

A woman wearing a bright orange headscarf and a long, flowing orange dress stands in the foreground on the left, smiling. She is barefoot. In the background, a herd of white sheep with black faces is grazing in a dry, open field. A person in a red shirt is visible in the distance on the right. The sky is a clear, pale blue.

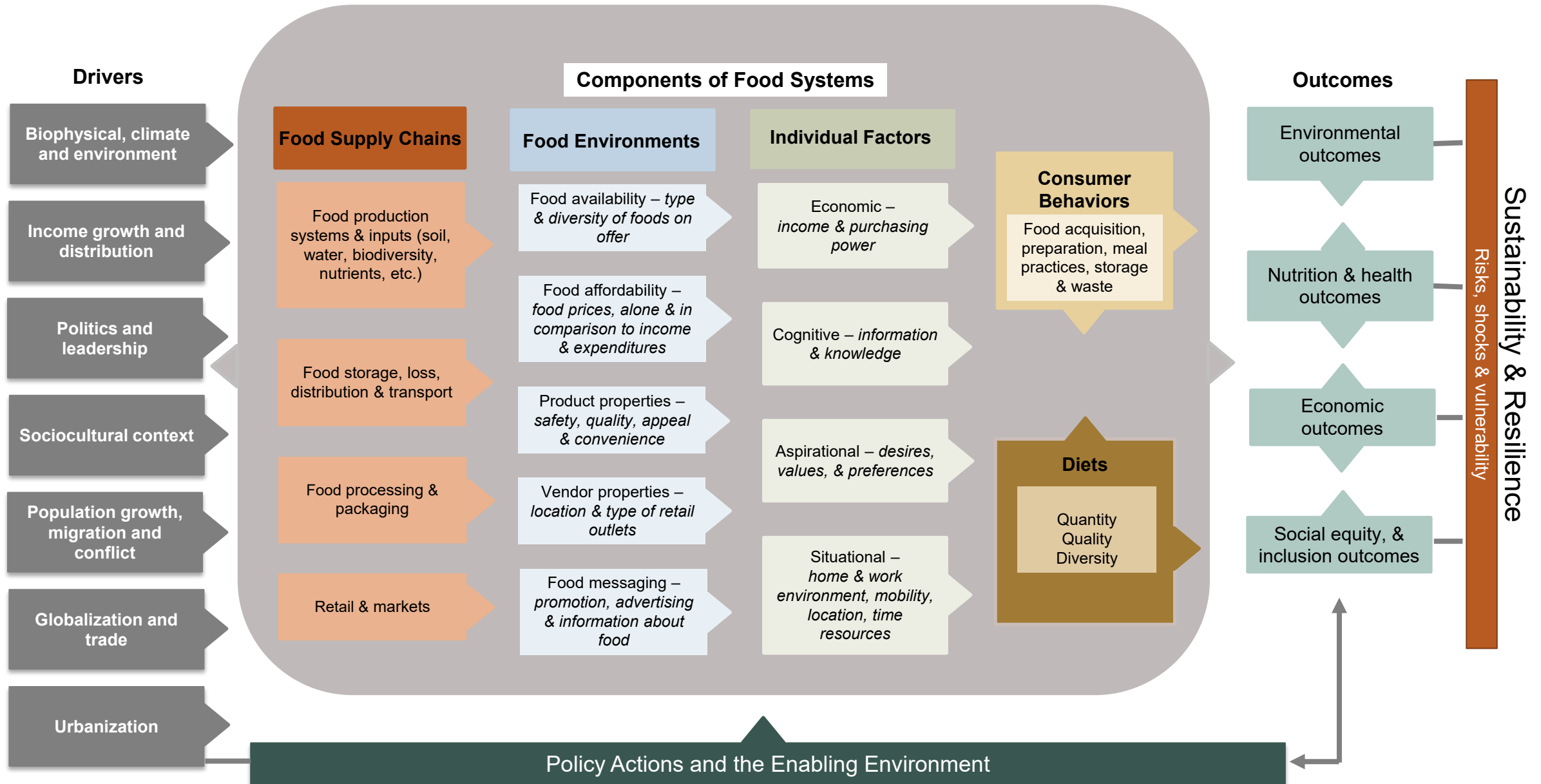
Global Food Systems and Health

Jess Fanzo, PhD

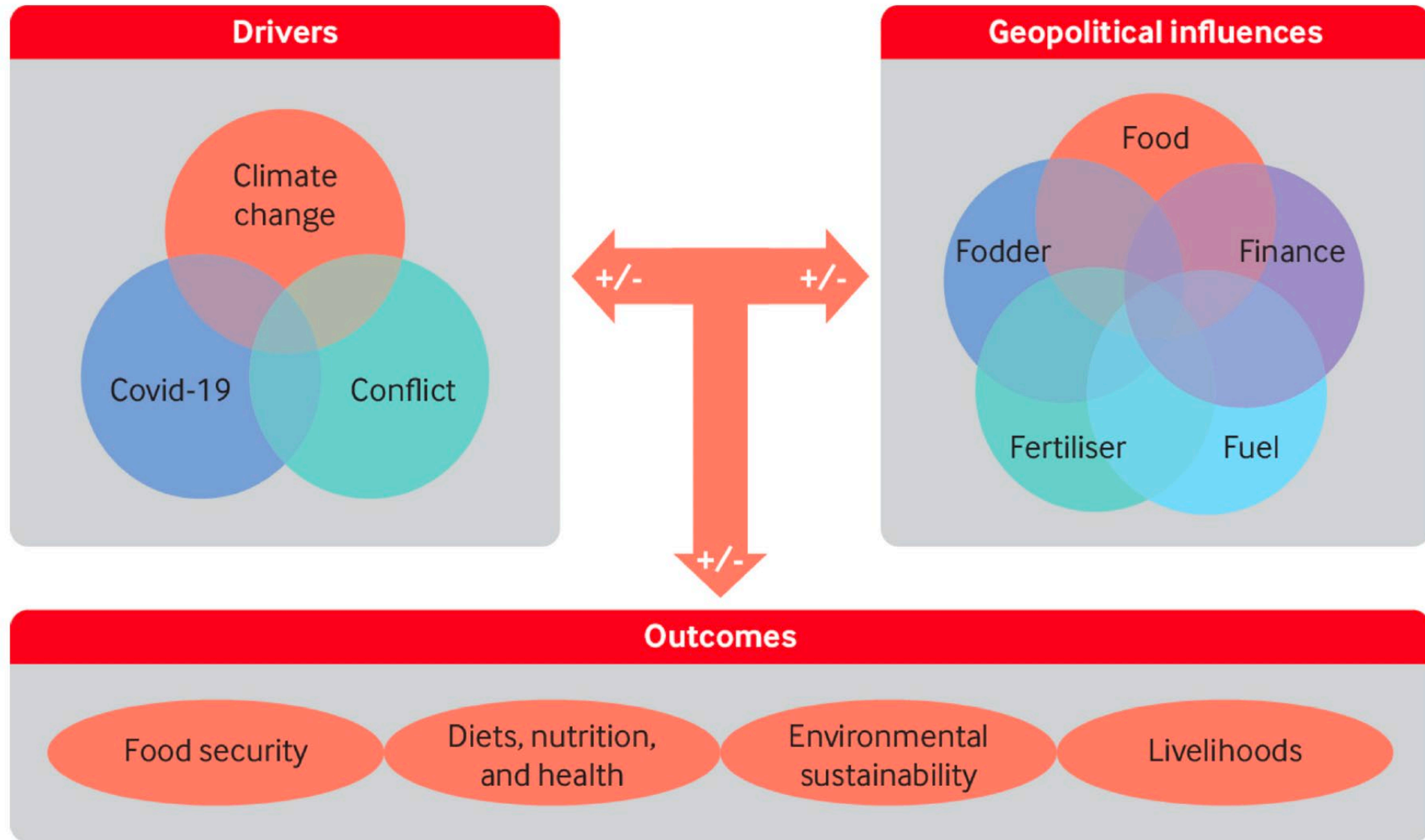
Bloomberg Distinguished Professor of Global Food Policy & Ethics

Johns Hopkins University

Food systems are complex



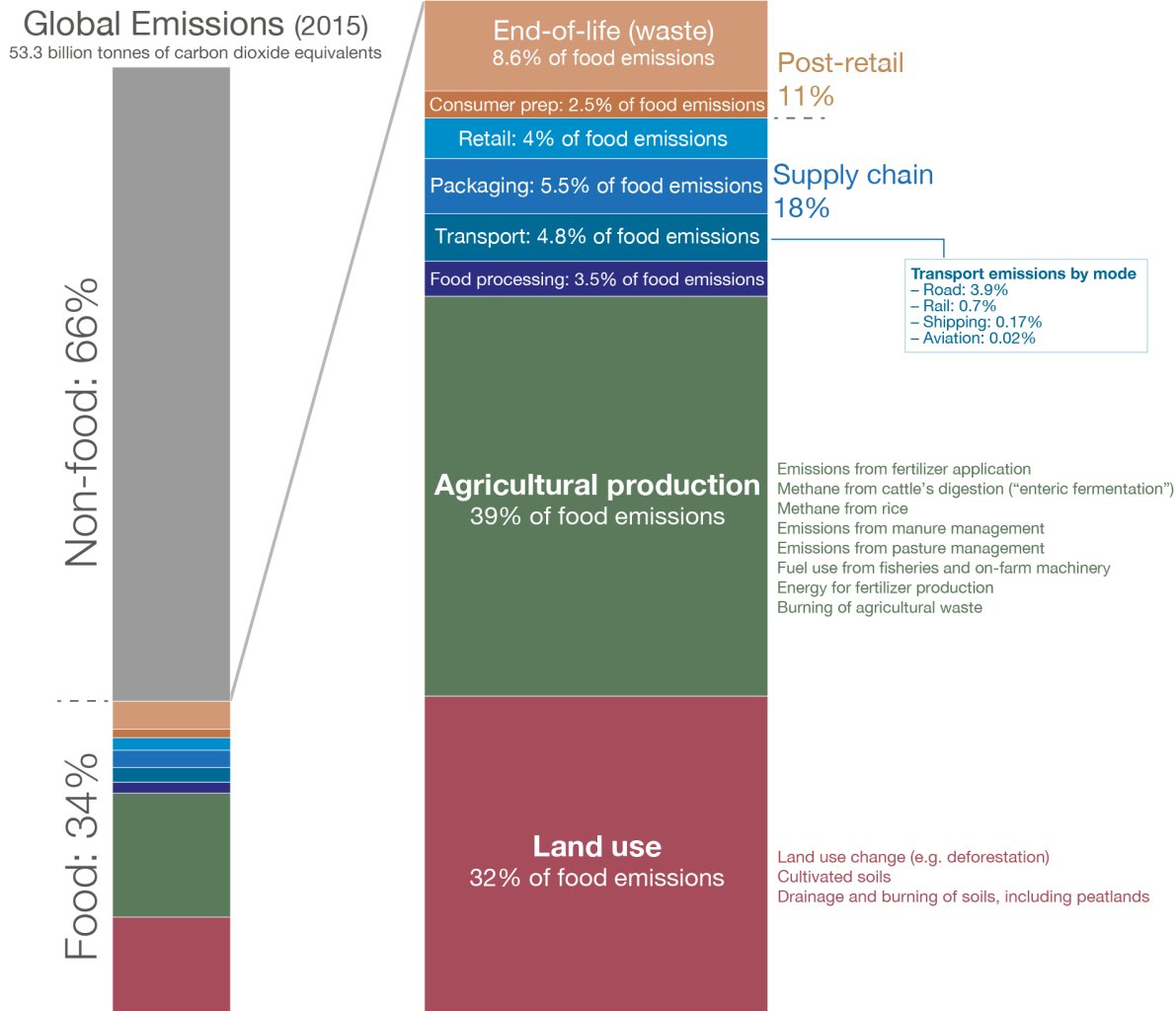
A Polycrisis: “three Cs” and “five Fs” of concern



