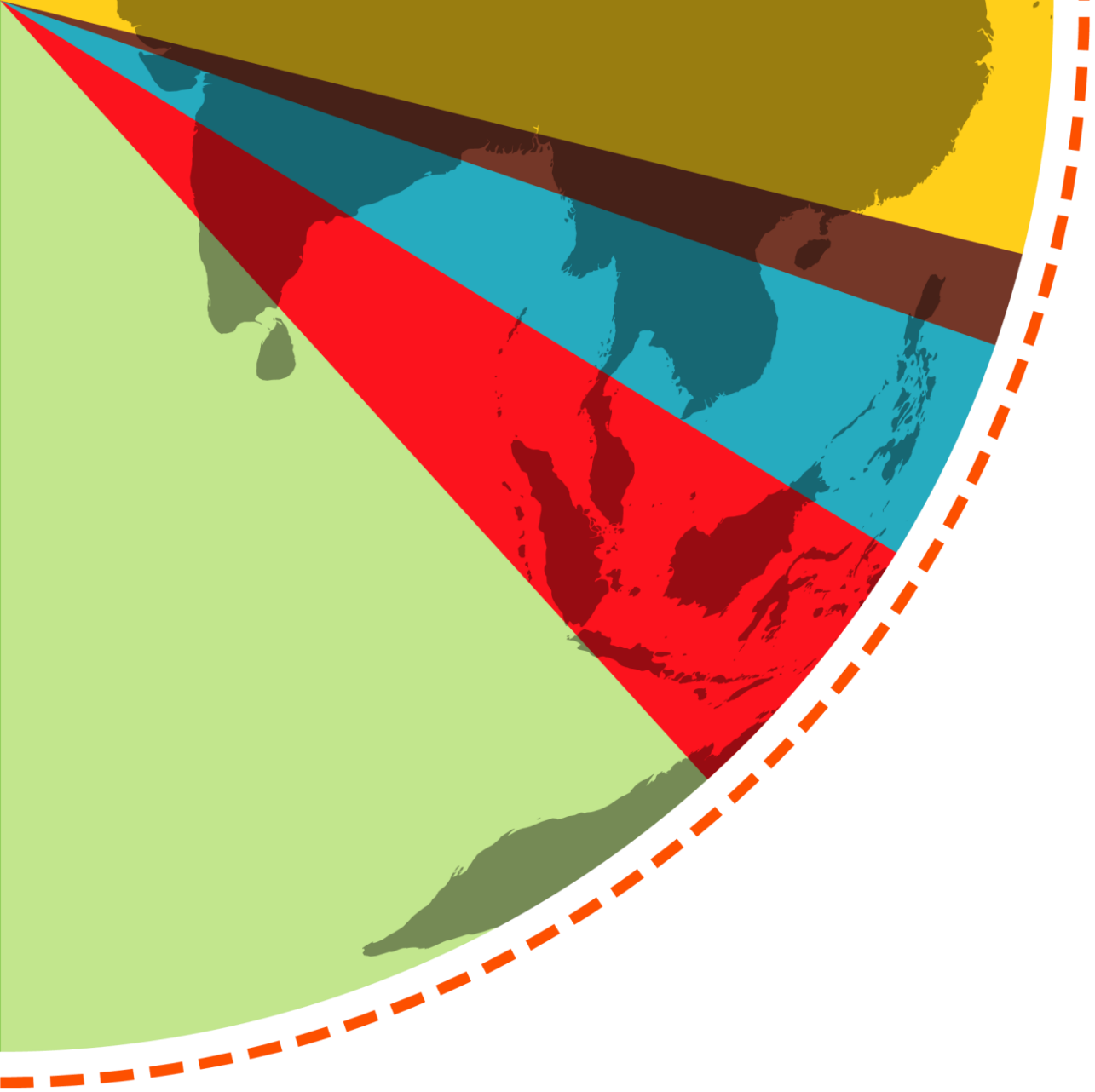
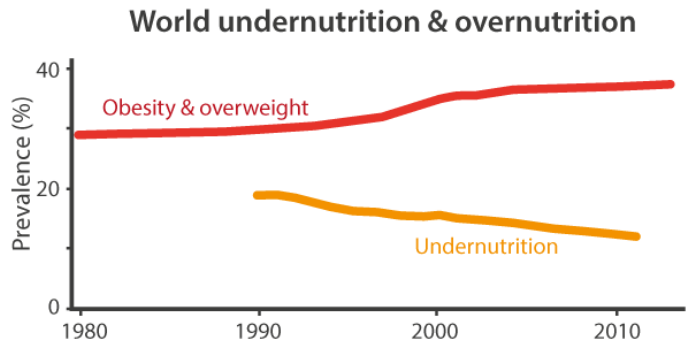


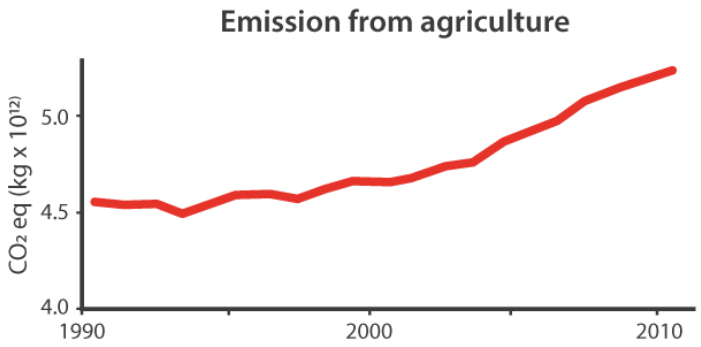
The EAT-*Lancet* Commission on Healthy Diets From Sustainable Food Systems

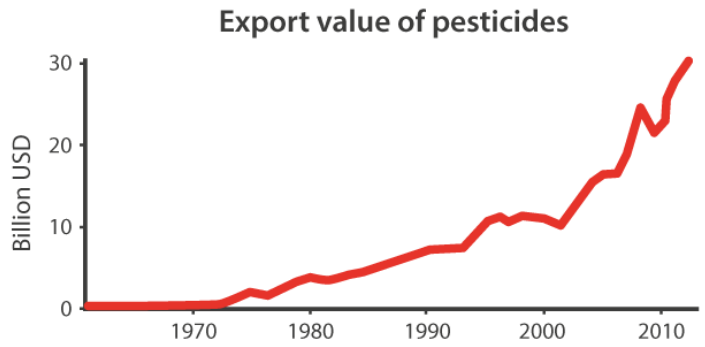
Food Planet Health

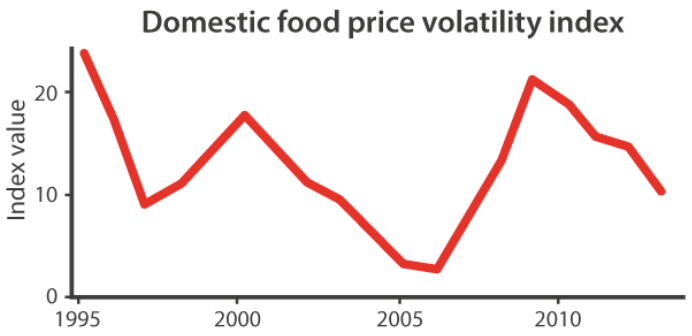
The Challenge

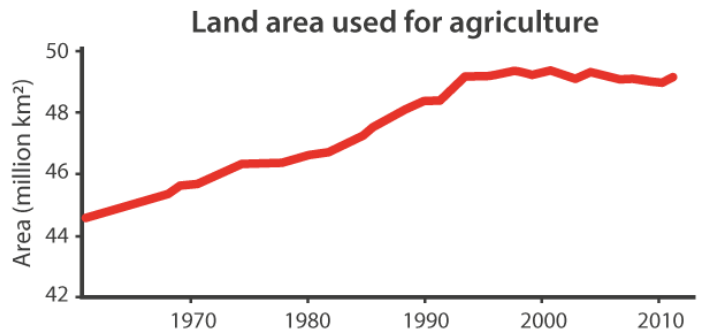
A great acceleration in the global food system

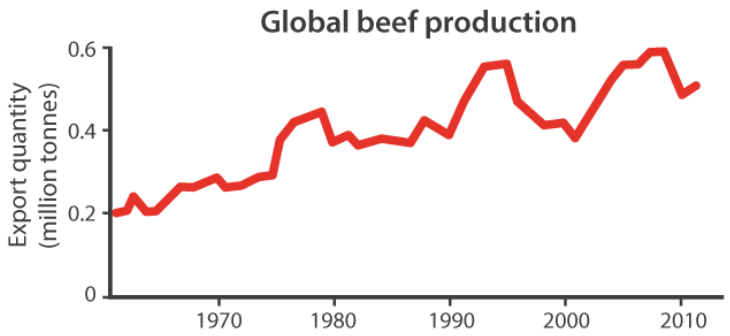


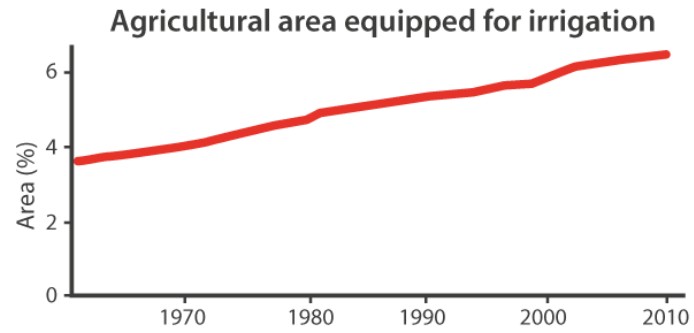


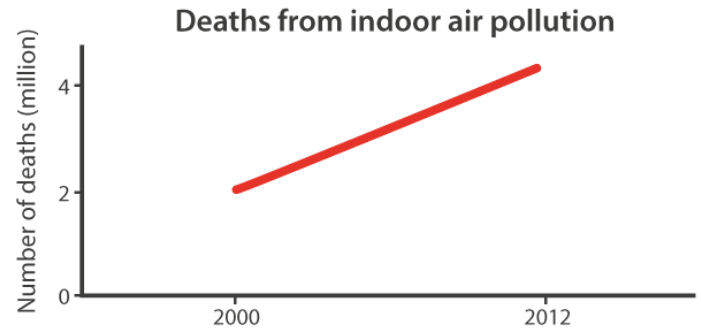


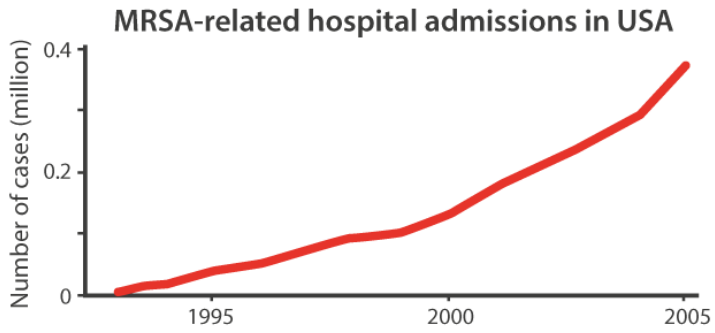












Malnutrition in all its forms is universal and massive

Globally, one person in three is malnourished today and one in two could be malnourished by 2030 if nothing is done.

