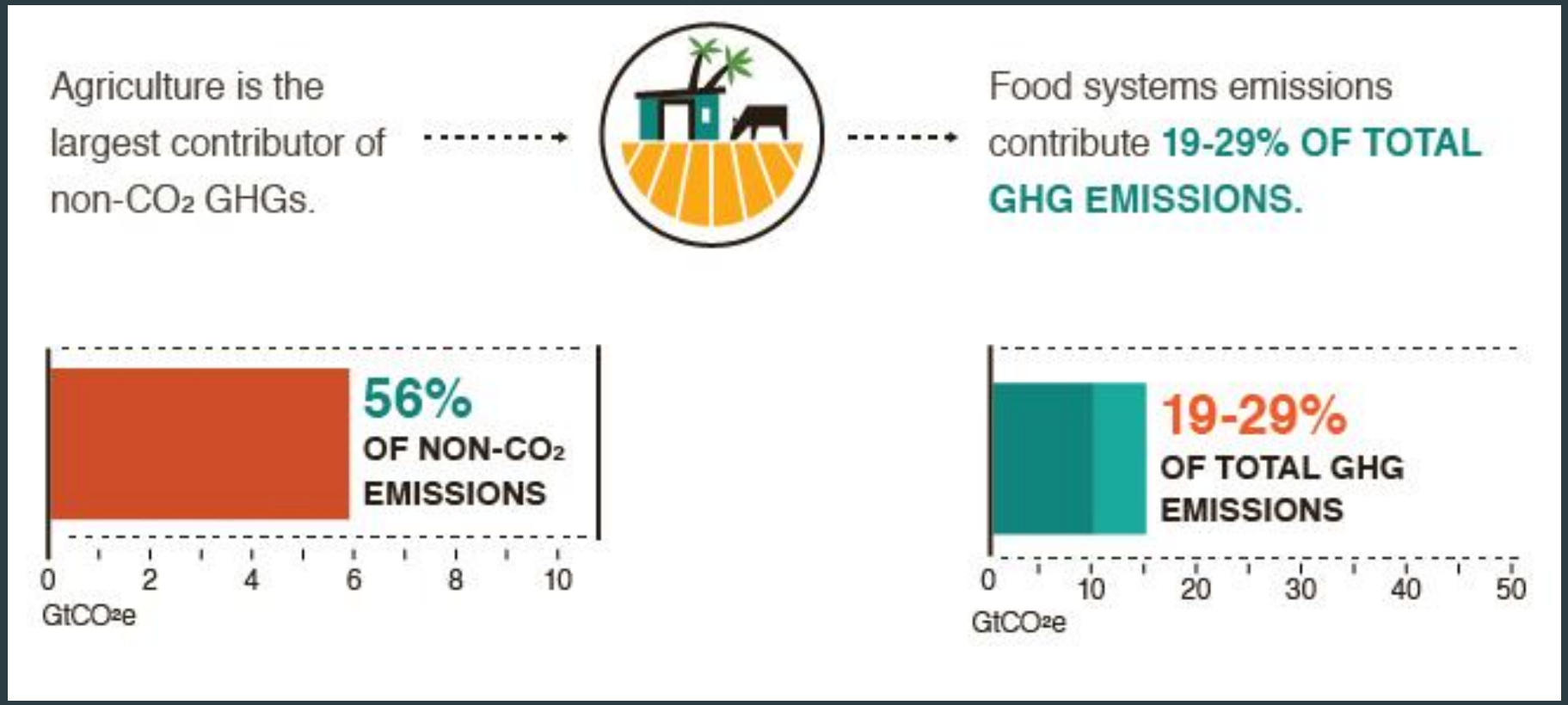
- Source: ourworldindata.org

1. Greenhouse gas emissions

“Modern agriculture is the use of land to convert petroleum into food.”