An aerial photograph of a lush, green landscape featuring terraced rice fields. The terraces are carved into the hillsides, creating a series of concentric, wavy lines. The fields are filled with water, reflecting the sky, and are surrounded by dense tropical vegetation, including numerous palm trees. The overall scene is vibrant and verdant, with various shades of green dominating the palette.

10 reasons why food systems must be transformed and the hurdles we face

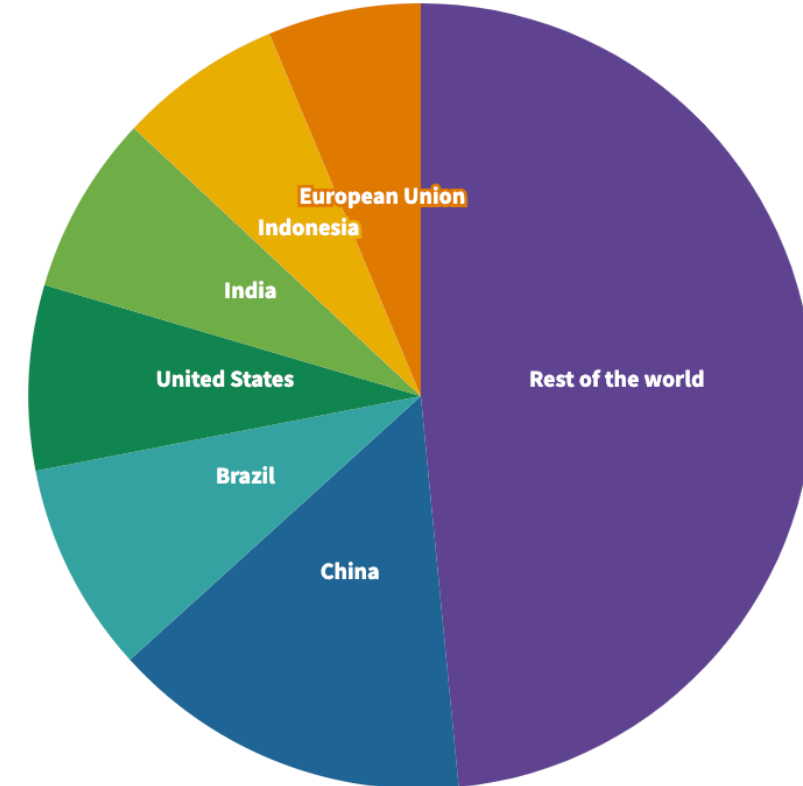
1. Food systems contribute to climate change & environmental degradation



Six economies emit half of the world's food system greenhouse gases

Greenhouse gas (GHG) emissions are measured in metric gigatons of CO2 equivalents.

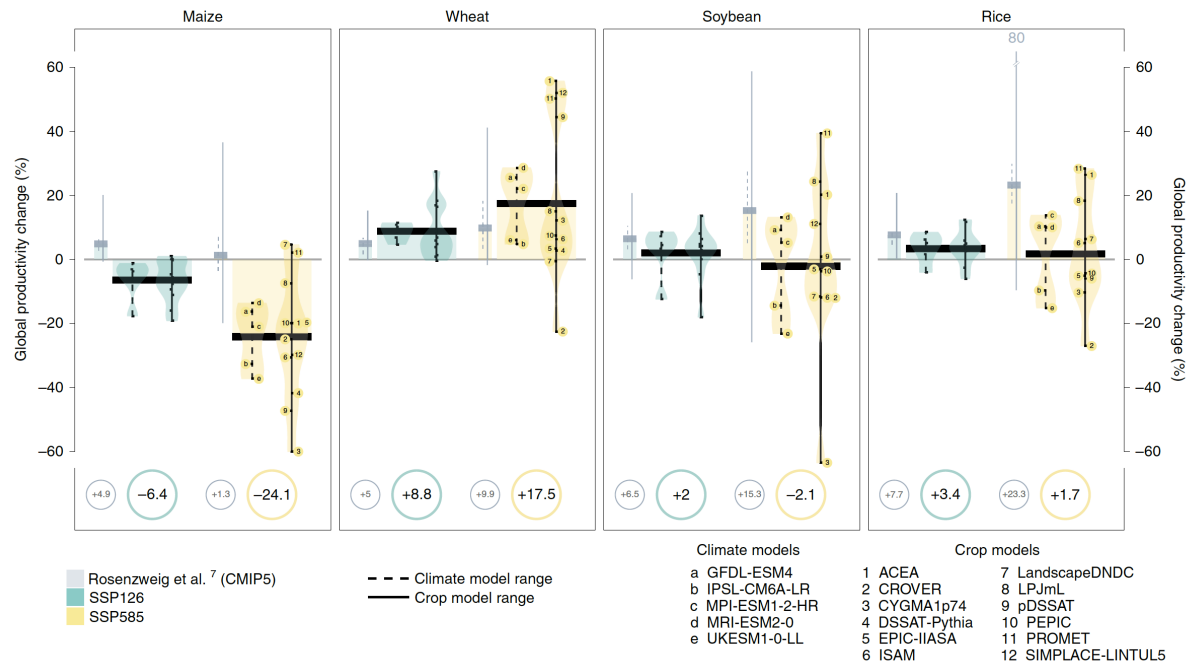
Rest of the world China Brazil United States India Indonesia European Union



Data: M. Crippa et al/Nature Food 2021 • Visualization: Betsy Ladyzhets

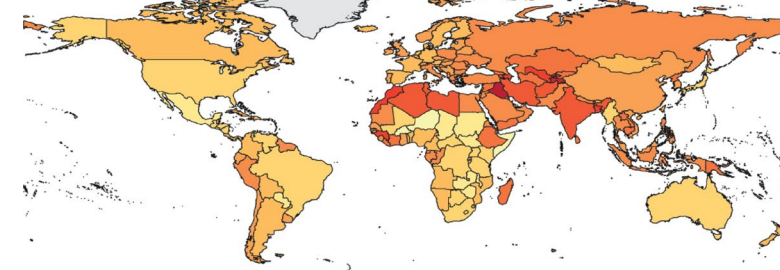
2. Climate change is & will have net adverse impacts on crop yields & their nutritional quality