821 million
of the world's population are undernourished

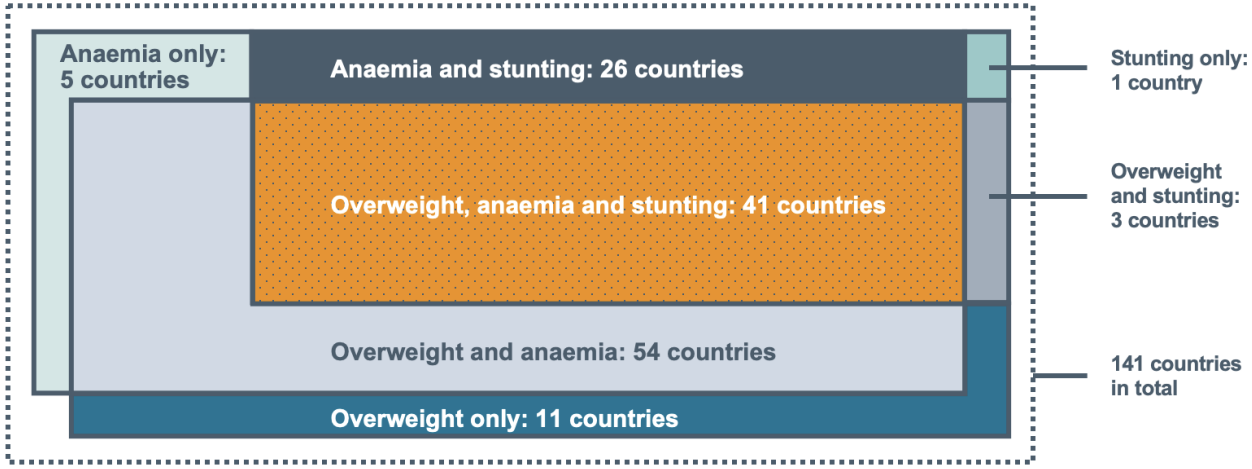
149 million
children under five years of age are stunted

49.5 million
children under five years of age are wasted

40 million
children under five years of age are overweight

2.1 billion
adults are overweight or obese

88% of countries face overlapping burdens

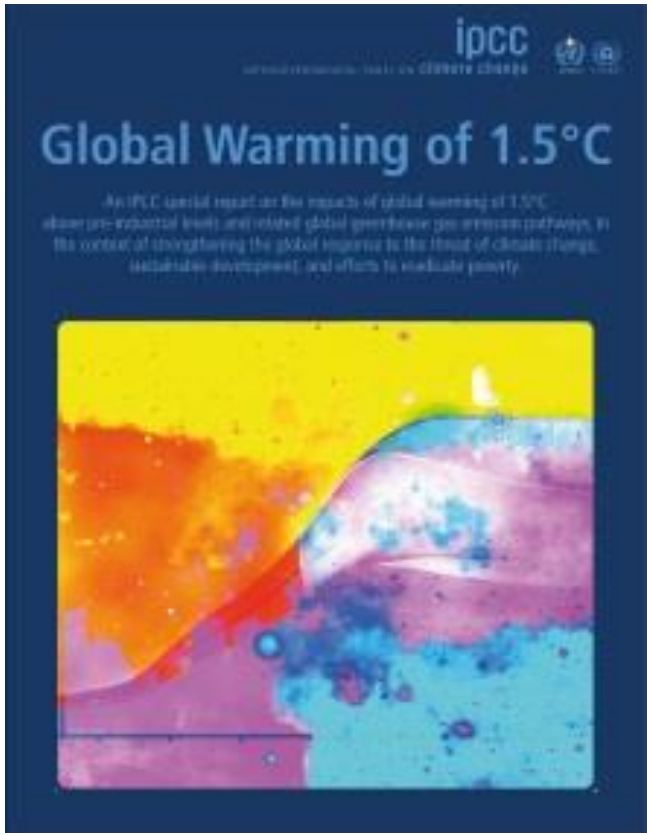


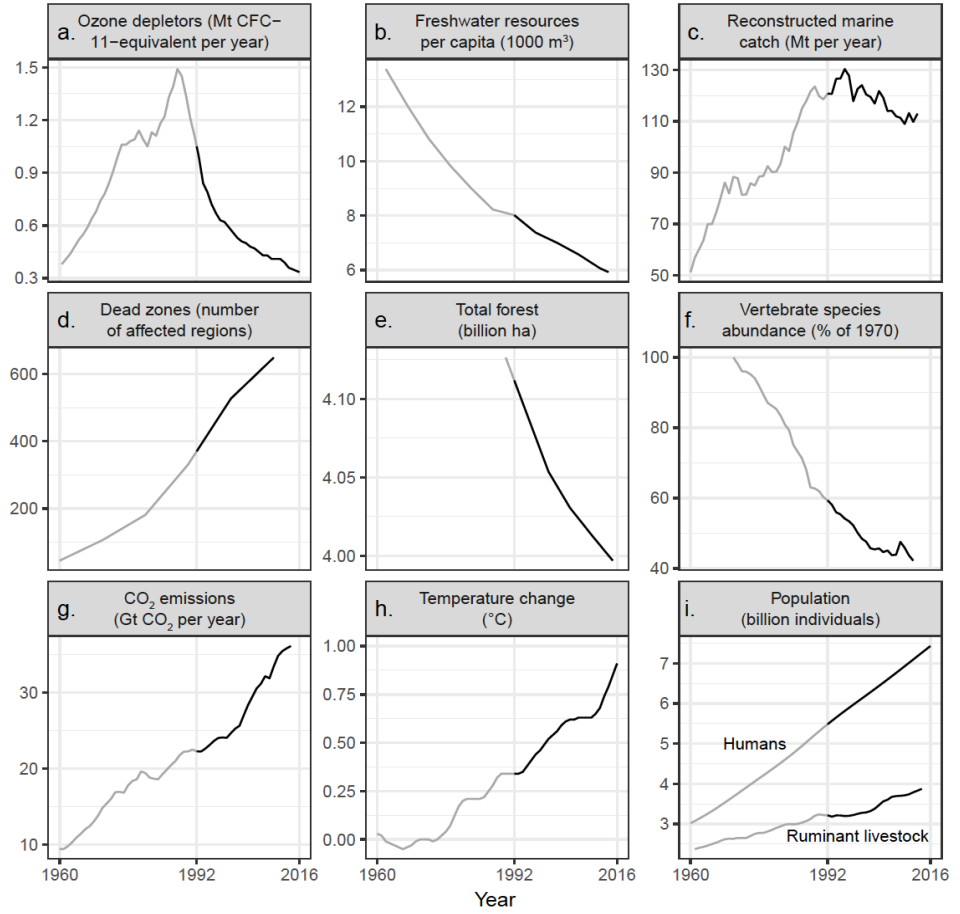
Sources: Development Initiatives: 2018 Global Nutrition Report; WHO/UNICEF/World Bank Group. Joint Malnutrition Estimates 2019

Catastrophic climate breakdown…

The challenge of avoiding catastrophic climate breakdown requires “rapid, far-reaching and unprecedented changes in all aspects of society.”

IPCC, 2018



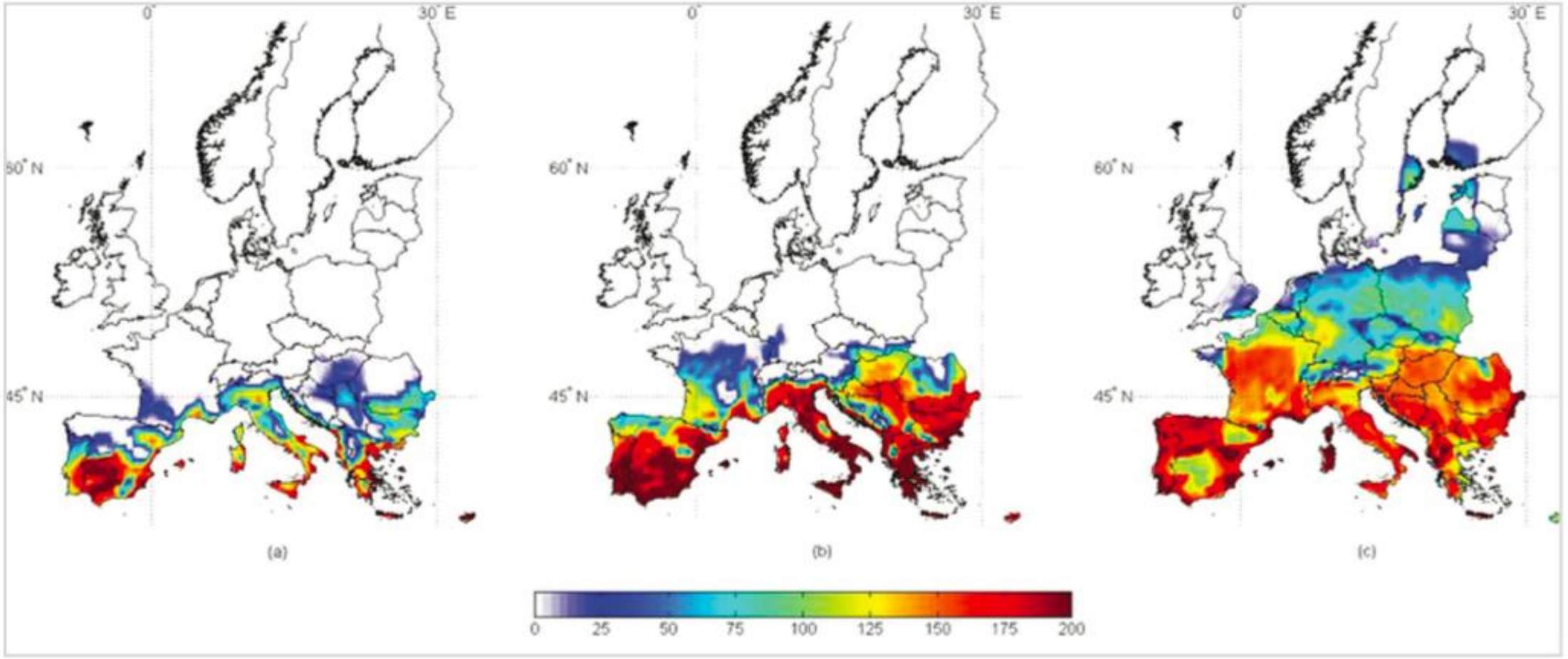


Source: Ripple, W.J., Wolf, C., Newsome, T.M., Galetti, M., Alamgir, M., Crist, E., Mahmoud, M.I., Laurance, W.F. and 15,364 scientist signatories from 184 countries, 2017. World scientists’ warning to humanity: A second notice. *BioScience*, *67*(12), pp.1026-1028

Quantity, quality + safety of crops & climate change

Additional deaths (thousands)