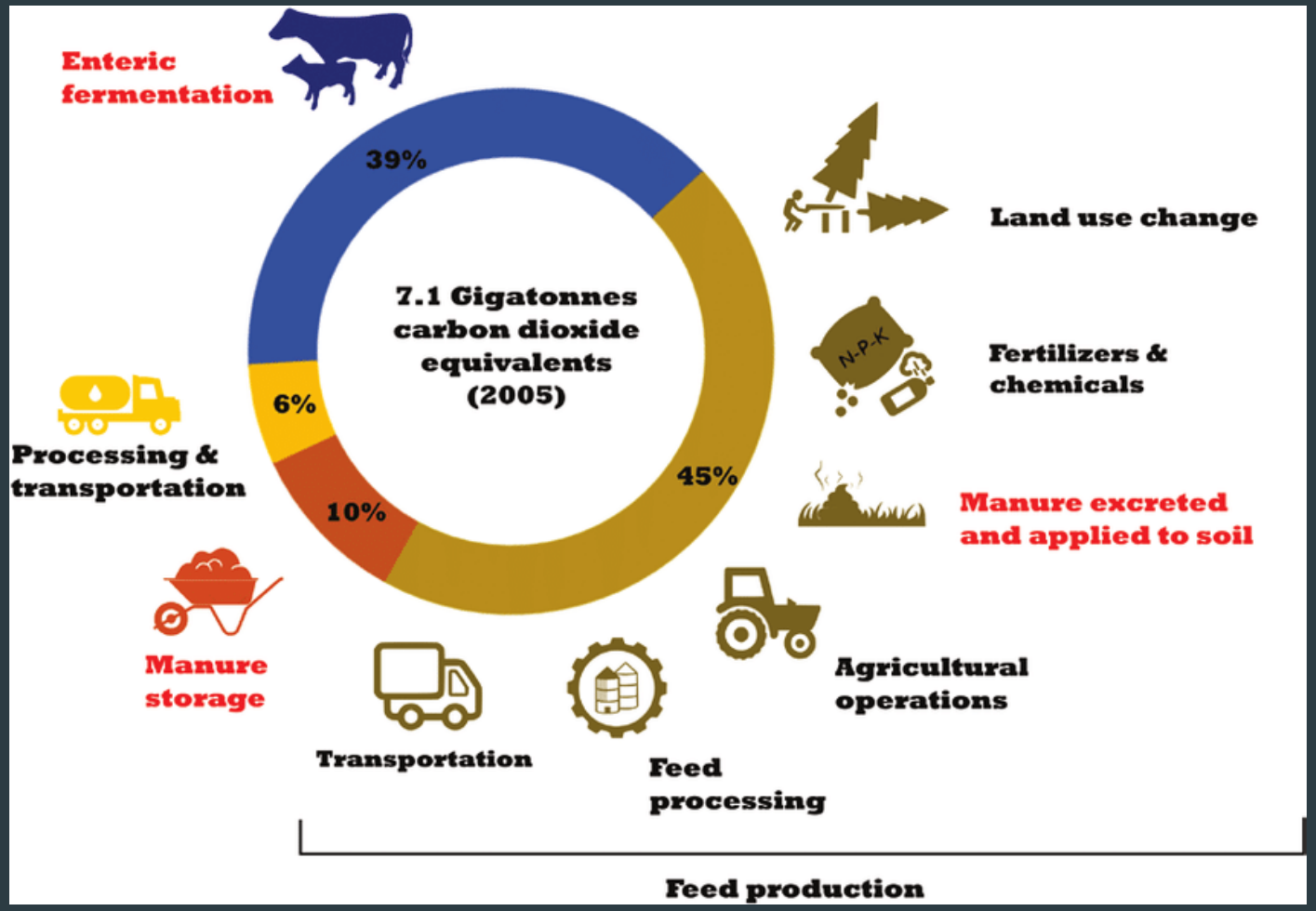
Albert Allen Bartlett

Greenhouse gas emissions from agriculture



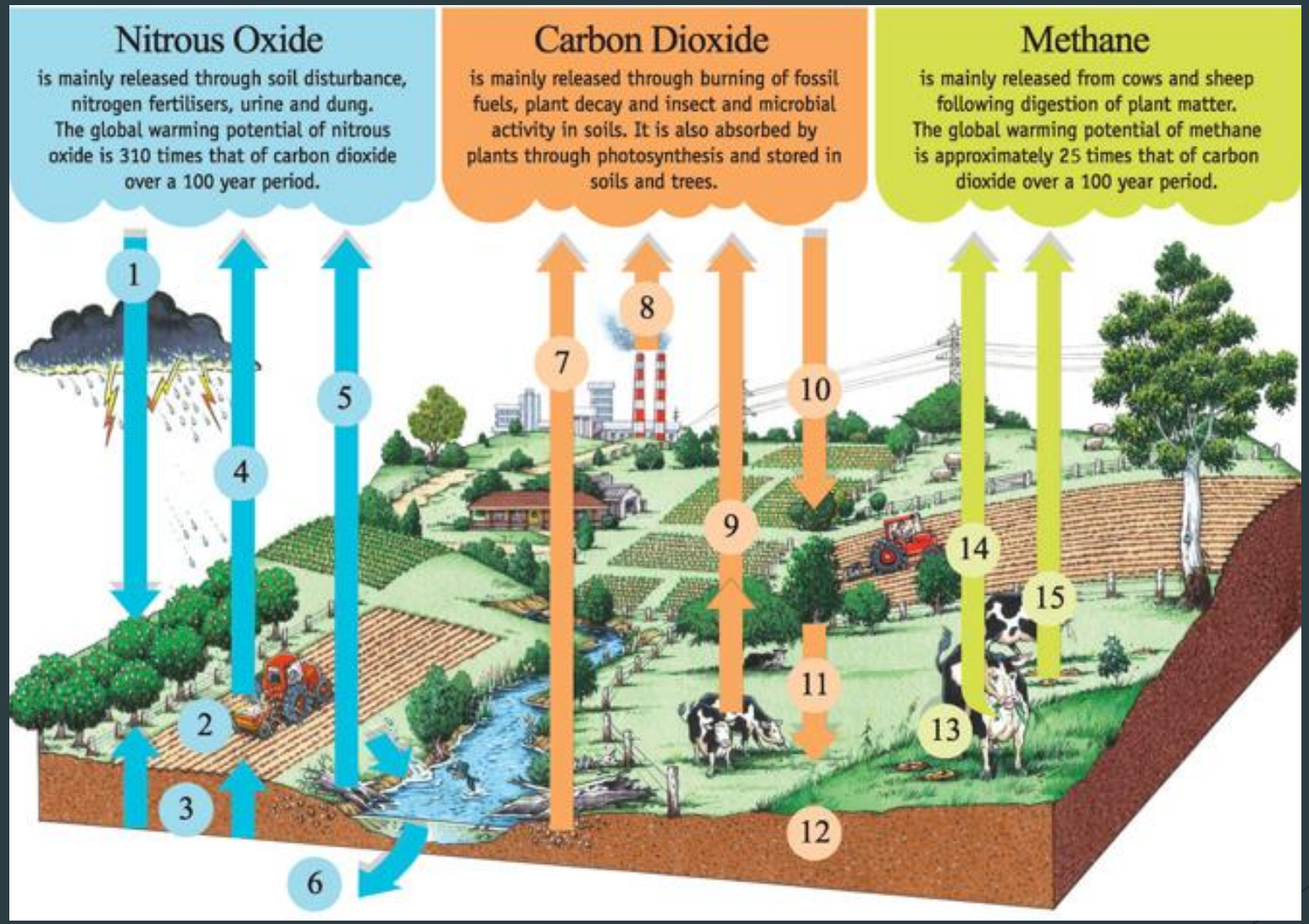
Source: ccafs.cgiar.org

Greenhouse gas emissions from livestock



- Source: *Livestock and climate change*

The three greenhouse gases



- Source: agriculture.vic.gov.au

The significance of methane and nitrous oxide

Methane:

- 1/3 of anthropogenic emissions come from animal agriculture (80 mln tonnes)
- It stays in the atmosphere for around 12 years
- Its potency as equivalent of carbon dioxide should be 100 rather than 28
- Reducing methane emissions can have an impact within a decade

Nitrous oxide:

- 2/3 of anthropogenic emissions come from animal agriculture (8 mln tonnes)
- It is a greenhouse gas 300 times stronger than carbon dioxide
- It also leads to acid rains, devastating marine environments

2. From water pollution to ocean dead zones

Water pollution from agriculture

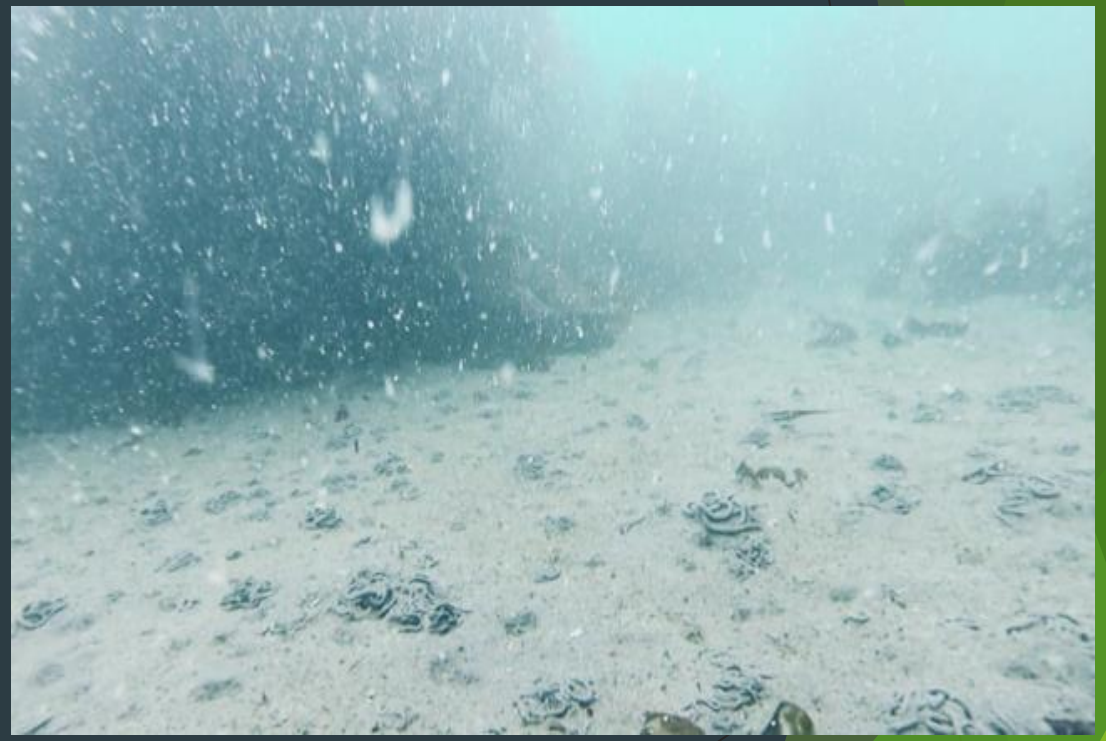
- Agriculture accounts for 70% of water use worldwide
- Inputs like fertilizers and pesticides are major sources of surface water and groundwater pollution
- 38 percent of water bodies are significantly under pressure from agricultural pollution
- Intensive monoculture cropping systems involve increasing use of chemicals, the crops are frequently used as animal feed

Water pollution from animal agriculture

- Farmed animals produce nutrient-rich manure (containing nitrogen and phosphorus compounds)
- Manure is used used as fertilizer, but in reality discharged into the environment (surface runoff)
- Other contaminats include verterinary medicines (antibiotics, hormones, vaccines) that are harmful for aquatic life
- Intensification of livestock production leads to increased local pressure beyond the bearing capacity of the ecosystems