Climate change will have adverse impacts on crop yields and faster than expected



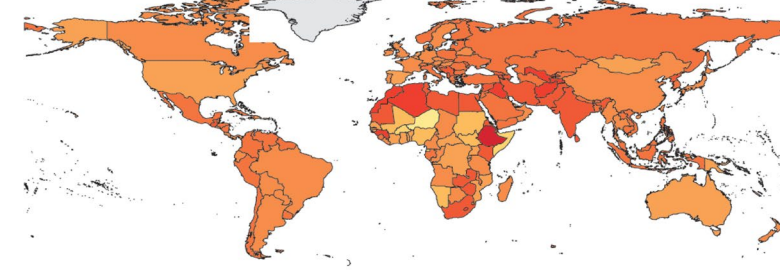
Myers et al (2014)¹⁹

Protein



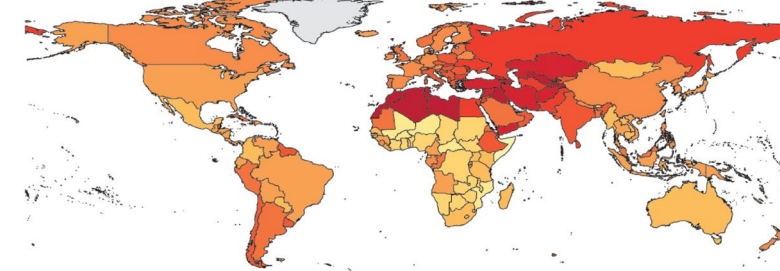
20% declines in protein

Iron



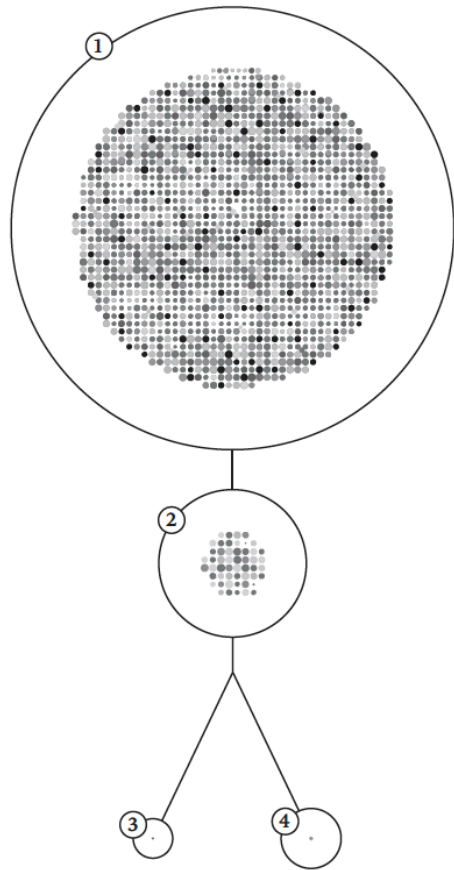
14% declines in iron

Zinc



15% declines in zinc

3. The lack of diversity is putting us at risk



① 391,000

**GLOBALLY IDENTIFIED
PLANT SPECIES**

② 5,538

**NUMBER OF CROPS USED
FOR FOOD BY HUMANS
THROUGHOUT HISTORY**

③ 3

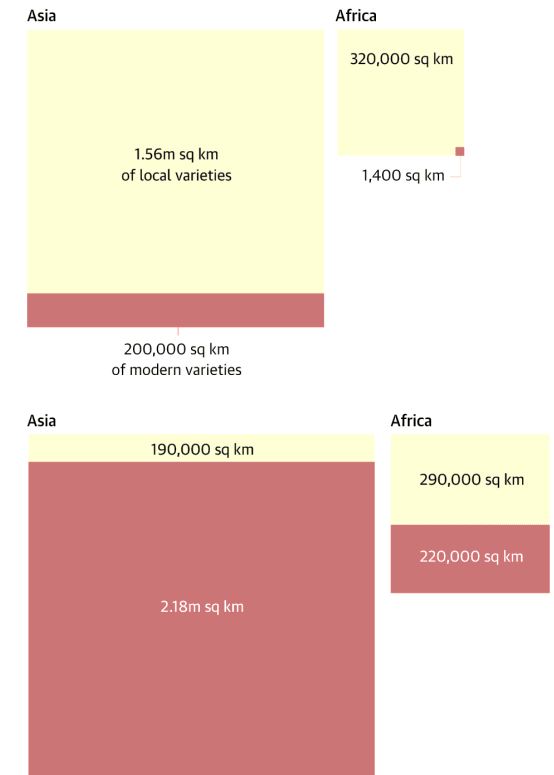
**RICE, MAIZE, AND WHEAT
CURRENTLY PROVIDE >50%
OF THE WORLD'S CALORIES
FROM PLANTS**

④ 12

**12 CROPS THAT TOGETHER
WITH 5 ANIMAL SPECIES*
PROVIDE 75% OF THE
WORLD'S FOOD TODAY**

*(IN ORDER OF GLOBAL
CONSUMPTION, COWS, CHICKENS,
PIGS, GOATS, AND SHEEP)

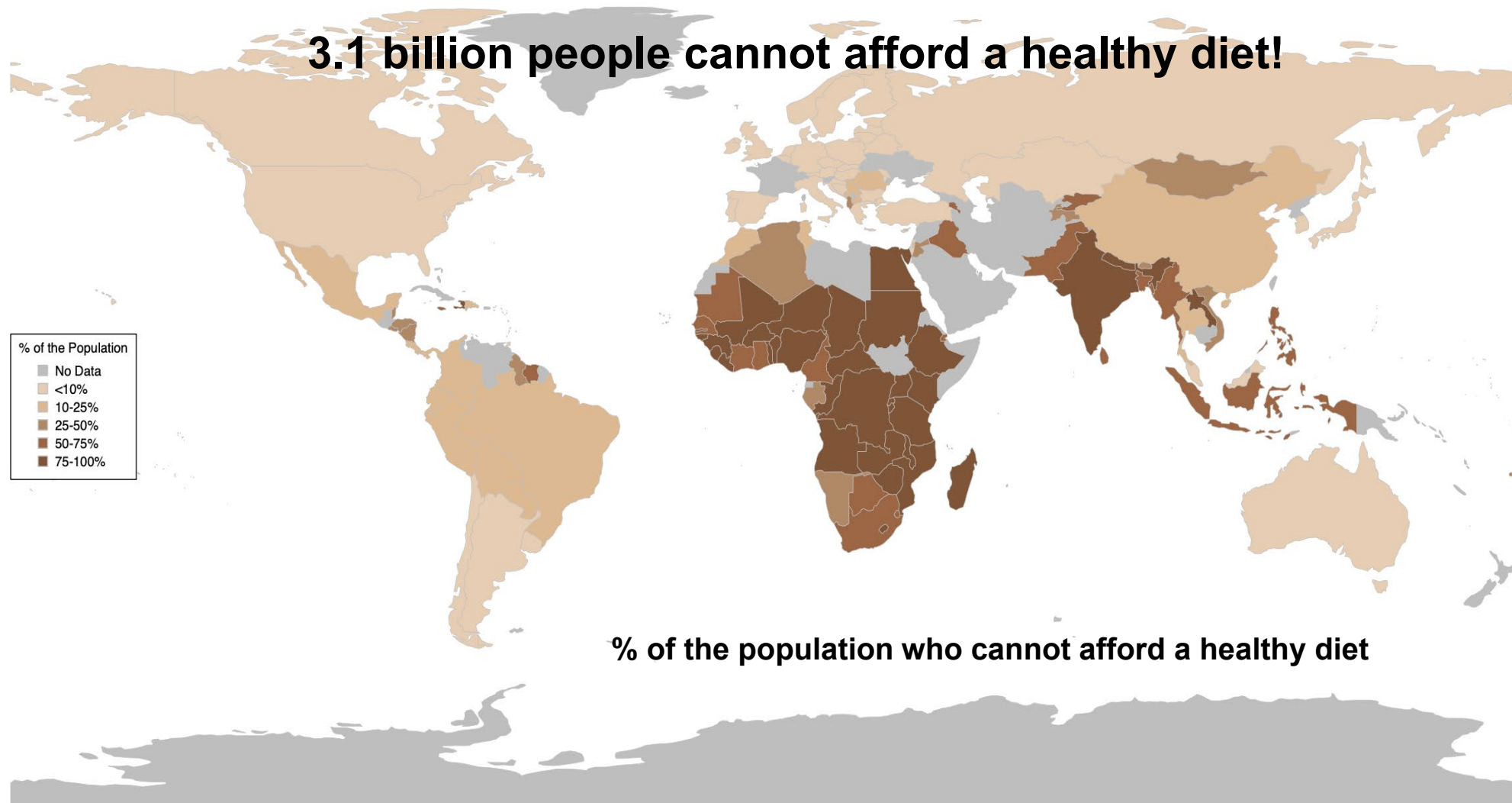
In 1970, the large majority of farm land in Asia and Africa was used for local varieties of crops.



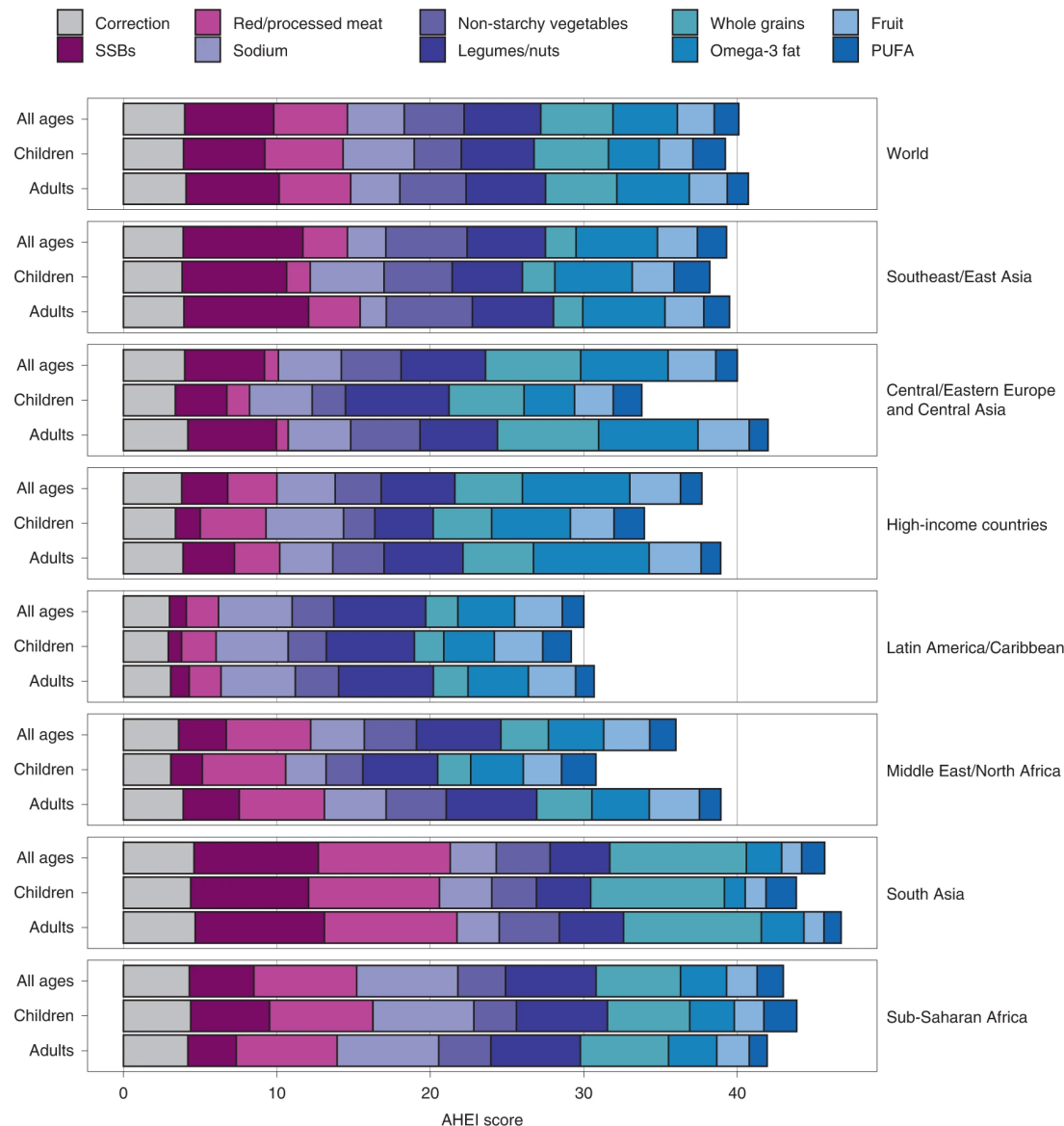
About 40 years later, far more land in 2010-14 was used for **modern varieties** that often lack genetic diversity.