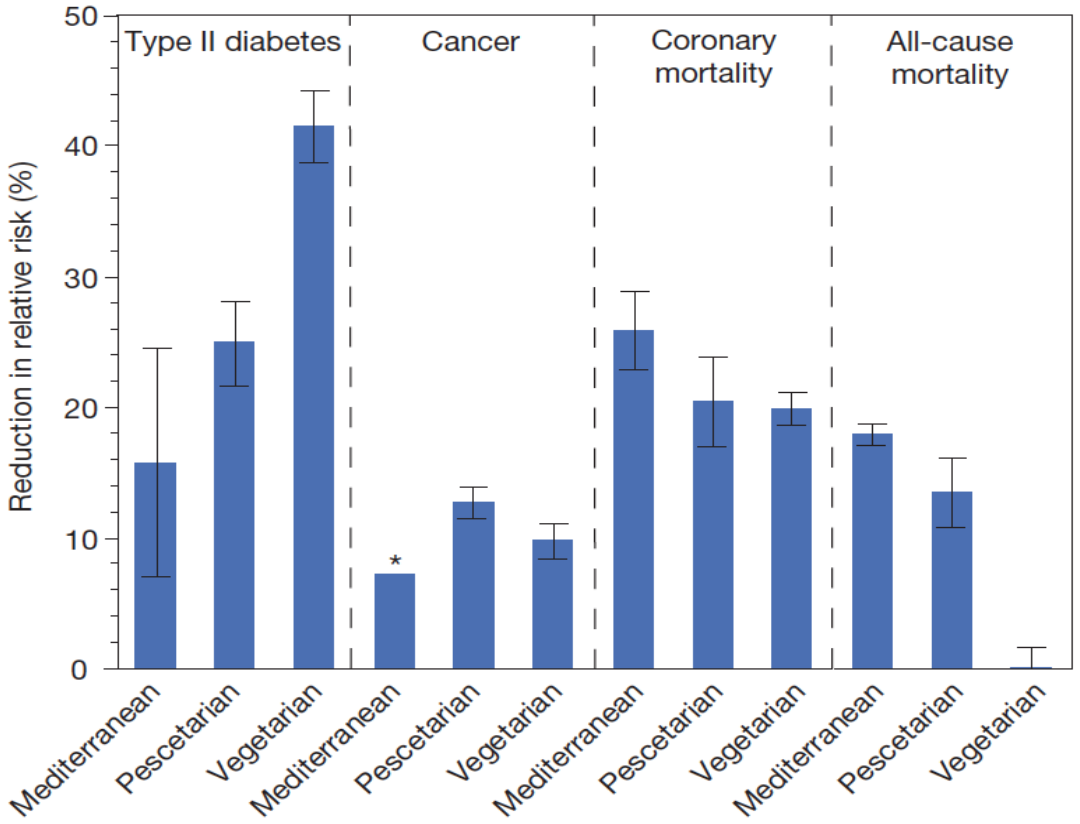
Risk maps for aflatoxin contamination in maize at harvest in 3 different climate scenarios, present, +2 °C, +5 °C

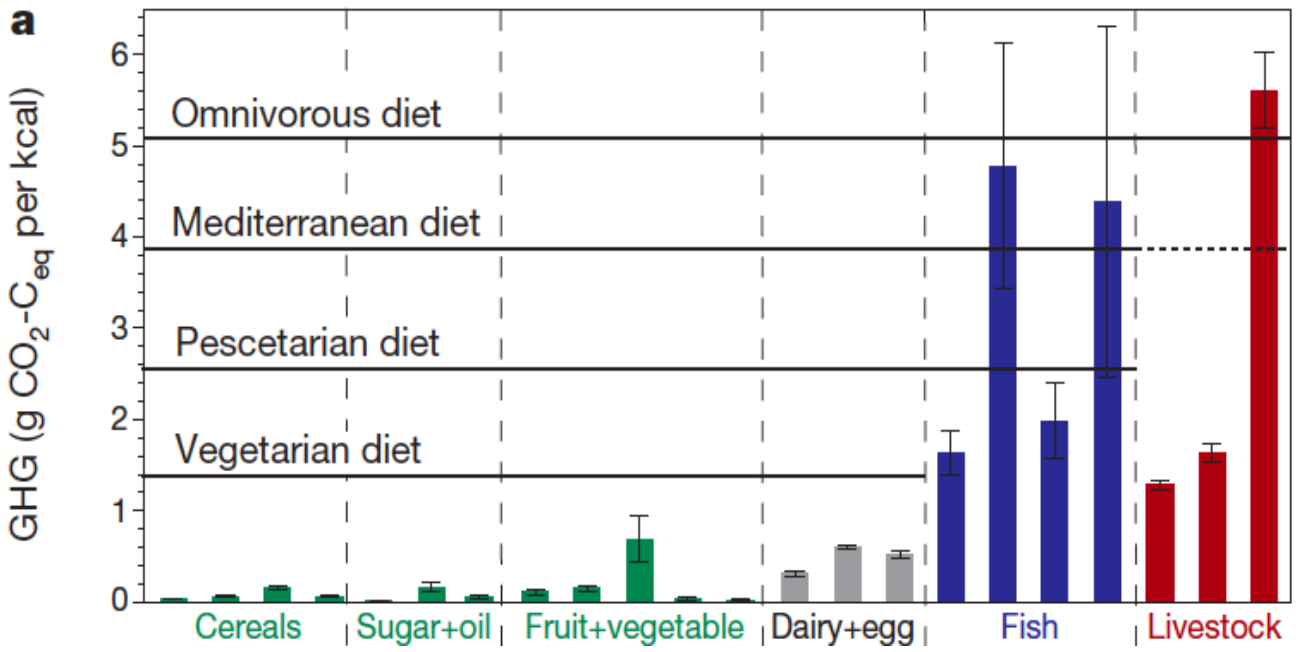


Source: Battilani *et al.* (2016)[21]
Material available under Public License, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4828719/

Sources: World Resources Institute 2016; Myers et al Nature CC 2015; Springmann et al Lancet Planetary Health 2016

Dietary patterns matter for health and environment





Source: Tilman, D. and Clark, M., 2014. Global diets link environmental sustainability and human health. *Nature*, *515*(7528), p.518.

1 Goal – 2 Targets – 5 Strategies

To Achieve Planetary Health Diets for Nearly 10 Billion People By 2050

EAT-*Lancet* Commission approach

Define a healthy reference diet using the best available evidence (controlled feeding studies, long-term cohort studies, randomized trials).

Define planetary boundaries for 6 key environmental systems and processes (GHG, cropland use, water use, nitrogen and phosphorus application, extinction rate).

Apply a global food systems modeling framework to analyze what combinations of readily implementable measures are needed to stay within food production boundaries while still delivering healthy diets by 2050.

Outline Strategies to achieve the changes needed to meet the goal of healthy diets from sustainable food systems for all by 2050.

1 Goal – 2 Targets – 5 Strategies

Scientific Targets for Healthy Diets from Sustainable Food Production

Evidence base for the Planetary Health Diet

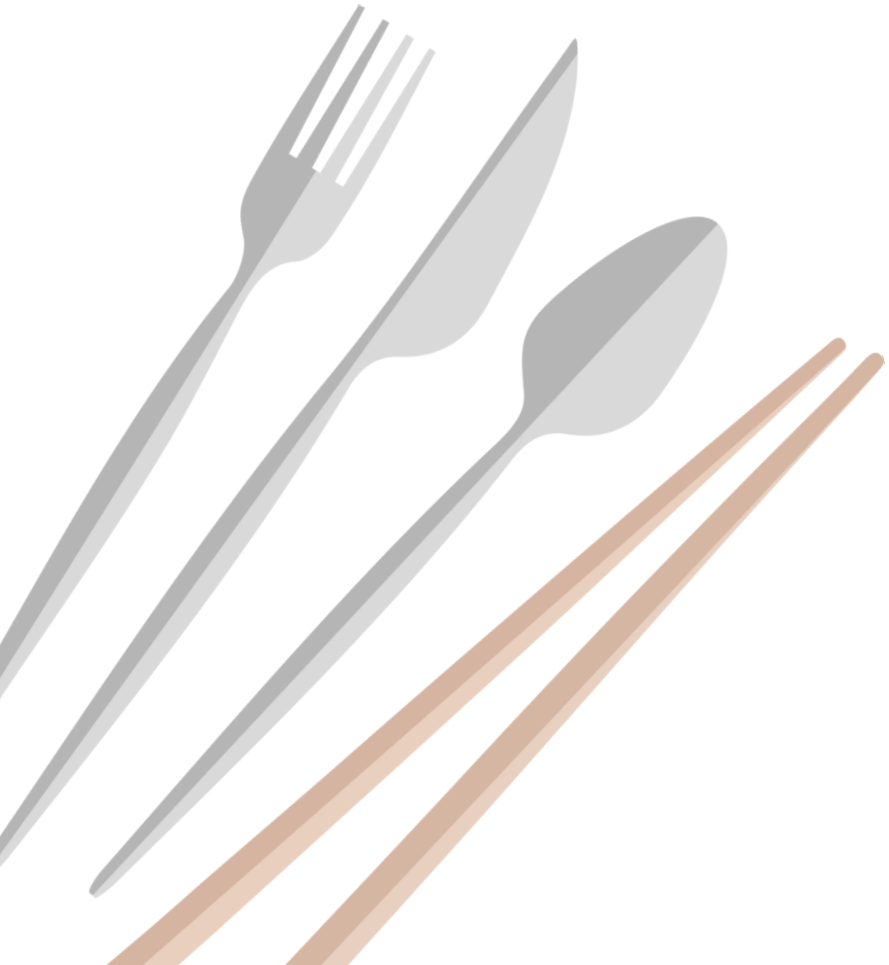
Randomized controlled feeding studies with CVD risk factor outcomes