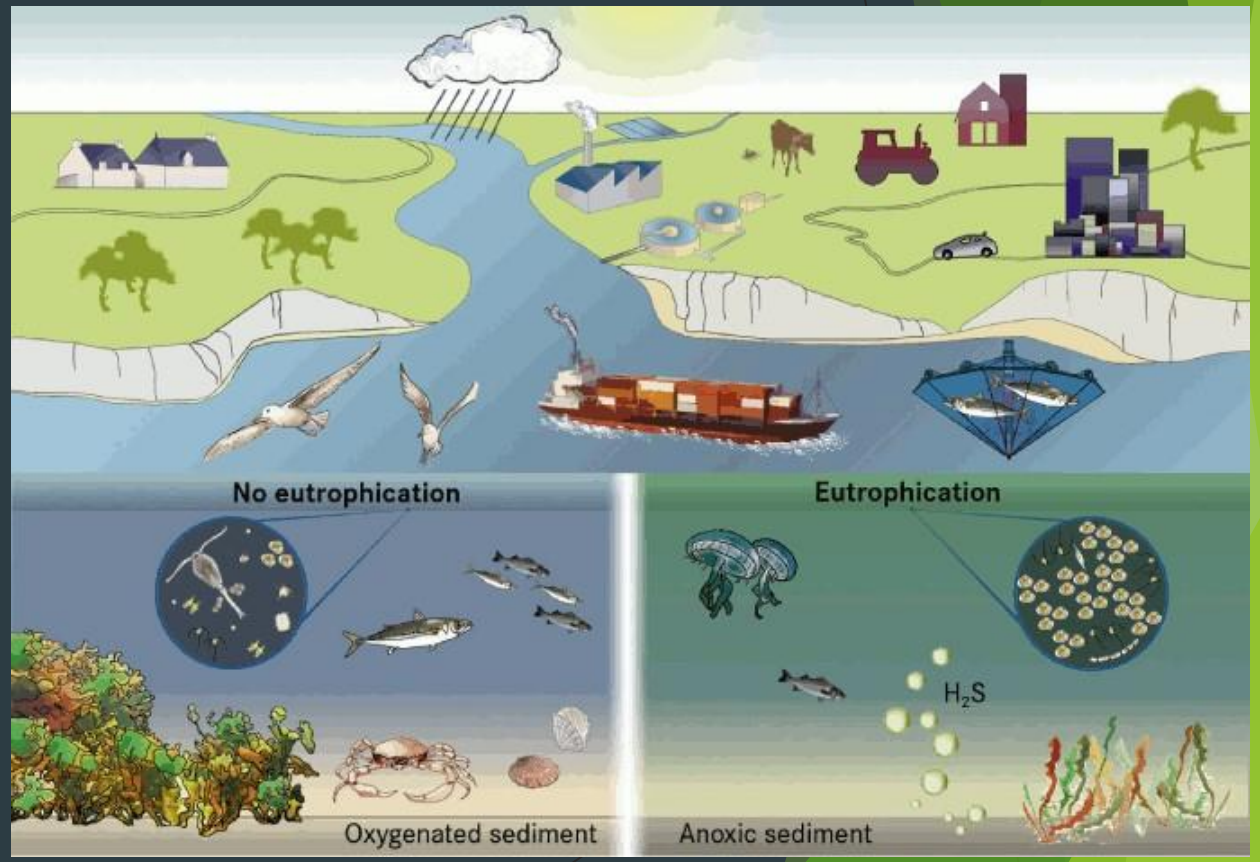
Water pollution from aquaculture

- Aquaculture accounts for around half of all fish consumed
- Farmed fish are mostly carnivorous, consuming fishmeal and other pelleted feed
- The feaces waste and uneaten feed disrupt the nutrient cycles devastating sea bottom and downstream ecosystems
- Antibiotics and fungicides additionally harm wildlife



Eutrophication and marine dead zones

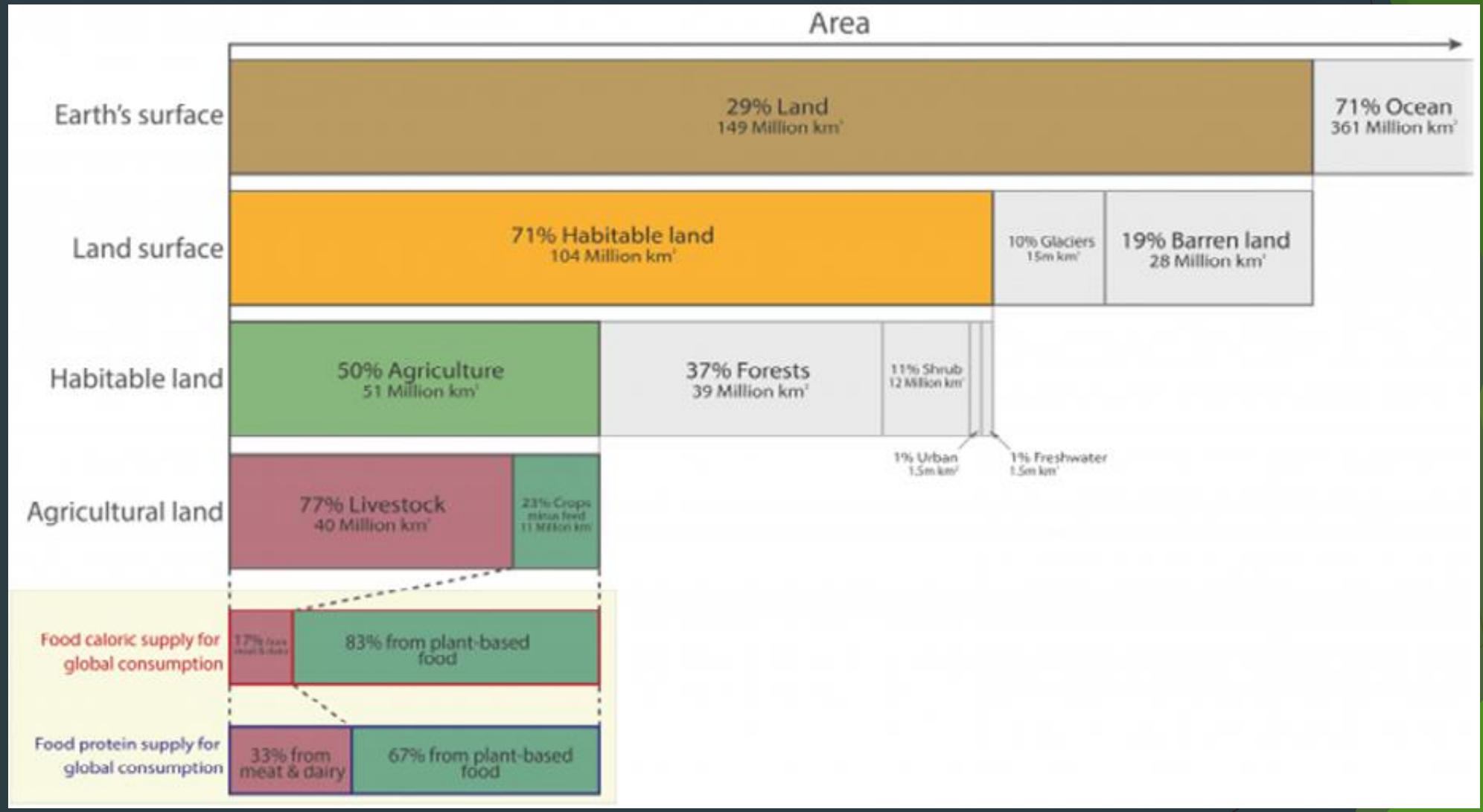
- Nutrient loads from agriculture cause eutrophication in aquatic ecosystems
- Nutrients come from overuse of fertilizers and directly discharge of waste, both related to animal agriculture
- Hypoxic conditions make it impossible for water bodies to sustain rich fauna and flora, leading to dead zones