Guardian graphic. Source: Trends in Varietal Diversity of Main Staple Crops in Asia and Africa and Implications for Sustainable Food Systems by Gatto et al.

4. Inequities are deepening and plaguing progress

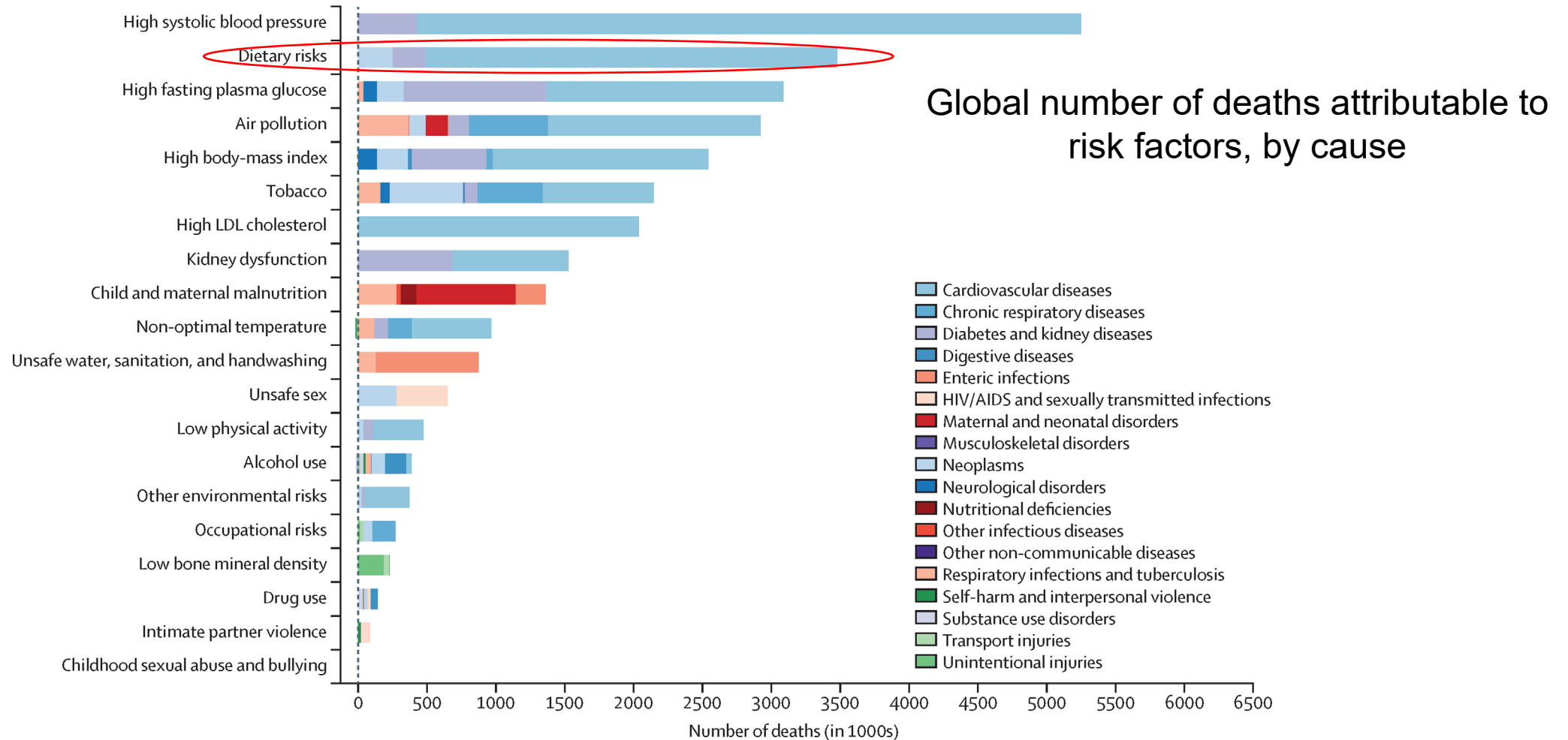


5. Dietary quality is modest worldwide

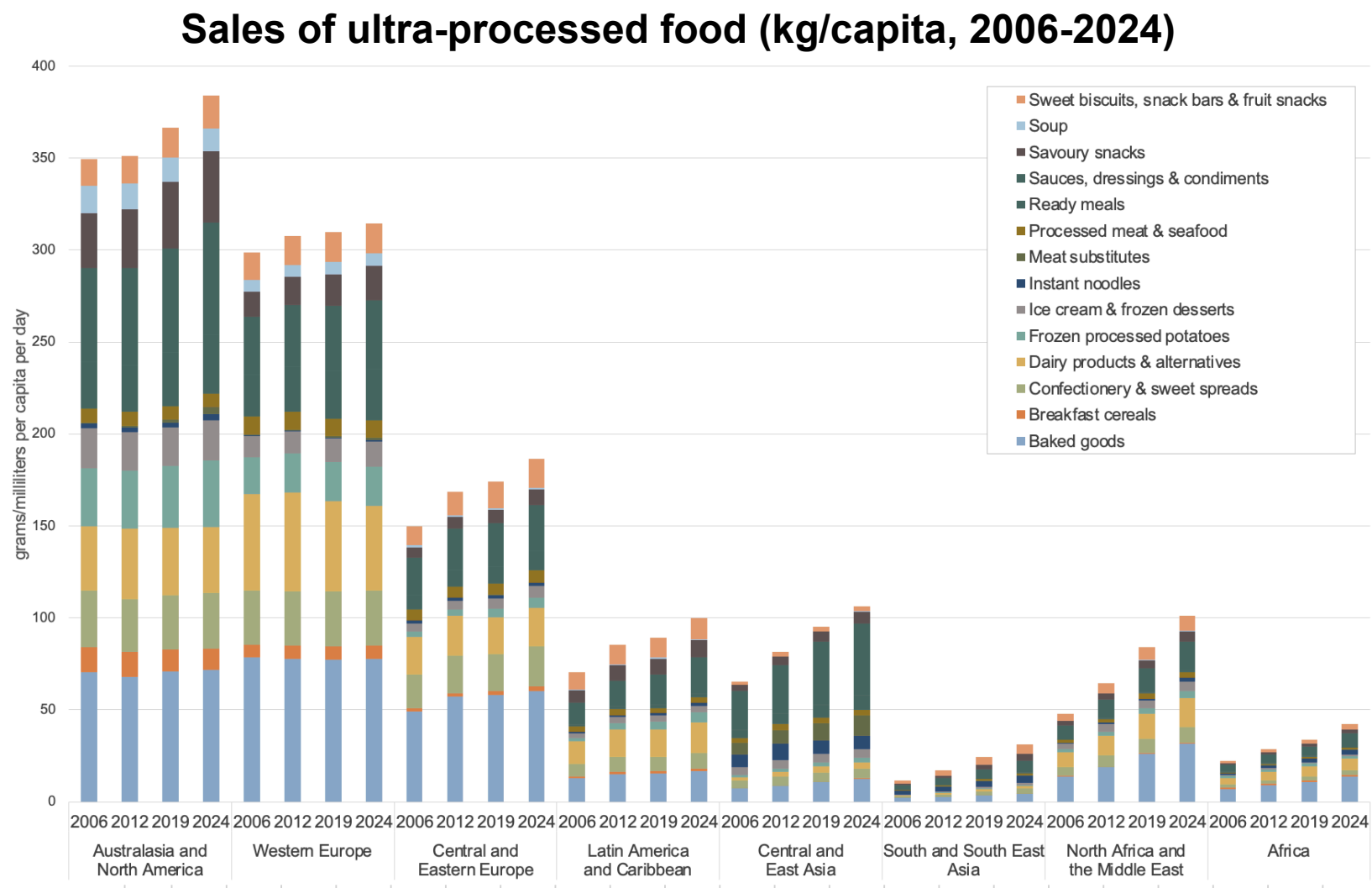


- Dietary quality is generally modest worldwide. In 2018, the mean global Alternative Healthy Eating Index score was 40.3, ranging from 0 (least healthy) to 100 (most healthy).
- Regional means ranged from 30.3 in Latin America and the Caribbean to 45.7 in South Asia.
- Scores among children versus adults were generally similar across regions, except in Central/Eastern Europe and Central Asia, high-income countries, and the Middle East and Northern Africa, where children had lower diet quality.
- Globally, diet quality scores were higher among women versus men, and more versus less educated individuals.
- Diet quality increased modestly between 1990 and 2018 globally and in all world regions except in South Asia and Sub-Saharan Africa, where it did not improve.

6. Sub-optimal diets are a major risk factor of death and disease



7. The types of foods available to most are not optimal



P.I. Baker, P. Machado, T. Santos, et al., “Ultra-Processed Foods and the Nutrition Transition: Global, Regional and National Trends, Food Systems Transformations and Political Economy Drivers,” Obesity Reviews 21, 12 (2020): e13126.