Observational cohort studies with long follow-up and disease outcomes

Randomized trials of dietary patterns with CVD risk factors
and disease outcomes

Target 1 – **Healthy Diets**

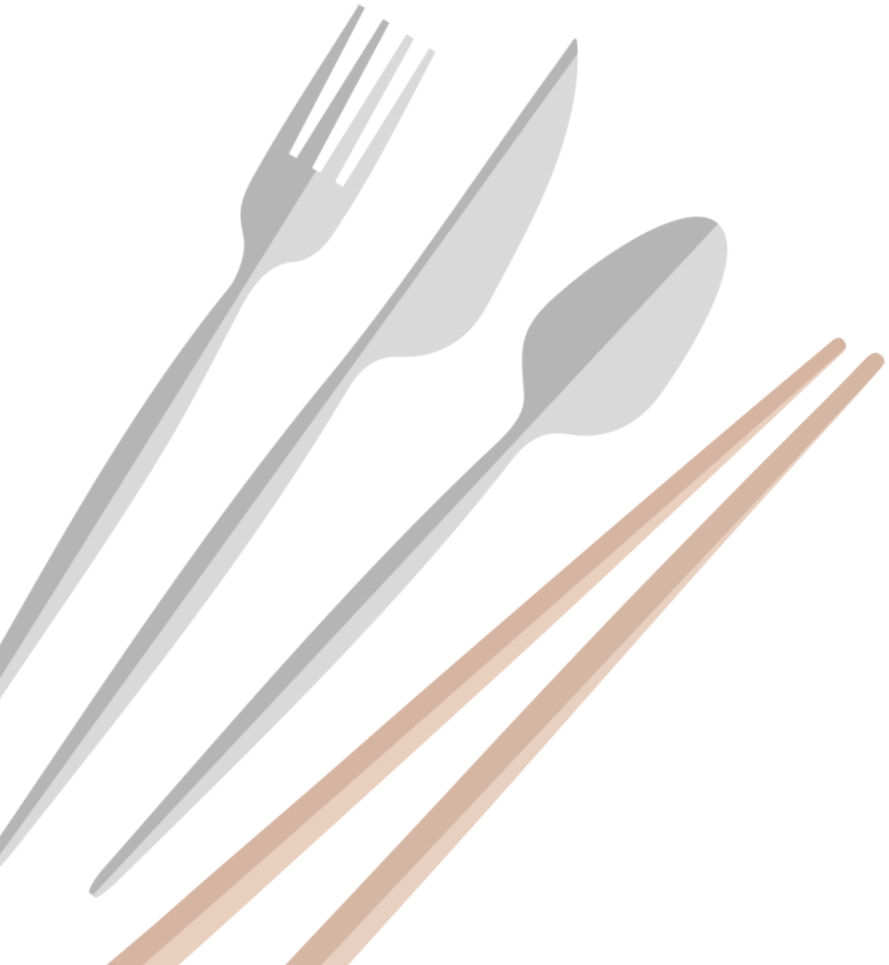
2500 kcal/day

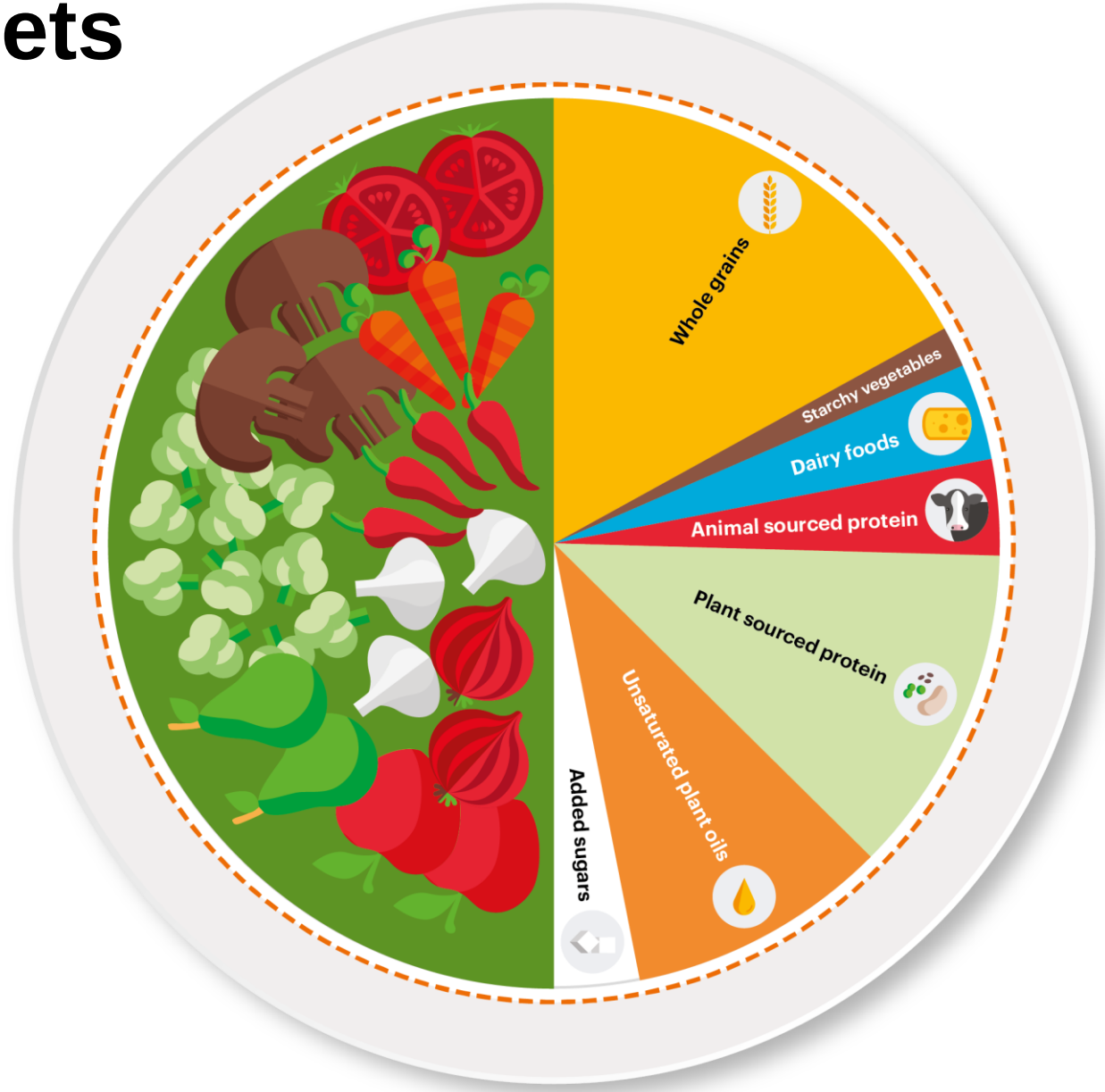


	Macronutrient intake grams per day (possible range)	Caloric intake kcal per day
Whole grains		
Rice, wheat, corn and other	**232**	**811**
Tubers or starchy vegetables		
Potatoes and cassava	**50** (0–100)	**39**
Vegetables		
All vegetables	**300** (200–600)	**78**
Fruits		
All fruits	**200** (100–300)	**126**
Dairy foods		
Whole milk or equivalents	**250** (0–500)	**153**
Protein sources		
Beef, lamb and pork	**14** (0–28)	**30**
Chicken and other poultry	**29** (0–58)	**62**
Eggs	**13** (0–25)	**19**
Fish	**28** (0–100)	**40**
Legumes	**75** (0–100)	**284**
Nuts	**50** (0–75)	**291**
Added fats		
Unsaturated oils	**40** (20–80)	**354**
Saturated oils	**11.8** (0-11.8)	**96**
Added sugars		
All sugars	**31** (0–31)	**120**