- Source: marinespecies.org

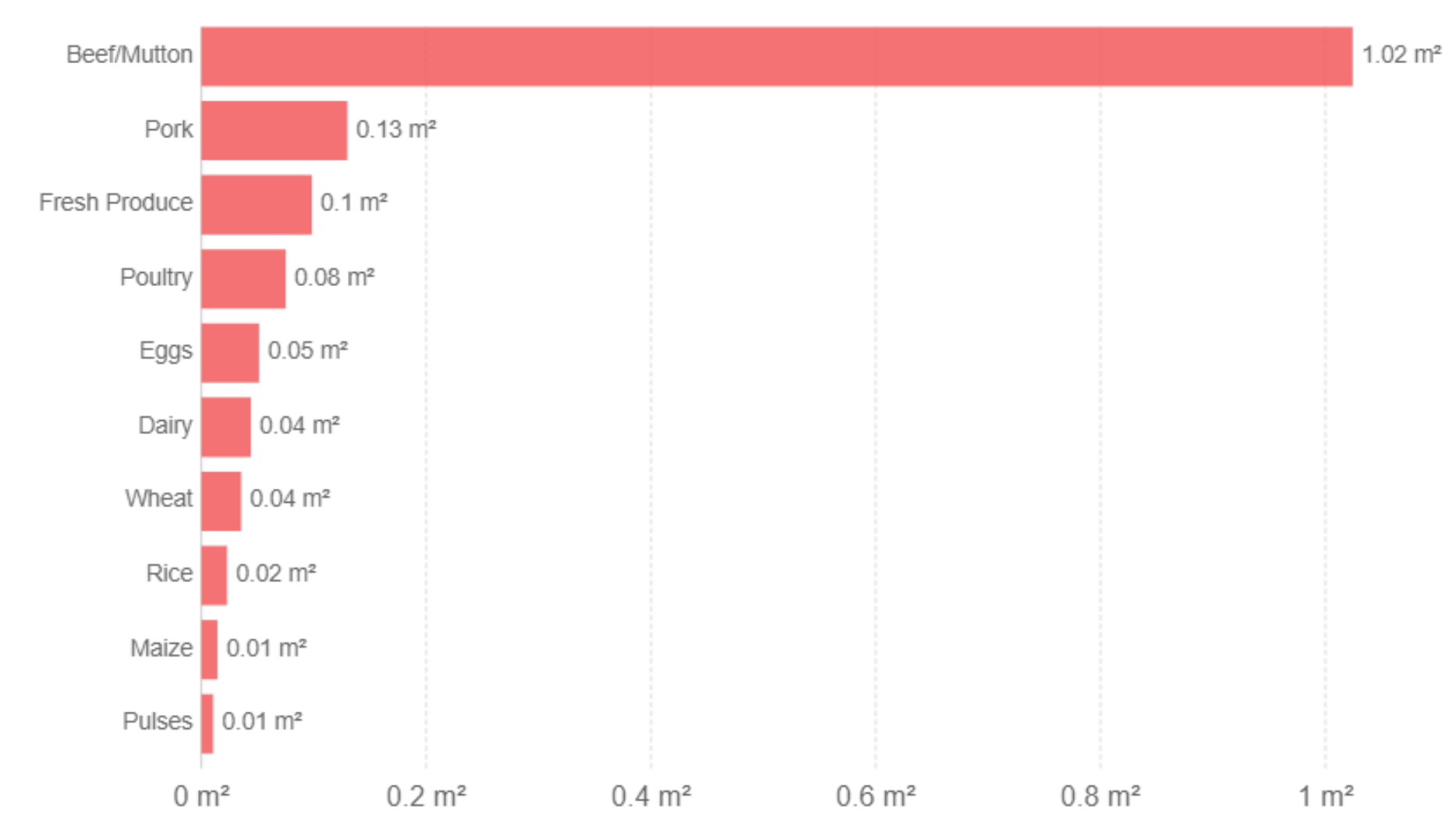
3. Land use, deforestation and biodiversity loss