8. The scale of malnutrition is universal & worsening

205.1 million people in **45 countries/territories** face acute high food insecurity

Numbers of people in IPC/CH Phase 3 or above or equivalent in 45 countries/territories in 2022

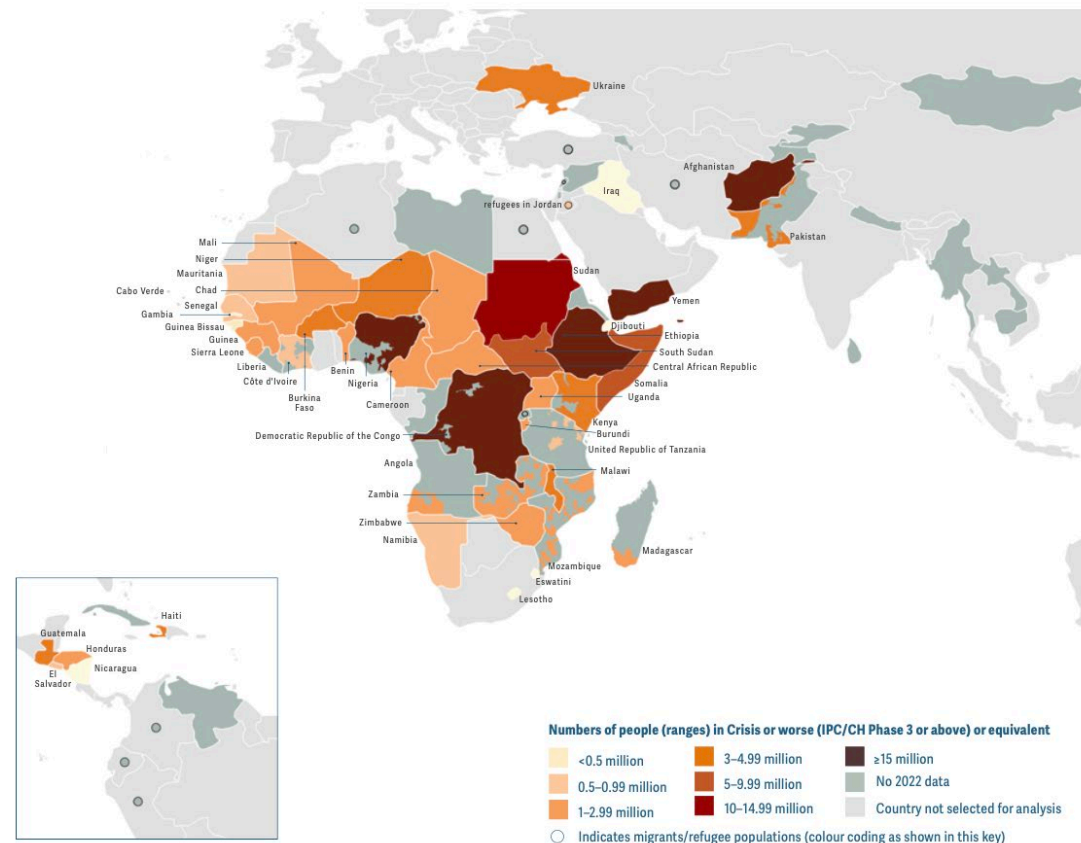
828 million (10%)
of the world's population are undernourished

149 million (23%)
children under five years of age are stunted

45 million
children under five years of age are wasted

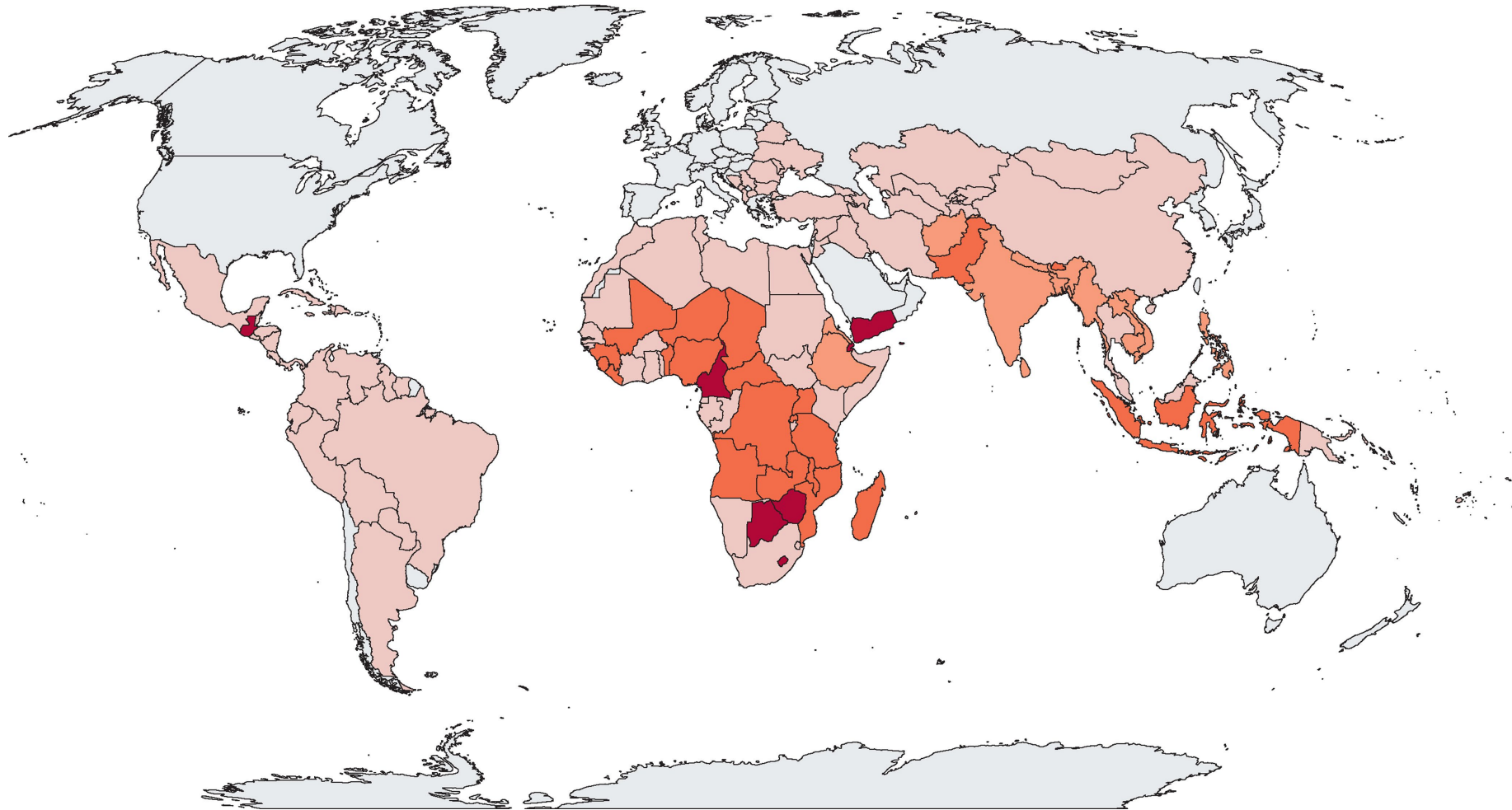
39 million
children under five years of age are overweight

2.2 billion
adults are overweight or obese



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. Final status of the Abyei area is not yet determined.
Source: FSIN, GRFC 2022 Mid-Year Update.

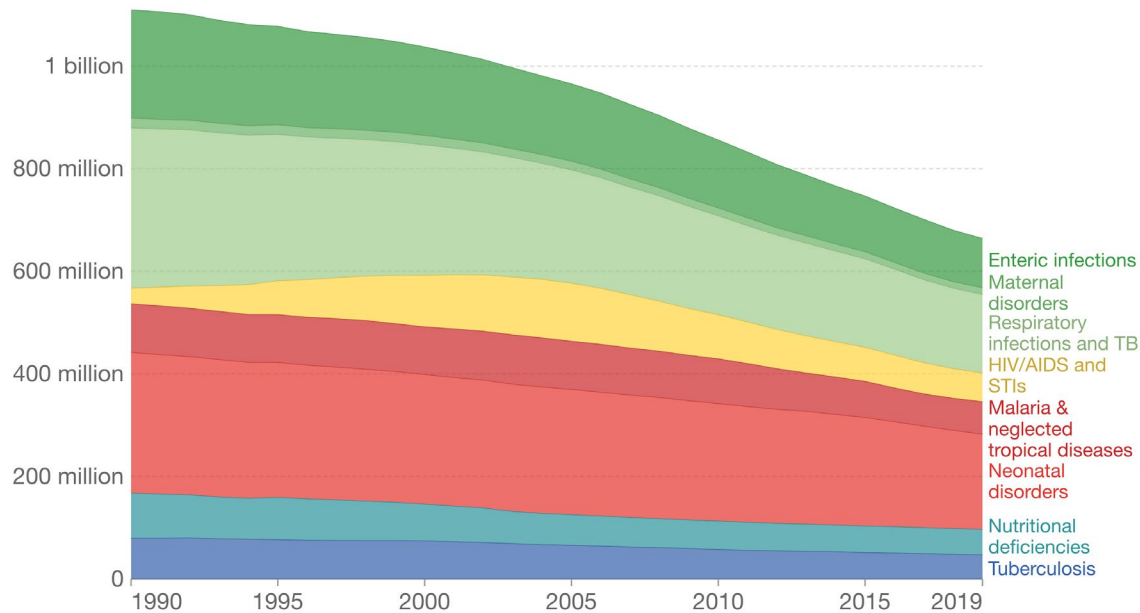
9. Double burden of malnutrition is increasing in LMICs



10. Significant rise in non-communicable disease burden

Disease burden from communicable, maternal, neonatal and nutritional diseases, World, 1990 to 2019

Total disease burden from communicable, maternal, neonatal and nutritional diseases, measured in DALYs (Disability-Adjusted Life Years) per year. DALYs are used to measure total burden of disease - both from years of life lost and years lived with a disability. One DALY equals one lost year of healthy life.

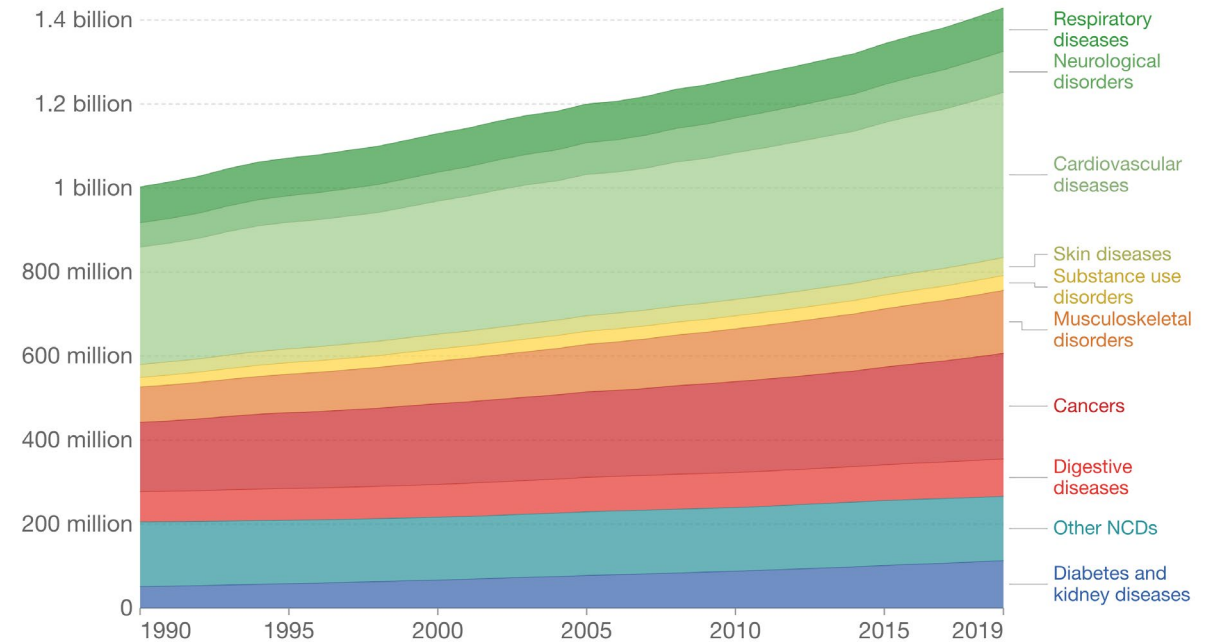


Source: IHME, Global Burden of Disease

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Disease burden from non-communicable diseases, World, 1990 to 2019

Total disease burden from non-communicable diseases (NCDs), measured in DALYs (Disability-Adjusted Life Years) per year. DALYs are used to measure total burden of disease - both from years of life lost and years lived with a disability. One DALY equals one lost year of healthy life.