Target 1 – **Healthy Diets**

2500 kcal/day





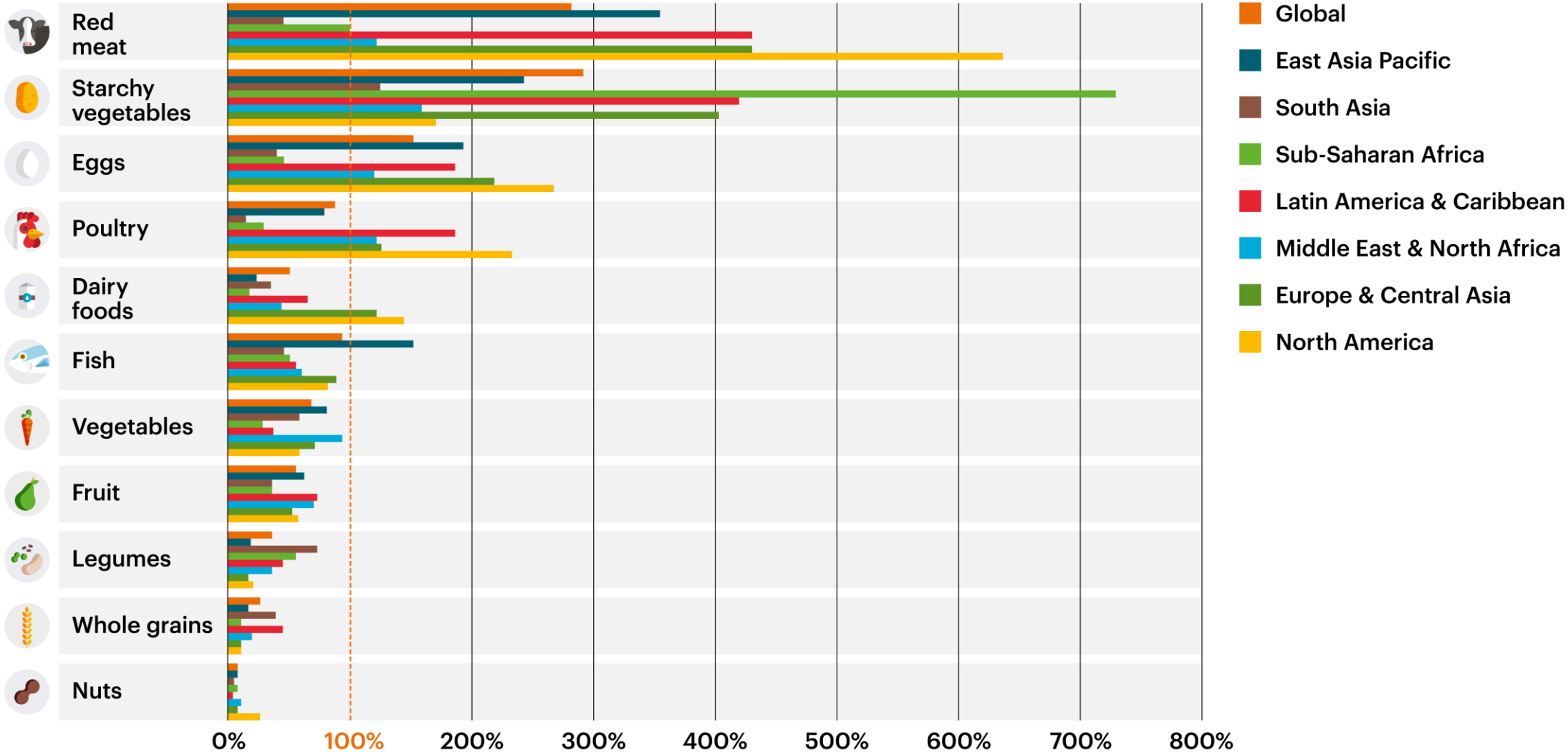
Samples of planetary health plates



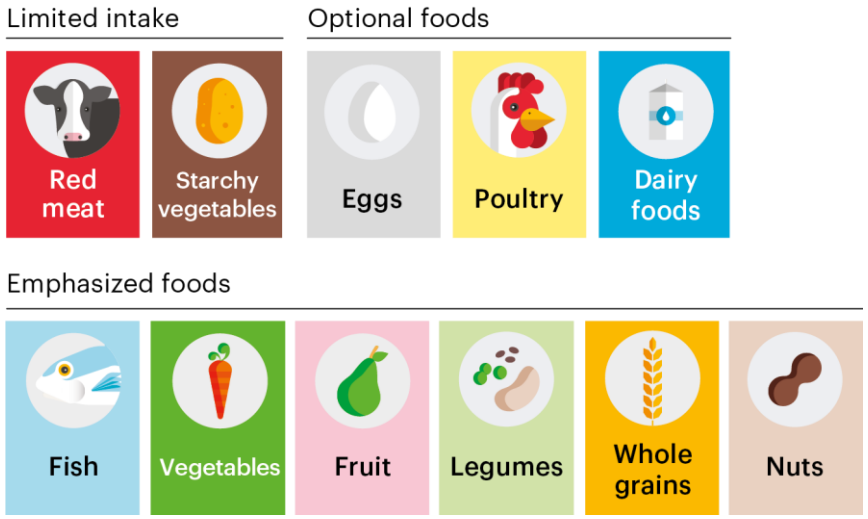


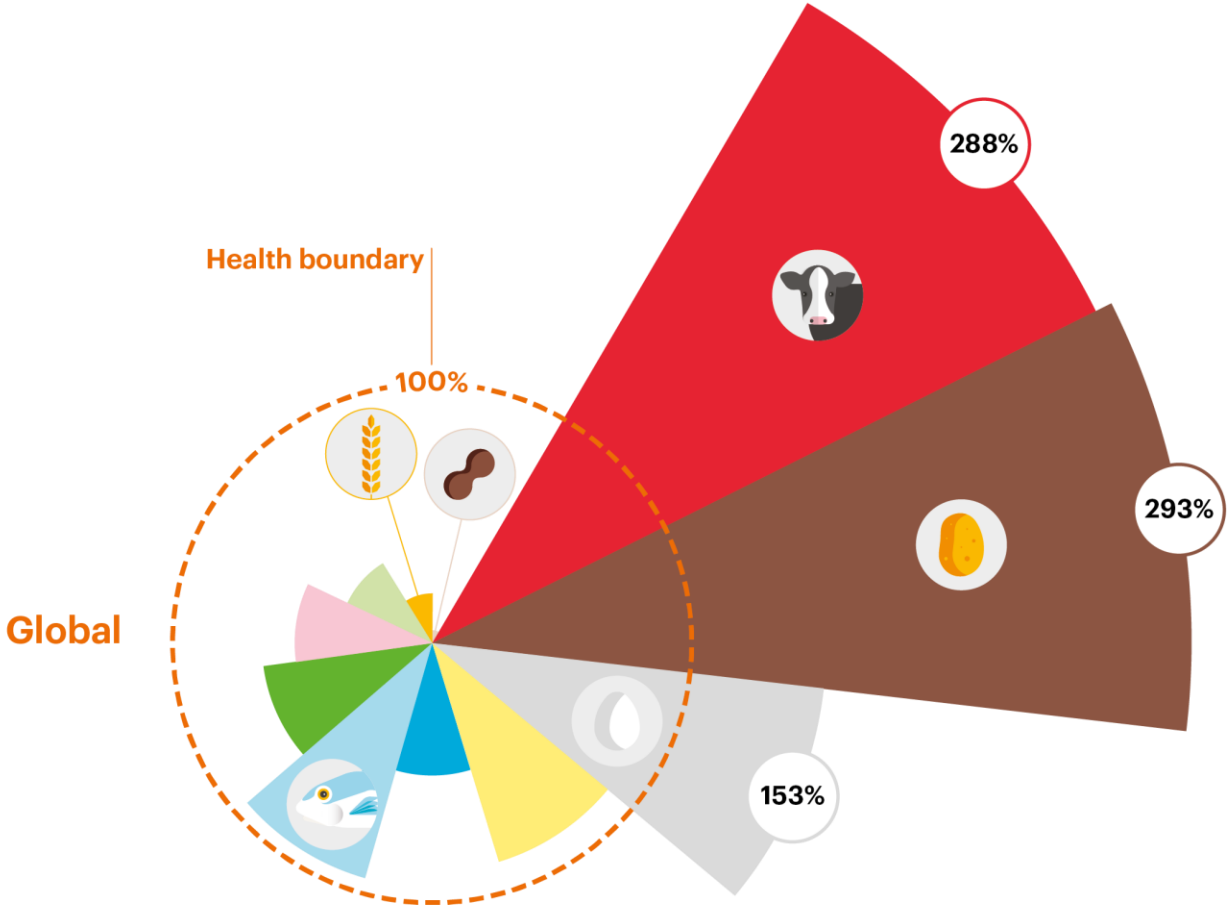



Current intakes versus planetary health diet

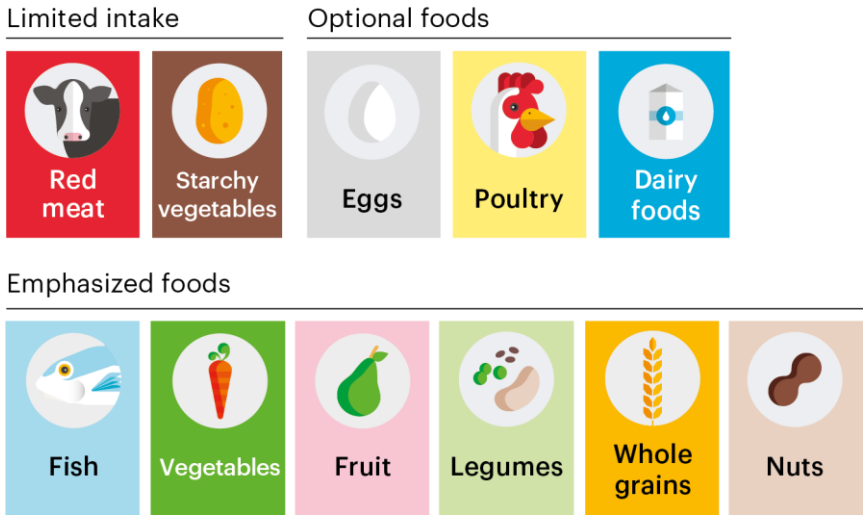


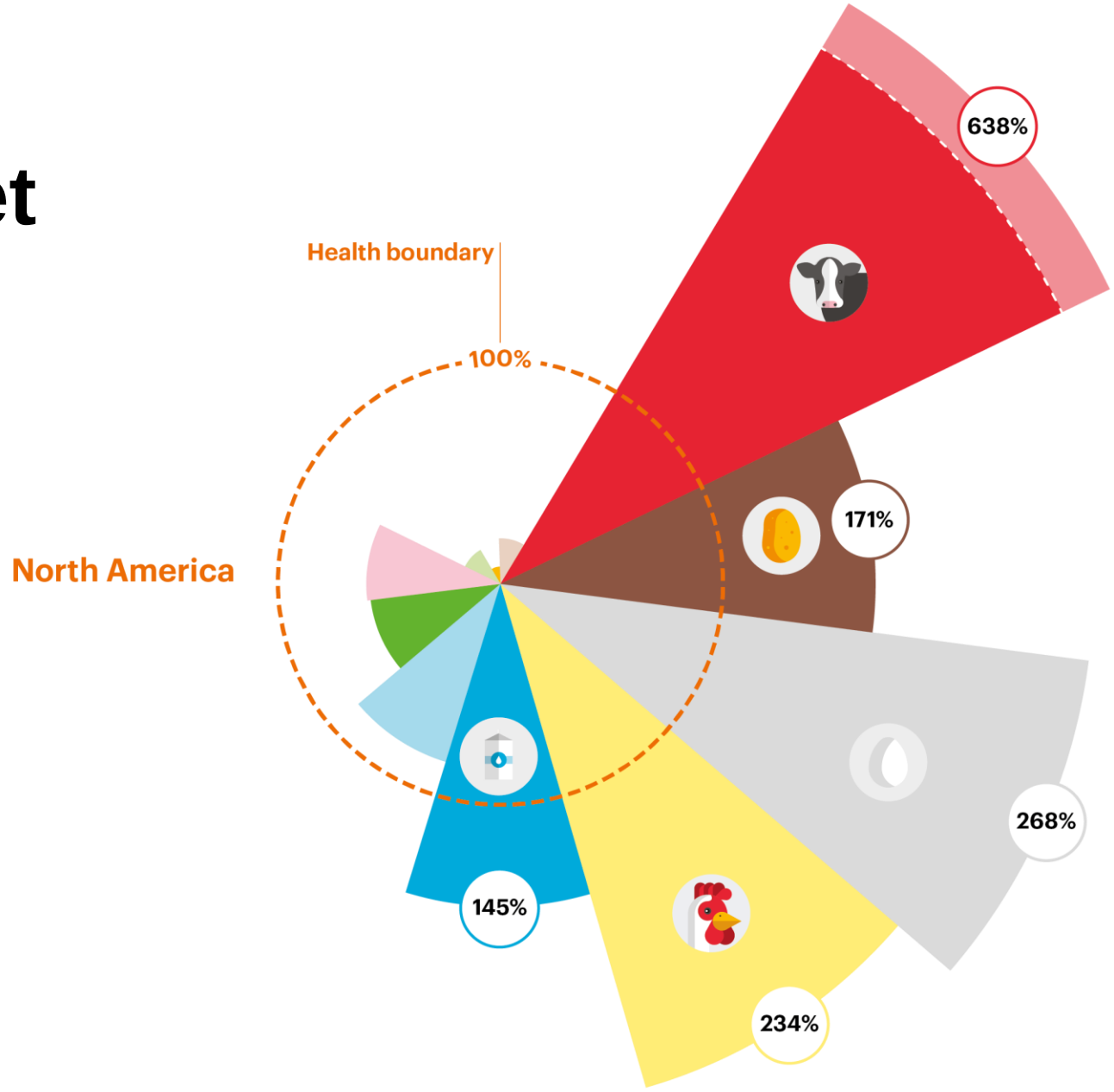
Current Intakes vs Planetary Health Diet