Land used for production of food



- Source: FAO

Land used to produce a gram of protein from different sources



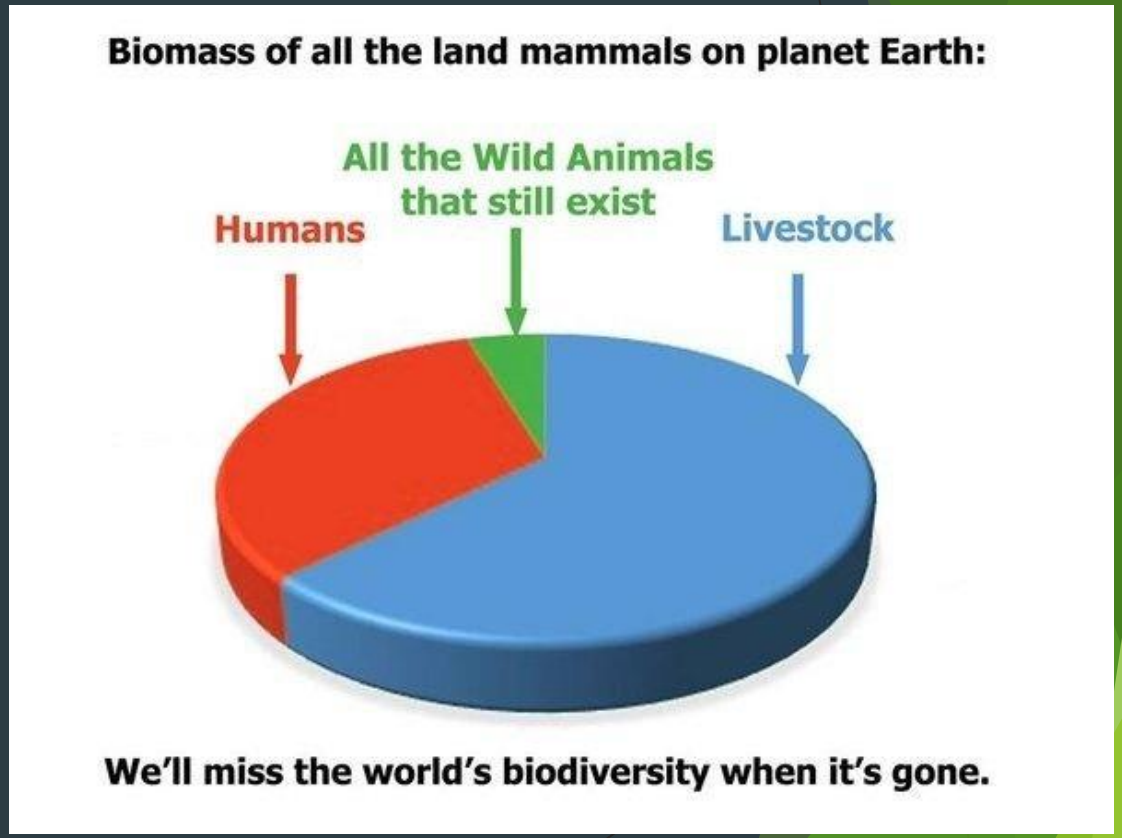
- Source: ourworldindata.org

Deforestation

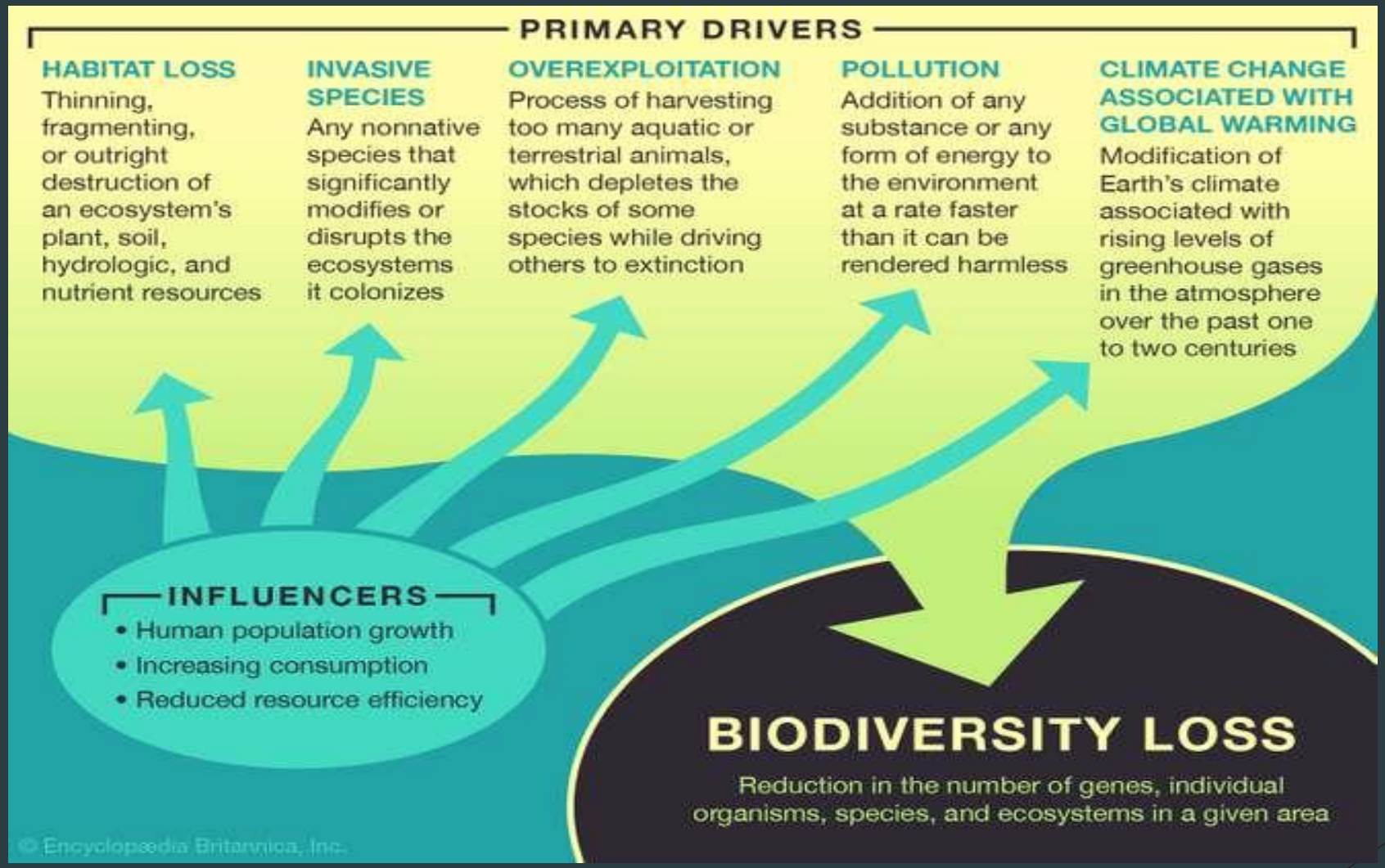
- Earth loses around 15 mln ha of forests
- Among the drivers of deforestation, agriculture plays the major role as the end use of the land
- 91% of deforestation in Brazil was connected to animal agriculture (grazing and feed production)
- Globally, forests are currently estimated to emit more carbon dioxide through burning (intentional or climate change driven) than they absorb

Biodiversity loss

- We are in the middle of Earth's sixth mass extinction – the current rate of species disappearance is about thousand times higher than the natural one
- We have wiped out 60% of land verterbrate animals since 1970, or 83% of all mammals and half of plants since the start of civilization
- The biological annihilation threatens the survival of humankind



Causes of biodiversity loss



- Source: *Encyclopaedia Britannica*

Causes of biodiversity loss in the oceans

- Fishing, including by-catch, trawling, reaching for deeper, smaller and younger fish
- Abandoned fishing gear accounts for half of plastic waste in the oceans – repeatedly trapping and killing animals
- Global warming induced acidification prevents proper formation of shells and exoskeletons, e.g. bleaching of coral reef
- Oceans are predicted to be empty 2048

What Can You Do?