Source: IHME, Global Burden of Disease

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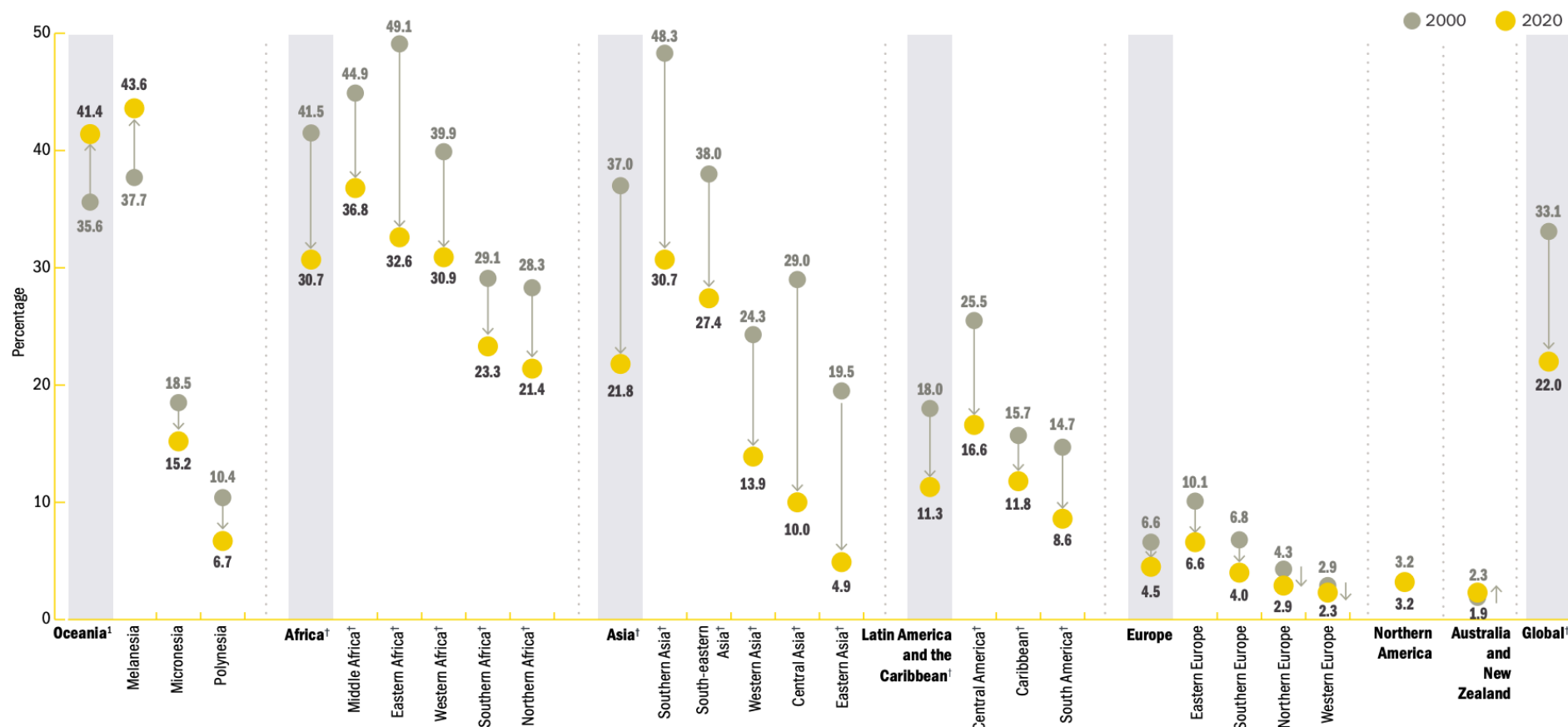
**Ethical and
equity issues
that stymie
progress**



1. Who disproportionately suffers from malnutrition?

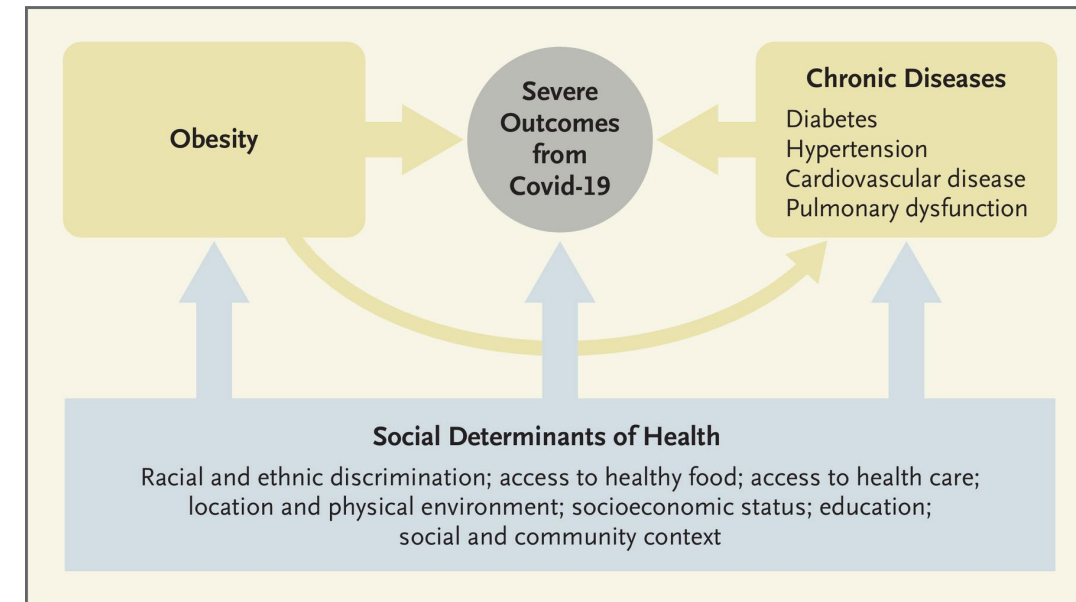
Progress to reduce stunting has not been equal across regions and sub-regions

Trends in the percentage of children under 5 affected by stunting, by United Nations region/sub-region, 2000 and 2020¹