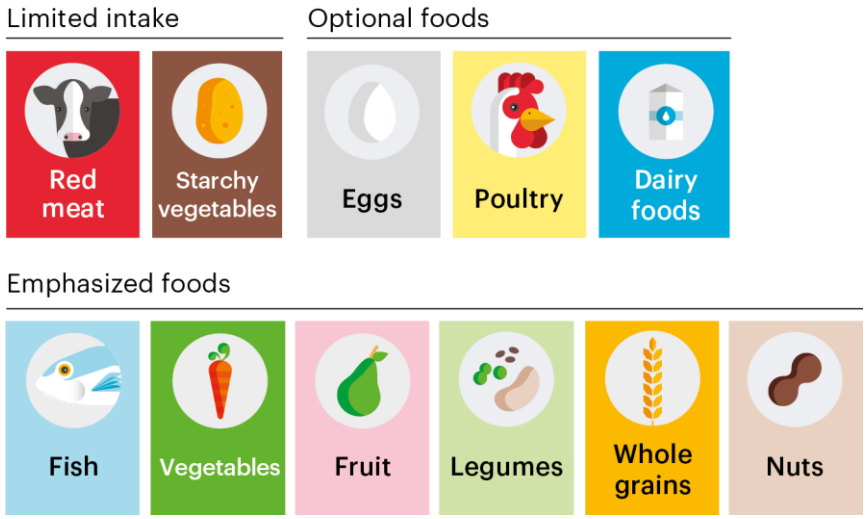


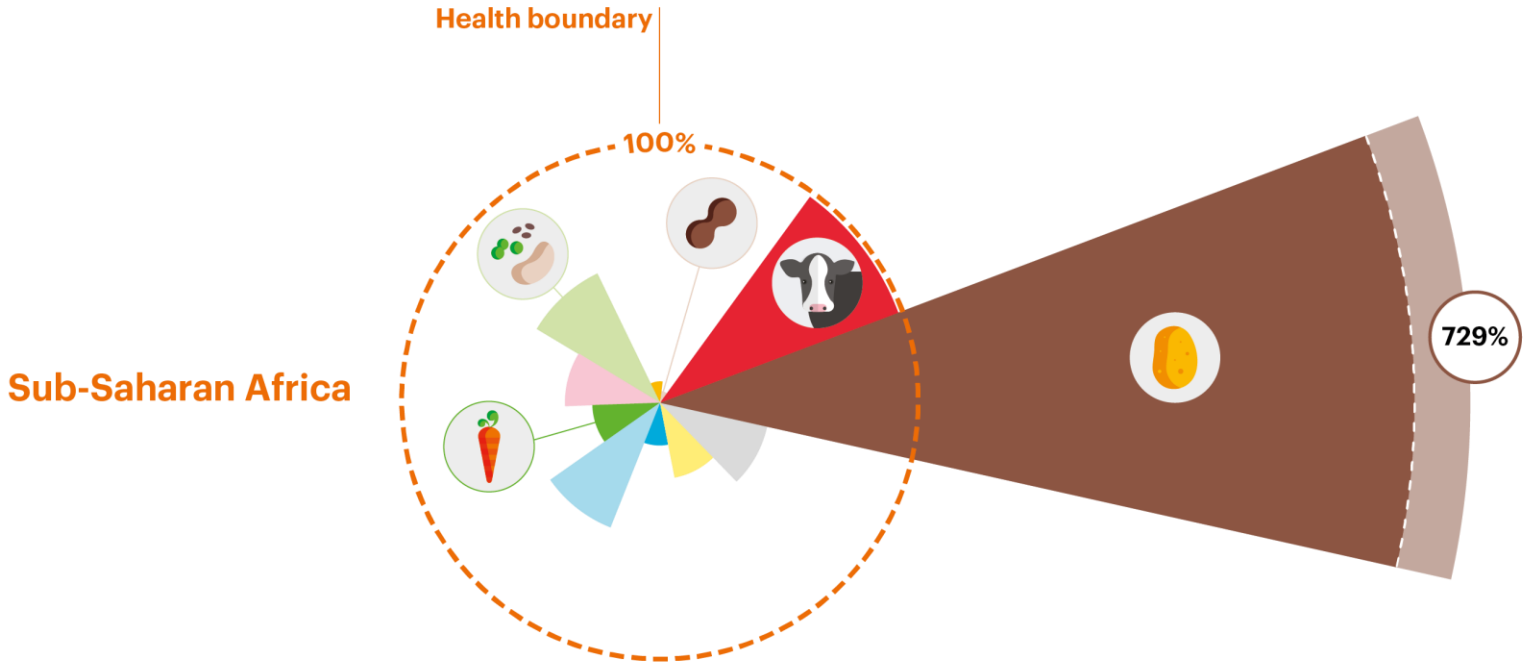
Current Intakes vs Planetary Health Diet



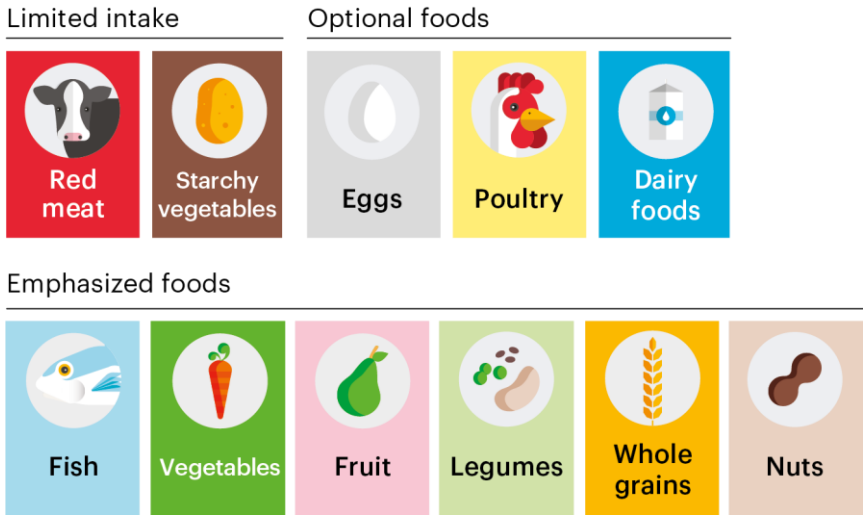


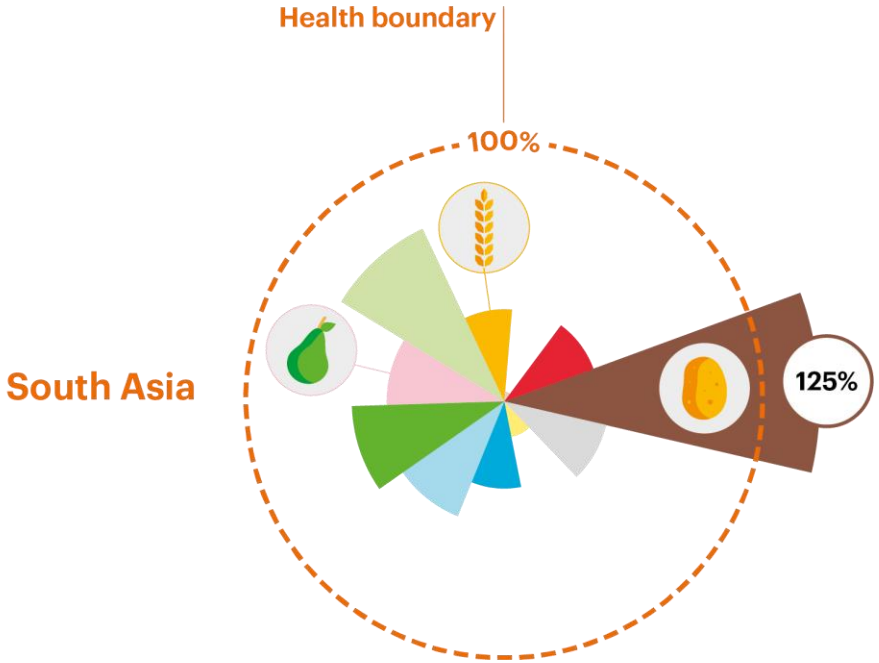
Current Intakes vs Planetary Health Diet





Current Intakes vs Planetary Health Diet

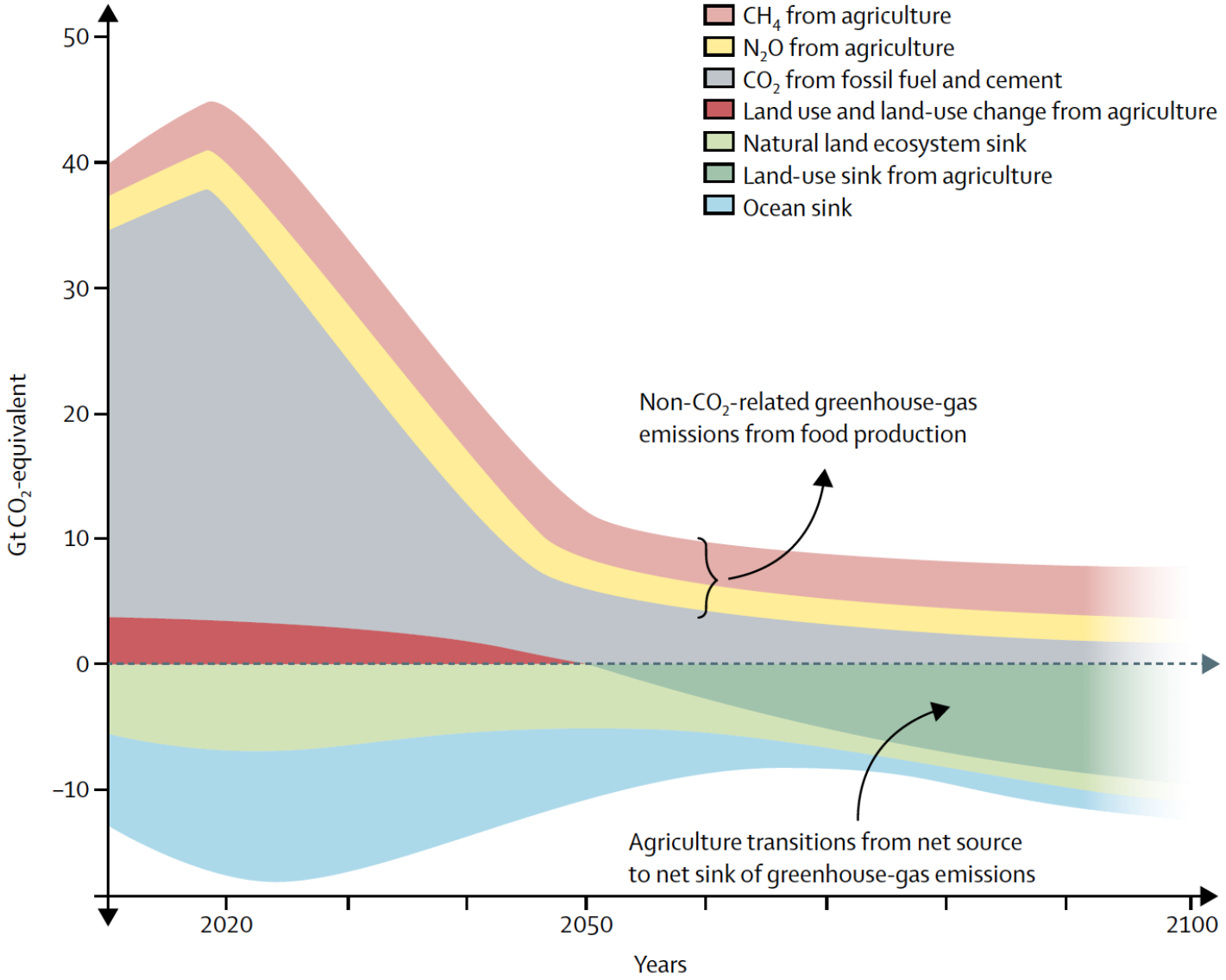




Substantial health benefits

Approach 1 Comparative Risk	19%	or	11.1 million adult deaths per year
Approach 2 Global Burden of Disease	22.4%	or	10.8 million adult deaths per year
Approach 3 Empirical Disease Risk	23.6%	or	11.6 million adult deaths per year

Projects of global emissions




Climate
C


Nitrogen
(N)
Phosphorus
(P)


Water
(H_2O)


Biodiversity
(DNA)


Land

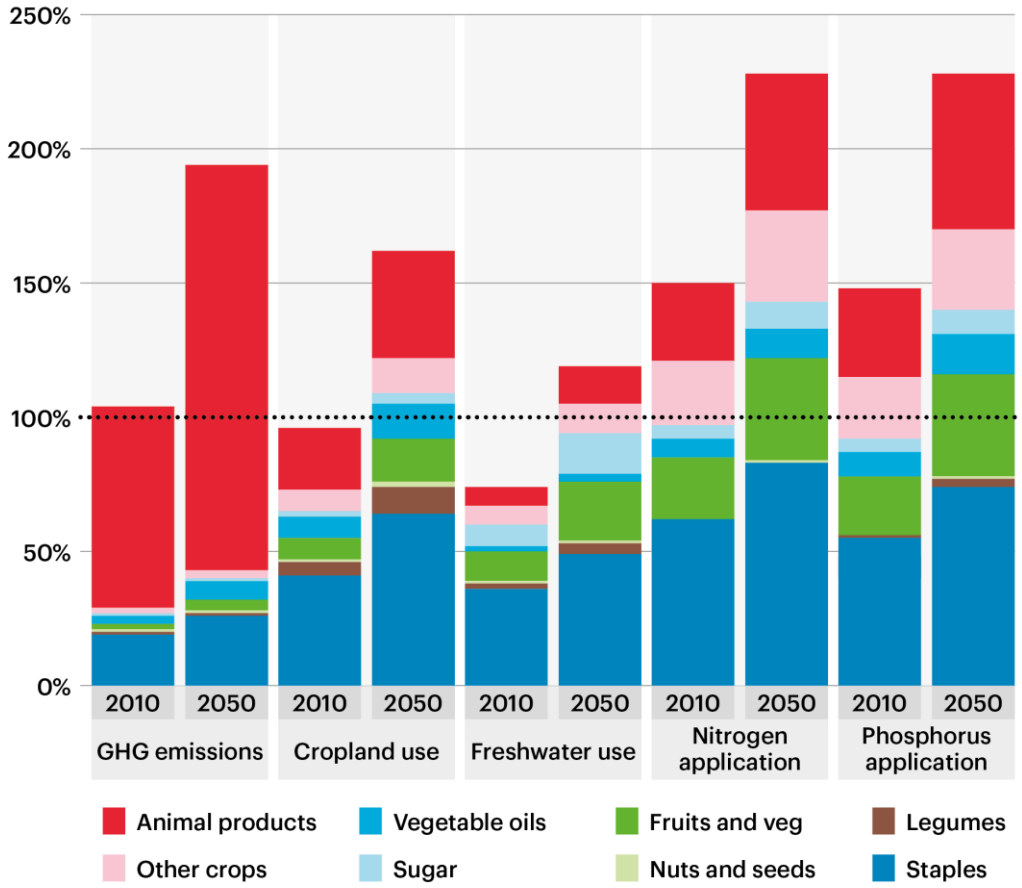
Target 2 – **Sustainable Food Production**