1. Possible solutions
2. Scientific studies

1. Possible solutions

Eating local and/or seasonal food

Advantages:

- Small carbon footprint related to transportation
- Supporting local economies, greater control over where the food comes from
- Seasonal food is produced with the lowest inputs for given food types

Disadvantages:

- Transportation is just a small fraction of the total carbon footprint of food
- Components like agricultural inputs or feed for livestock can still travel huge distances which is often not reflected in the local label
- Limited applicability in terms of food types, hard to apply to staples

Takaway: yes, eating local and seasonal foods is a good thing, but its overall impact is often overestimated

Reducing food waste

Advantages:

- Around 30 percent of all food produced is wasted, so any reduction of the figure will be advantageous

Disadvantages:

- Most food is wasted at the field and storage stages, where the impact of consumers is limited

Takaway: There are many ways to reduce food waste in your household, including buying only as much as you will use, sharing food with friends and neighbours, supporting community sharing schemes, doing freeganism

Reducing processed food and packaging

Advantages:

- Generally, the more processing and packaging, the more emissions and pollution
- It's usually healthier
- By reducing packaging, you reduce waste, especially plastic

Disadvantages:

- Difficult to implement
- Some processed food can have lower emissions than meals prepared at home due to economies of scale, extended shelf life
- Limited impact on emissions

Takaway: Buy food without a label whenever you can

Traditional, extensive animal agriculture

Advantages:

- Better animal welfare
- Use of marginal land and crop residues
- Carbon capturing in the soil

Disadvantages:

- Greater GHG emissions due to longer life, poorer diet, more movement
- Animals don’t bind nitrogen from the air, pulses are better for soils
- Grazing already takes up 30% of habitable land, while overgrazing leads to erosion and desertification on marginal lands, already of poor quality
- Per unit of production, intensive farming will almost always have smaller emissions and environmental impact

Takaway: No, it is still much better to eat plants

Choosing plant foods

Advantages:

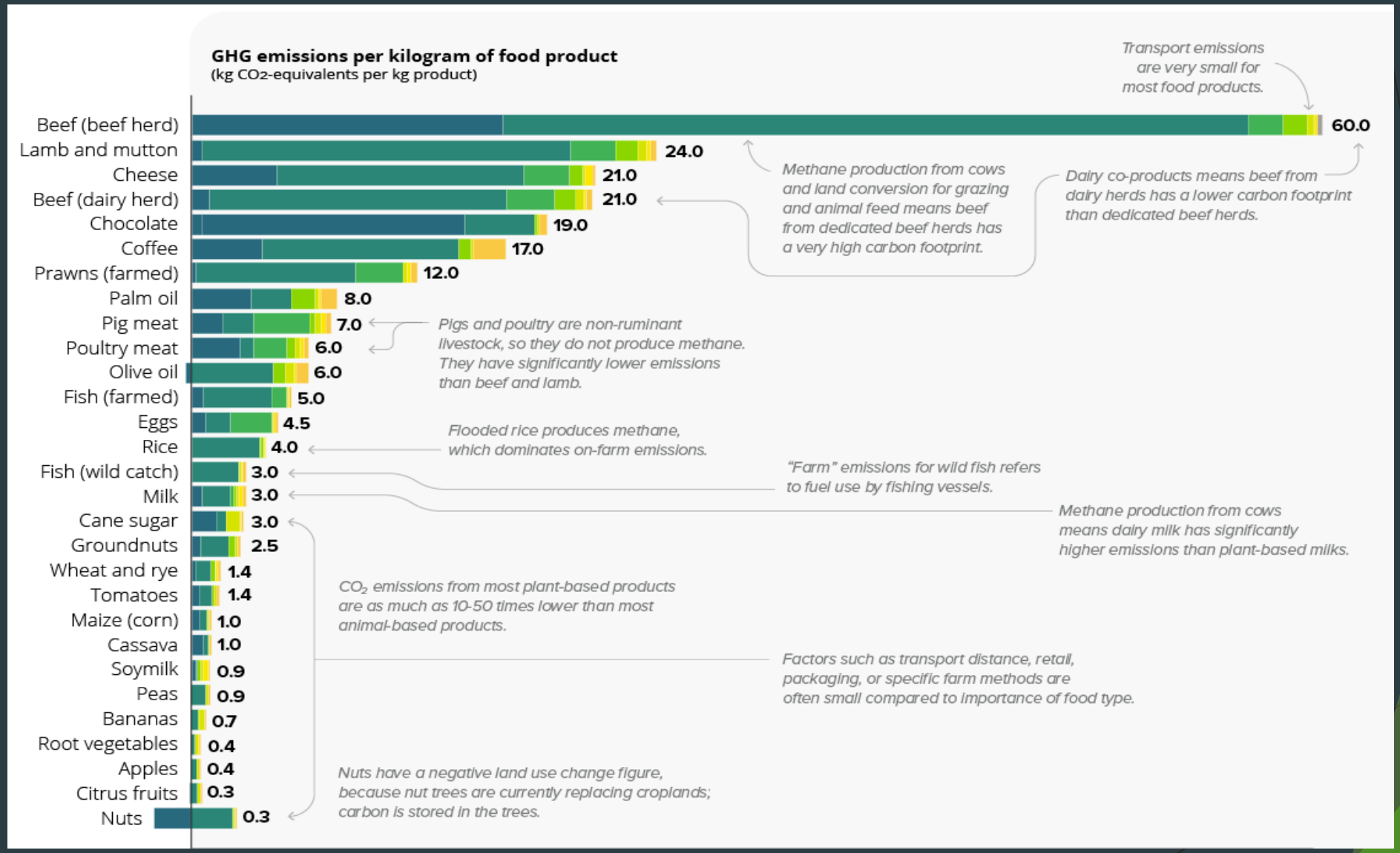
- The highest reduction in carbon footprint
- Reduction in all other impacts of agriculture, from land use, water use, pollution to biodiversity loss
- The only way to feed the planet long-term