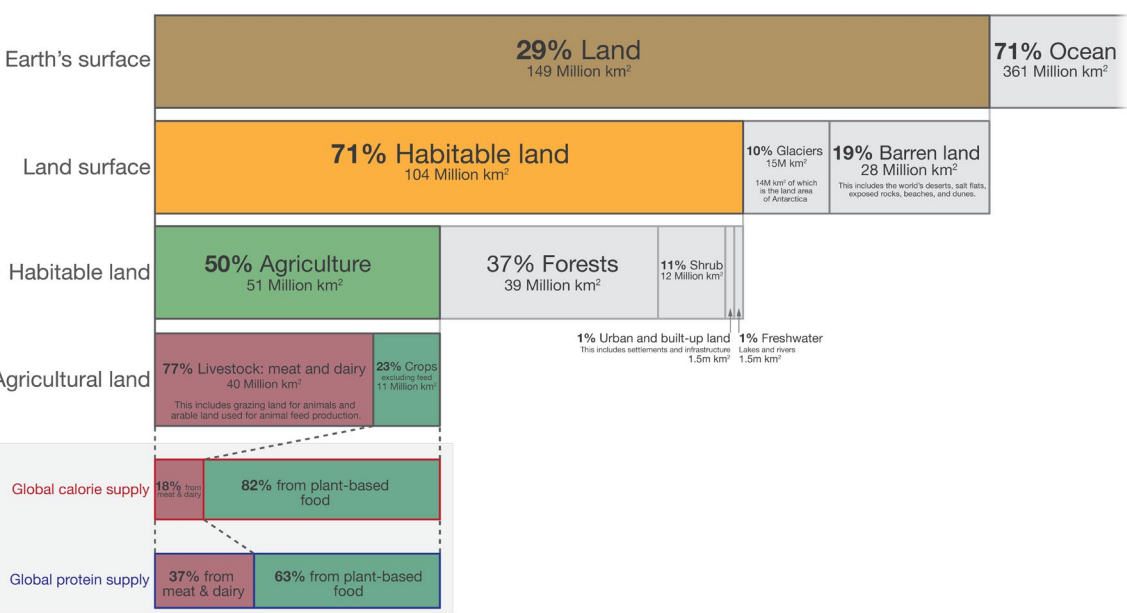


Chronic disease and health disparities

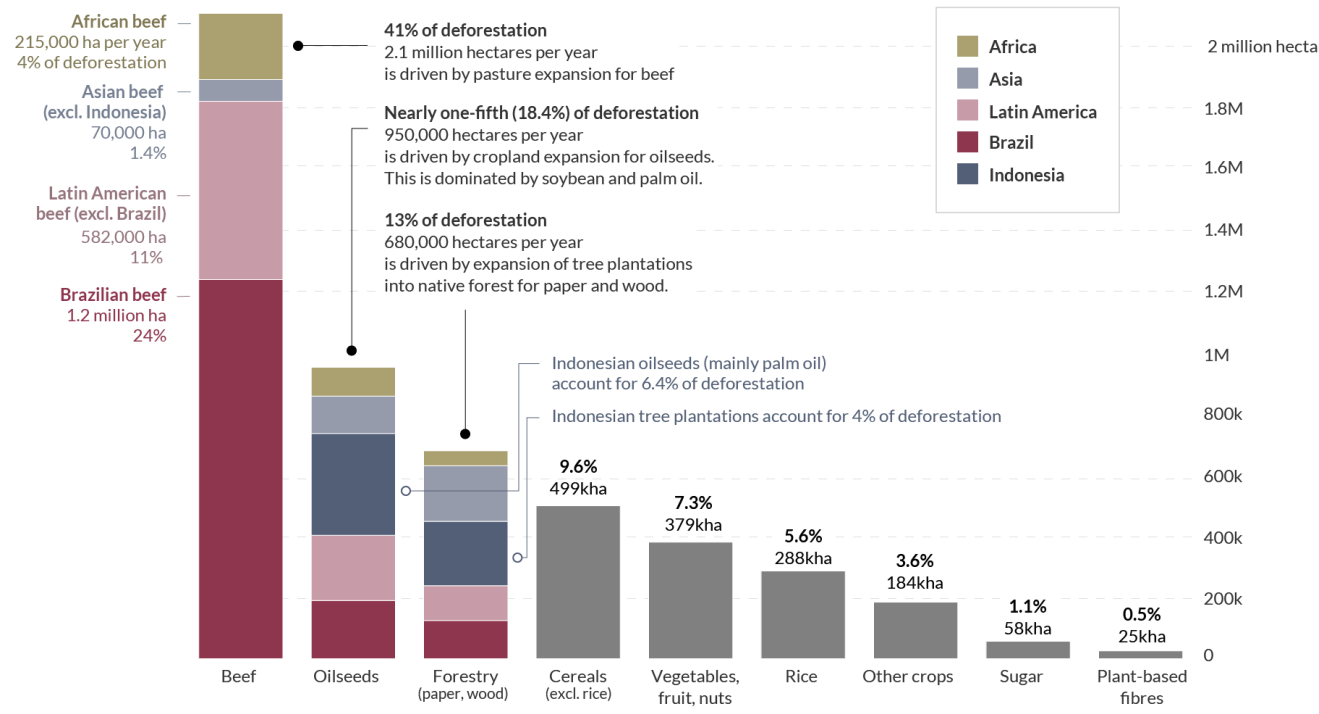
- Disparities in nutrition are driven by the socioeconomic, educational, and environmental disadvantages that have historically beset vulnerable communities and that persist today.
- Food insecurity affects approximately 11% of U.S. households but is more common in Black, Latinx, and Native American households.
- People experiencing food insecurity and without physical or economic access to food may instead have access to low-cost, energy-dense processed foods.
- Barriers to accessing high-quality, nutritious food, in turn, are major factors in people's risk to developing chronic disease -- also disproportionately affecting underserved racial and ethnic populations.



2. What kind of food should be grown that is ethically permissible when people are going hungry?



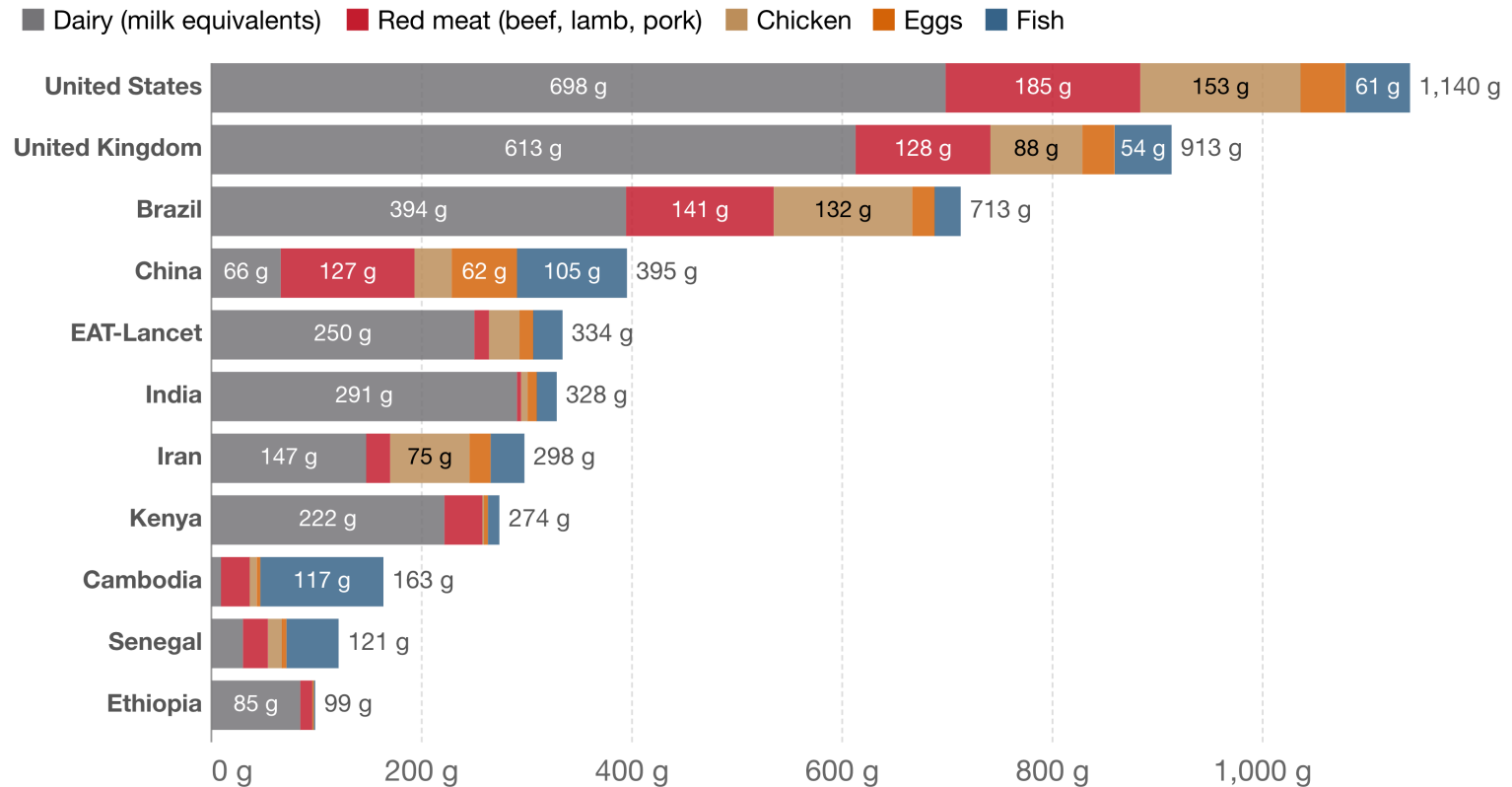
Data source: UN Food and Agriculture Organization (FAO)
OurWorldinData.org - Research and data to make progress against the world's largest problems.
Licensed under CC-BY by the authors Hannah Ritchie and Max Roser in 2019.



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.
Licensed under CC-BY by the author Hannah Ritchie.

Some countries/individuals will need to make bigger changes

Energy intensive lifestyles and dietary choices of those living in high-income countries are significant anthropogenic contributors to climate change.



Source: Food and Agriculture Organization of the United Nations; EAT-Lancet Commission
Note: Diets by country are given as food supply – this is higher than actual intakes because it does not correct for consumer waste.

OurWorldInData.org/diet-compositions • CC BY

Achieving dietary micronutrient adequacy in a finite world

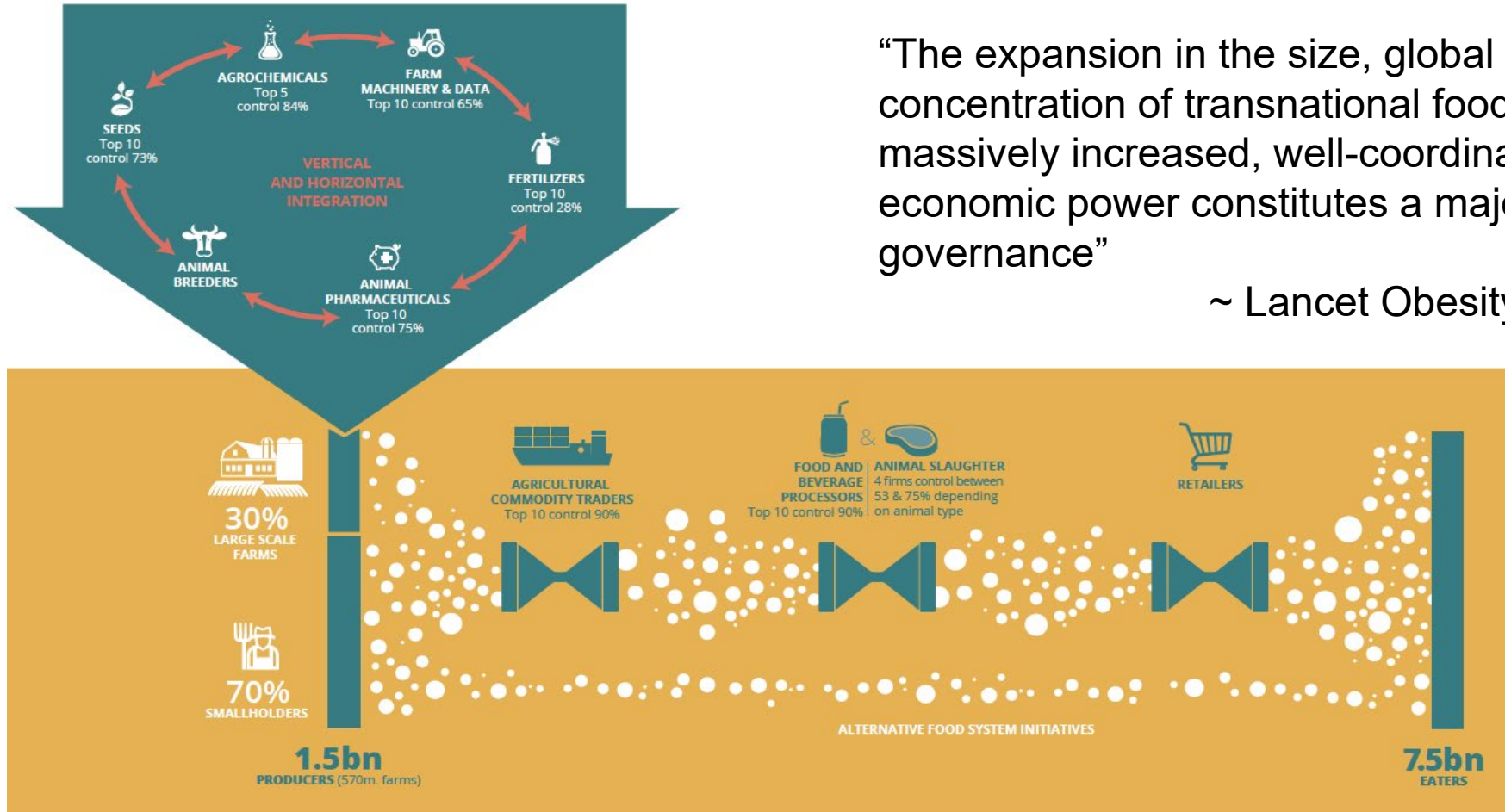
“The animal-source foods derived from livestock also happen to provide us with many of the nutrients we need, access to which varies dramatically around the world. How we provide a growing global population with these essential nutrients while staying within environmental limits is one of our greatest and most pressing challenges.”