Earth system process	Control variable	Boundary (Uncertainty range)	Global Implication
Climate change	 **GHG emissions**	**5 Gt CO_2-eq yr^{-1}** (4.7 – 5.4 Gt CO_2-eq yr^{-1})	No new emissions from Agriculture
Land-system change	 **Cropland use**	**13 M km^2** (11–15 M km^2)	0 land expansion
Freshwater use	 **Water use**	**2,500 km^3 yr^{-1}** (1000–4000 km^3 yr^{-1})	>30% flows in basins
Nitrogen cycling	 **N application**	**90 Tg N yr^{-1}** (65–90 Tg N yr^{-1}) * (90–130 Tg N yr^{-1})**	Pollution <1 – 2.5 mg N L^{-1}
Phosphorus cycling	 **P application**	**8 Tg P yr^{-1}** (6–12 Tg P yr^{-1}) * (8–16 Tg P yr^{-1})**	Pollution <50- 100 mg P m^{-3}
Biodiversity loss	 **Extinction rate**	**10 E/MSY** (1–80 E/MSY)	50% land intact by ecoregion

Achieving planetary health diets

Actions	Description
Dietary shift Planetary health diet	Planetary health diet – as outlined in Table 1.
Halve waste Reduced food loss and waste	Food losses and waste reduced by half, in line with SDG target 12.3.
PROD Improved production practices Standard level of ambition	Closing yield gaps to about 75%; rebalancing N and P application; improving water management; implementation of agricultural mitigation options; and land is expanded first into secondary habitat and then to intact forests to minimize impacts on biodiversity.
PROD+ Improved production practices High level of ambition	Closing yield gaps to 90%; a 30% increase in N use efficiency and 50% recycling rates of P; phase-out of first-generation biofuels; implementation of available bottom-up options for mitigating GHG emissions; and optimizing land-use across regions to minimize impacts on biodiversity.

Environmental effects of food



Environmental effects in 2010 and 2050 by food groups on various Earth systems based on BAU projections for consumption and production

Source: Springmann, M., Clark, M., Mason-D'Croz, D., Wiebe, K., Bodirsky, B.L., Lassaletta, L., De Vries, W., Vermeulen, S.J., Herrero, M., Carlson, K.M., Jonell, M., Troell, M., DeClerck, F., Gordon, L.J., Zurayk, R., Scarborough, P., Rayner, M., Loken, B., Fanzo, J., Godfray, H.C.J., Tilman, D., Rockström, J., Willett, W., n.d. Options for keeping the food system within environmental limits. *Nature.* doi:10.1038/s41586-018-0594-0

Environmental effects per serving of food produced

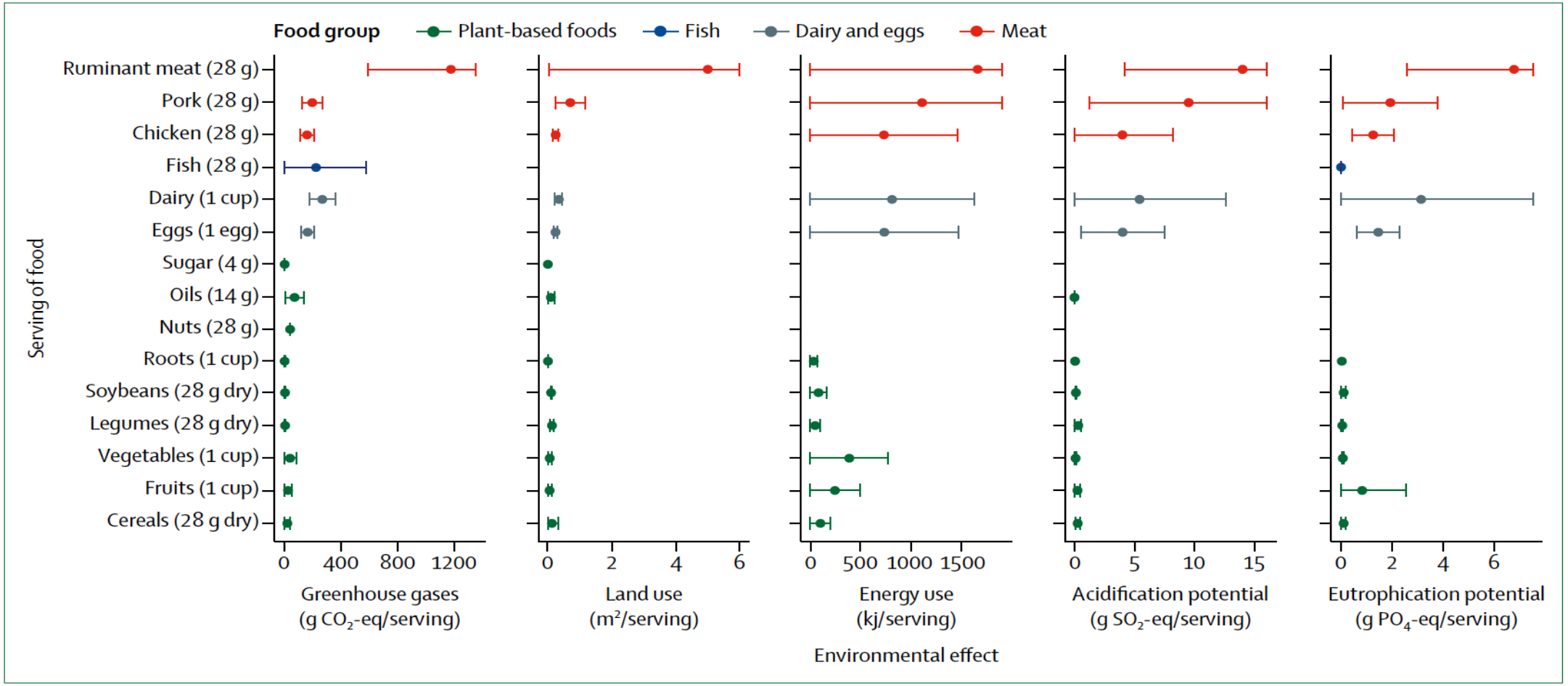
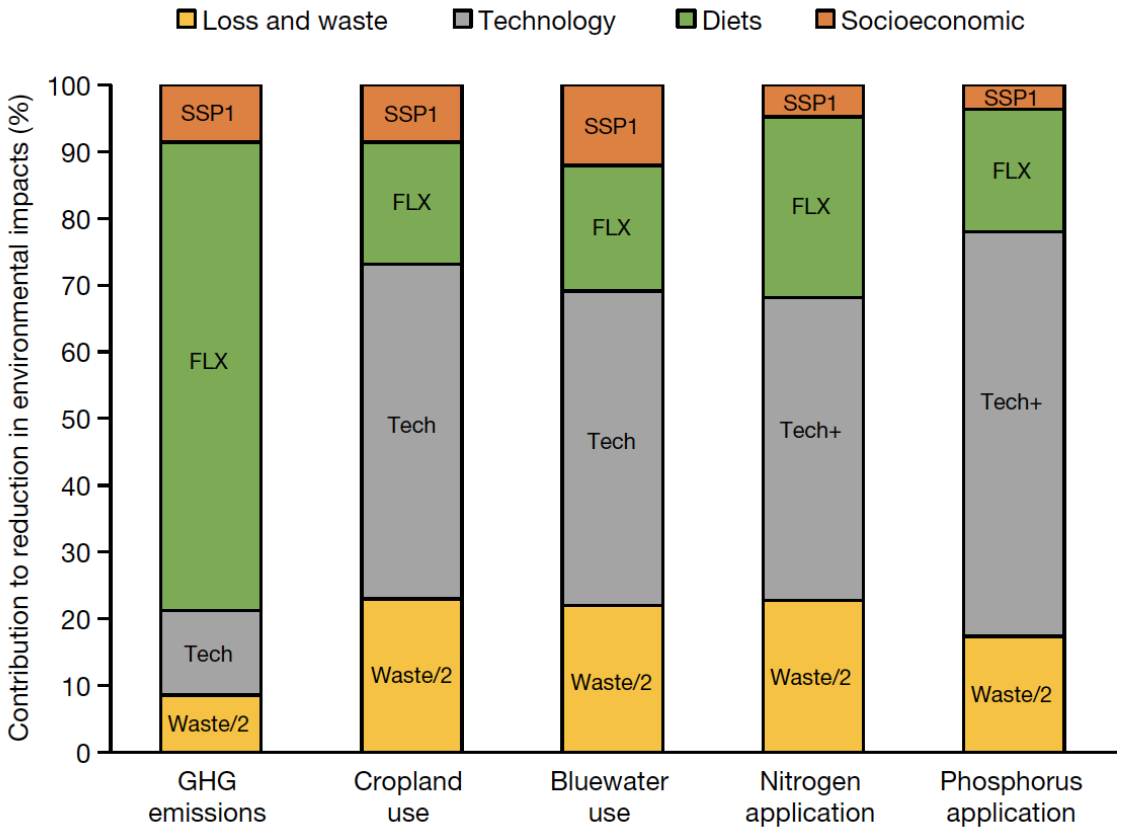


Figure 4: **Environmental effects per serving of food produced**
Bars are mean (SD).[5,216] Some results are missing for fish due to lack of data for some impact categories (eg, land use stemming from plant-based feeds in aquaculture). This was, however, accounted for in the global food systems modeling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

Source: Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T., Tilman, D., DeClerck, F., Wood, A. and Jonell, M., et al 2019. Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *The Lancet*, *393*(10170), pp.447-492.