Disadvantages:

- Difficult to implement due to cultural factors, political and business interests

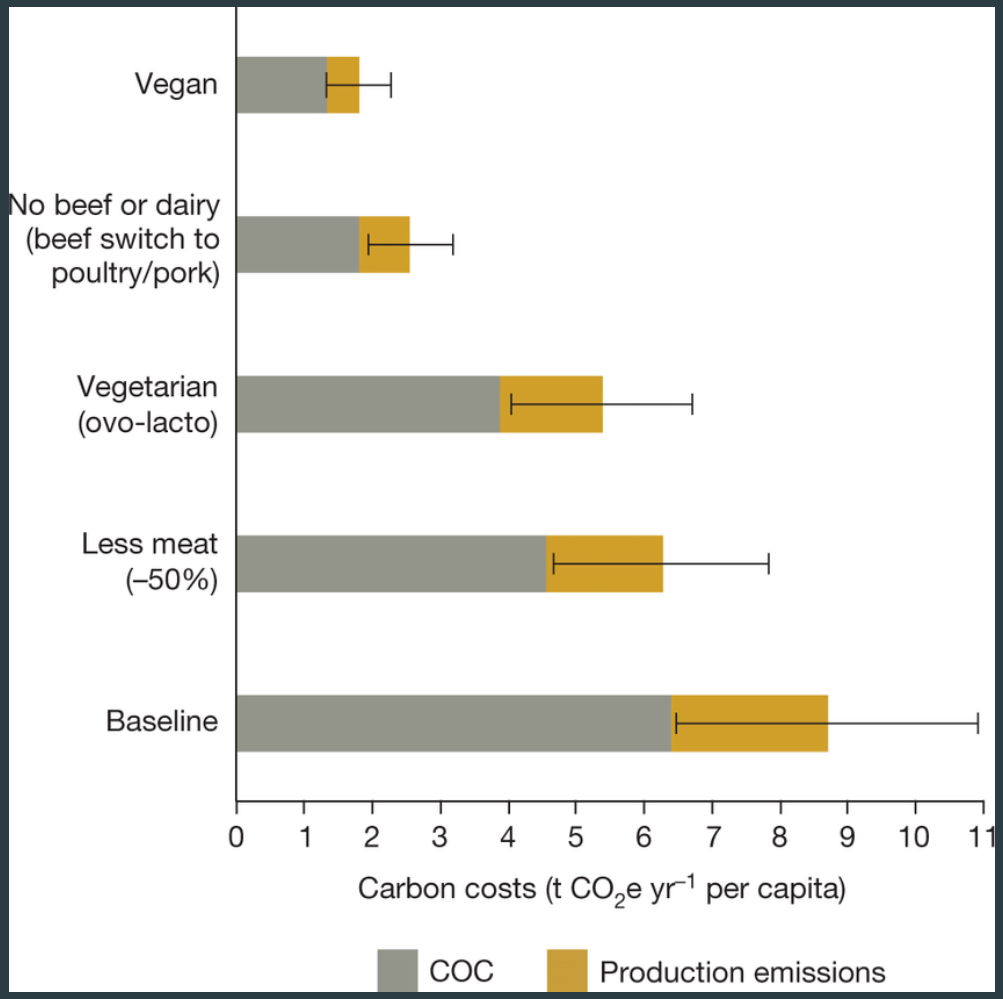
Takaway: Yes, go plant-based if you haven’t already

GHG emissions per product across supply chain stages



- Source: *ourworldindata.org*

Mitigation potential of different diets



- Source: *Assessing the efficiency of changes in land use for mitigating climate change*

2. Scientific studies

The Impacts of Dietary Change on Greenhouse Gas Emissions, Land Use, Water Use and Health: A Systematic Review

"The ranking of sustainable diet types showed similar trends for land use and GHG emissions, with vegan diets having the greatest median reductions for both indicators (-45% and -51%, respectively), and scenarios of balanced Energy intake or meat partly replaced with diary, having the least benefits."

Food in the Anthropocene: The EAT-*Lancet* Commission on healthy diets from sustainable food systems

"Many studies have assessed environmental effects of various diets, with most finding decreasing effects with increased replacement of animal source foods with plant-based foods. Vegan and vegetarian diets were associated with the greatest reductions in greenhouse-gas emissions and land use, and vegetarian diets with the greatest reductions in water use. (…) These studies show a diet including more plant-based foods than animal source foods would confer environmental benefits and improved health."

Reducing food's environmental impacts through producers and consumers

"Most strikingly, impacts of the lowest-impact animal products typically exceed those of vegetable substitutes, providing new evidence for the importance of dietary change."

“A vegan diet is probably the single biggest way to reduce your impact on planet Earth, not just greenhouse gases, but global acidification, eutrophication, land use, and water use. . . . It is far bigger than cutting down on your flights or buying an electric car, as these only cut greenhouse gas emissions.”

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Thank you