Food (100 g)		Iron (mg)	Zinc (mg)	Folate (µg DFE)	Calcium (mg)	Vitamin A (µg RAE)	Vitamin B ₁₂ (µg)
	Chicken liver	12.3	4	569	11	4139	19
	Ruminant liver	6.7	5.9	163	7	11562	69
	Bivalves	3.9	2.7	8	33	91	20
	Crustaceans	0.3	3.8	18	91	1.4	1
	Canned fish with bones	2.5	1.2	10	240	43	3.9
	Ruminant meat	3.5	6.1	7	11	0	2.7
	Eggs	1.2	1.1	44	50	149	1.1
	Chicken	1.2	1.9	5	14	46	0.3
	Milk	0	0.4	5	113	46	0.5
	Dark green leafy vegetables	2.7	0.6	54	151	367	0
	Groundnuts	1.3	2.3	86	57	0	0
	Fresh peas	2.1	0.3	42	43	54	0
	Pulses	2.6	1.3	45	34	1	0
	Whole grains	0.7	0.8	14	6	0	0
	Mango	0.5	0.1	33	13	152	0
	Carrot and pumpkin	0.5	0.2	12	23	570	0
	Okra	0.3	0.4	46	77	14	0

Beal, T., 2021. Achieving dietary micronutrient adequacy in a finite world. *One Earth*, 4(9), pp.1197-1200.

3. Who shapes and "governs" food systems?

CONCENTRATION IN THE AGRI-FOOD SUPPLY CHAIN



“The expansion in the size, global reach, and concentration of transnational food corporations and their massively increased, well-coordinated, political and economic power constitutes a major challenge to governance”

~ Lancet Obesity Commission, p27



Obesity Was Rising as Ghana Embraced Fast Food. Then Came KFC.

The growing popularity of fried chicken and pizza in parts of Africa underscores how fast food is changing habits and expanding waistlines.

By DIONNE SEARCEY and MATT RICHTER OCT. 2, 2017

TIMES INSIDER

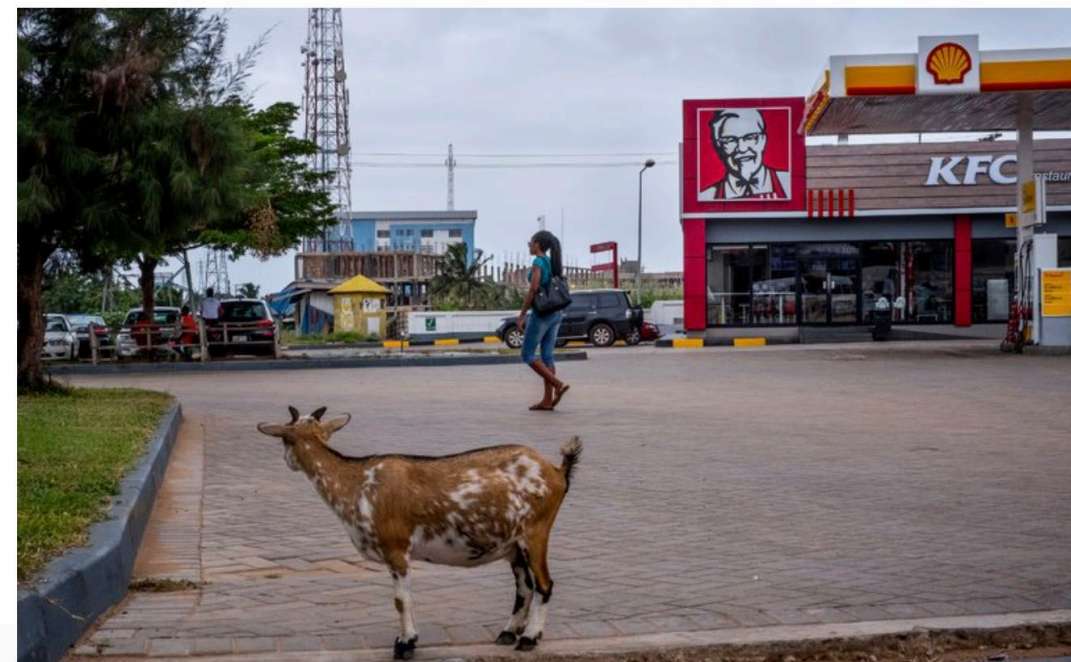
The Global Siren Call of Fast Food

By DIONNE SEARCEY OCT. 2, 2017



How Big Business Got Brazil Hooked on Junk Food

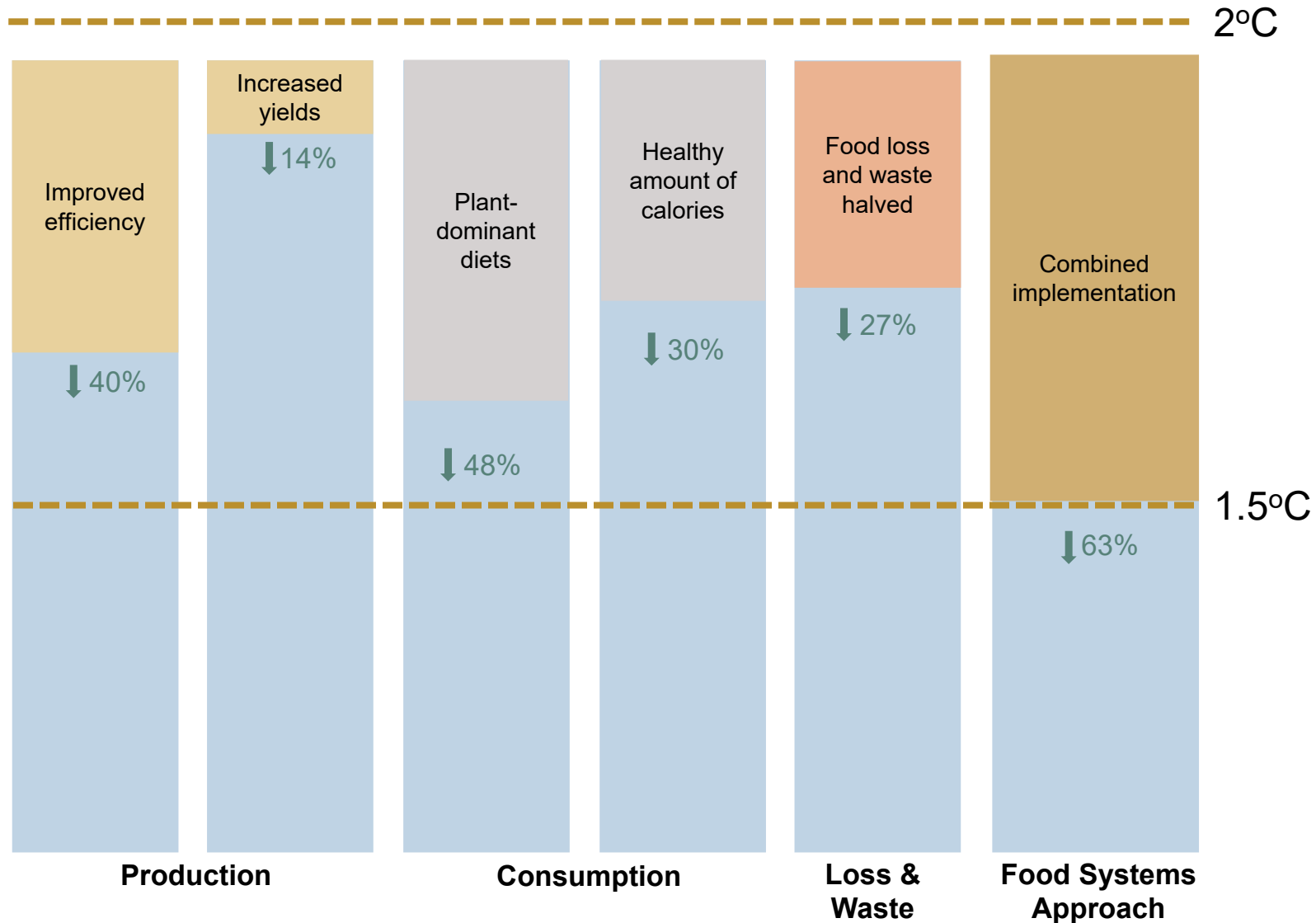
As growth slows in wealthy countries, Western-food companies are aggressively expanding in developing nations, contributing to obesity and health problems.



**Ensuring
equitable and
ethical diets
from
sustainable
food systems**



Achieving the Paris climate change targets requires multi-level food systems action



Policies to improve nutrition across food systems

Agricultural production



- **Diversification** - Incentives for horticulture and crop diversification
- **Adaptation** - Crop insurance and access to credit
- **Technology** - Investment in R&D and technology
- **Subsidies** Policies that promote nutritious crops

Processing & Transport



- **Reformulation** - healthier ingredients in food processing
- **Standards** – setting standards in food (salt, fat quantity in meat)
- **Fortification** - adding nutrients to staple foods
- **Processing** - fermenting, preserving, processing to enhance the nutritional content of foods
- **Cold chain storage and transport** – ensuring perishable foods do not rot and are safe for sale to avoid loss

Food environments



- Economic incentives (taxes and subsidies)
- Barriers and facilitators to access (e.g. junk food free check-outs)
- Zoning laws
- Farm-to-school programs
- Community and school gardens

Labeling and Promotion



- Improved labeling (leads to product reformulation)
- Restrictions on food marketing
- Mass media campaigns

Thank you!

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