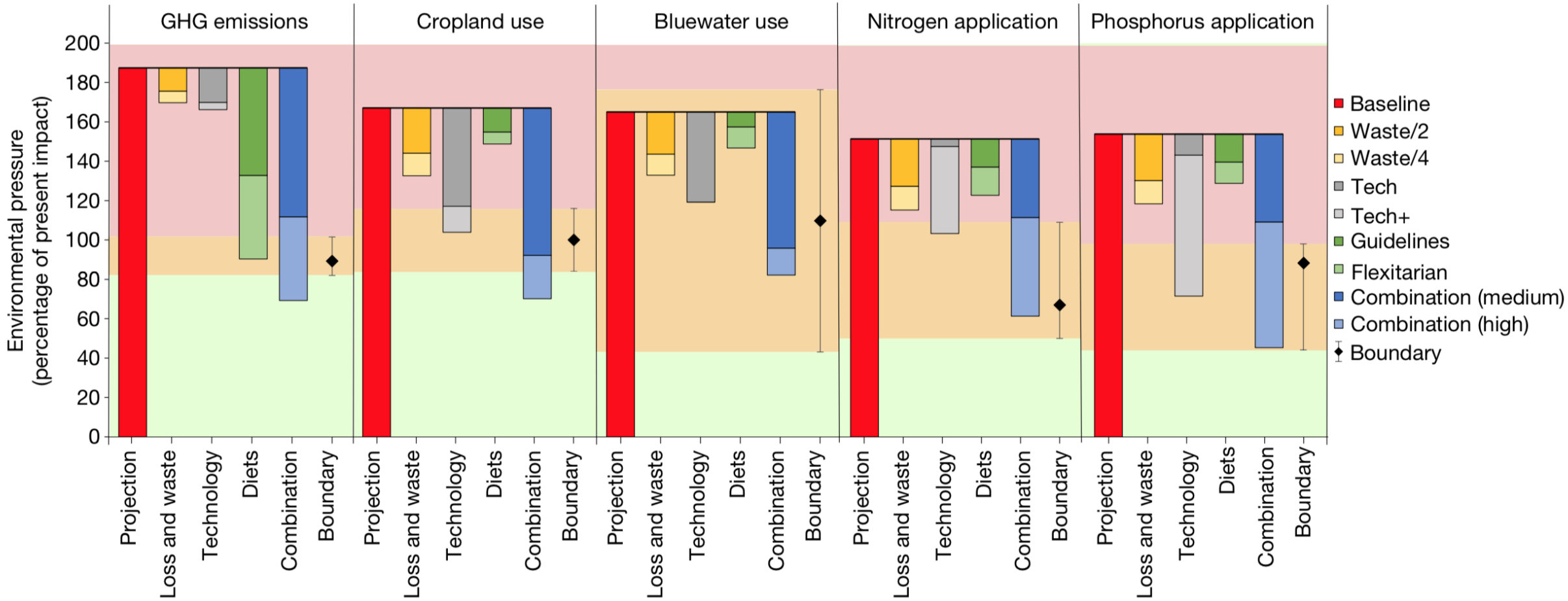
Options for keeping the food system within environmental limits



Dietary, technological change on farms, and reductions in food loss and waste are critical to reduce environmental impacts of our food system on the planet.

Source: Springmann, M., Clark, M., Mason-D'Croz, D., Wiebe, K., Bodirsky, B.L., Lassaletta, L., De Vries, W., Vermeulen, S.J., Herrero, M., Carlson, K.M., Jonell, M., Troell, M., DeClerck, F., Gordon, L.J., Zurayk, R., Scarborough, P., Rayner, M., Loken, B., Fanzo, J., Godfray, H.C.J., Tilman, D., Rockström, J., Willett, W., n.d. Options for keeping the food system within environmental limits. *Nature.* doi:10.1038/s41586-018-0594-0.

Modeling Out the Scenarios

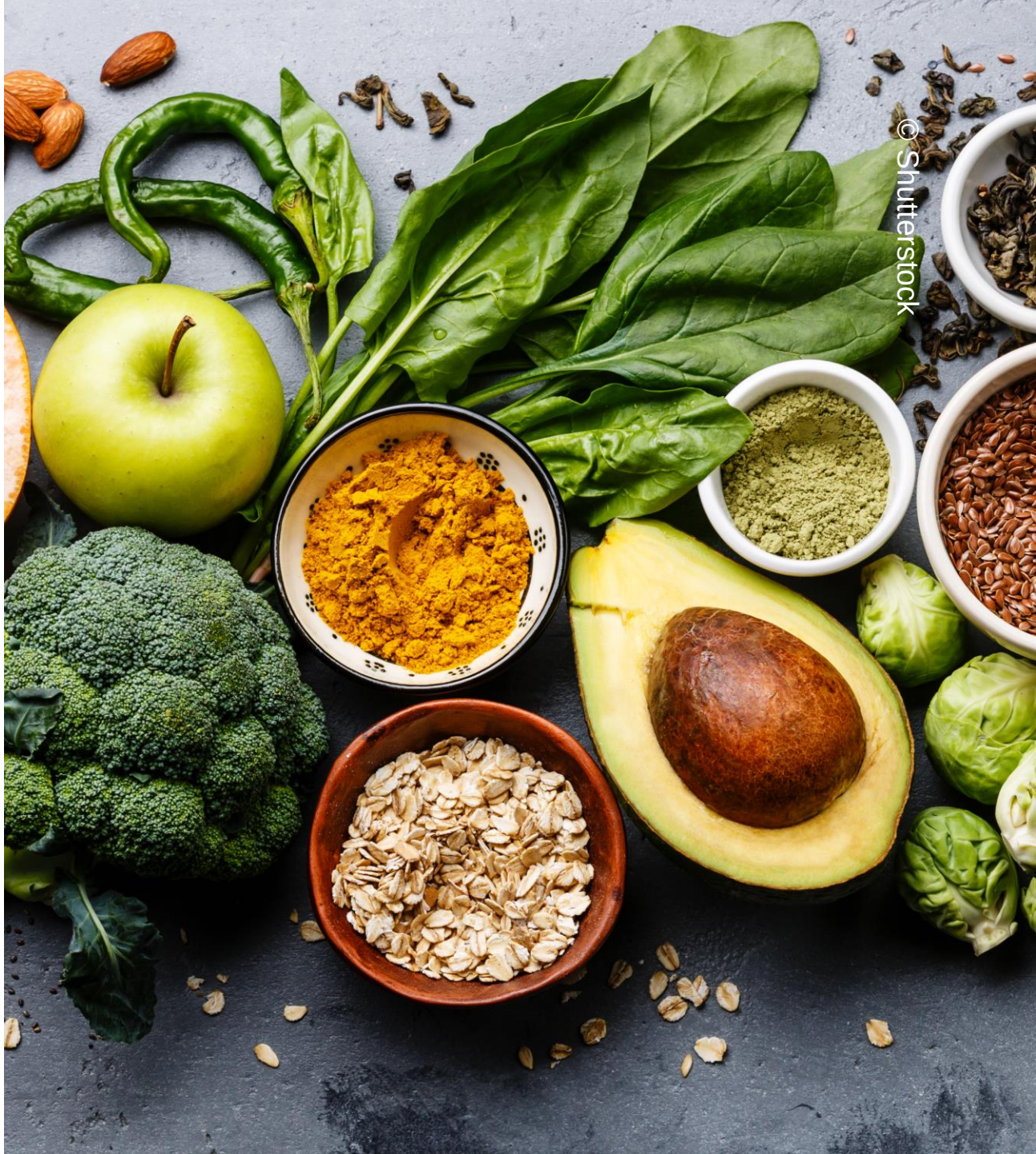


1 Goal – 2 Targets – 5 Strategies

Five Strategies for a Great Food Transformation

Strategy 1

Seek international and national commitment to shift towards healthy diets



“no single actor or breakthrough is likely to catalyze systems change… requires engagement of actors at all scales and in all sectors working towards a shared set of goals”

Healthy food needs to be made more available and accessible

The full range from soft (e.g. information) to hard (e.g. regulations) policy options should be considered and for actions at multiple scales, municipal, cities, national, international.

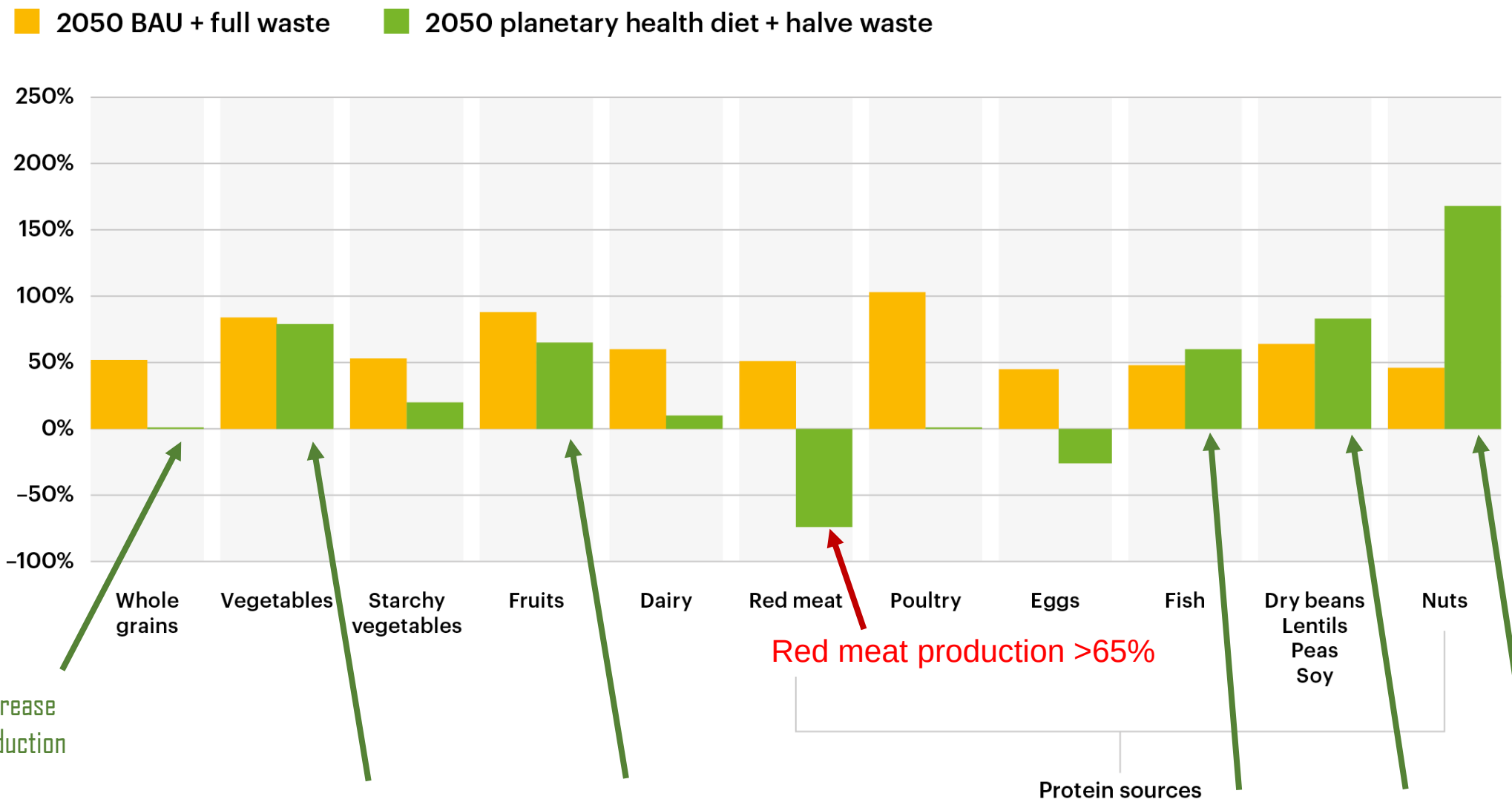
Examples of areas of improvements:

- Information and food marketing
- Investing in public health information and sustainability education
- Implementing dietary guidelines
- Using health care services to deliver dietary advice interventions

Strategy 2

Reorient agricultural priorities from producing high quantities of food to producing healthy food

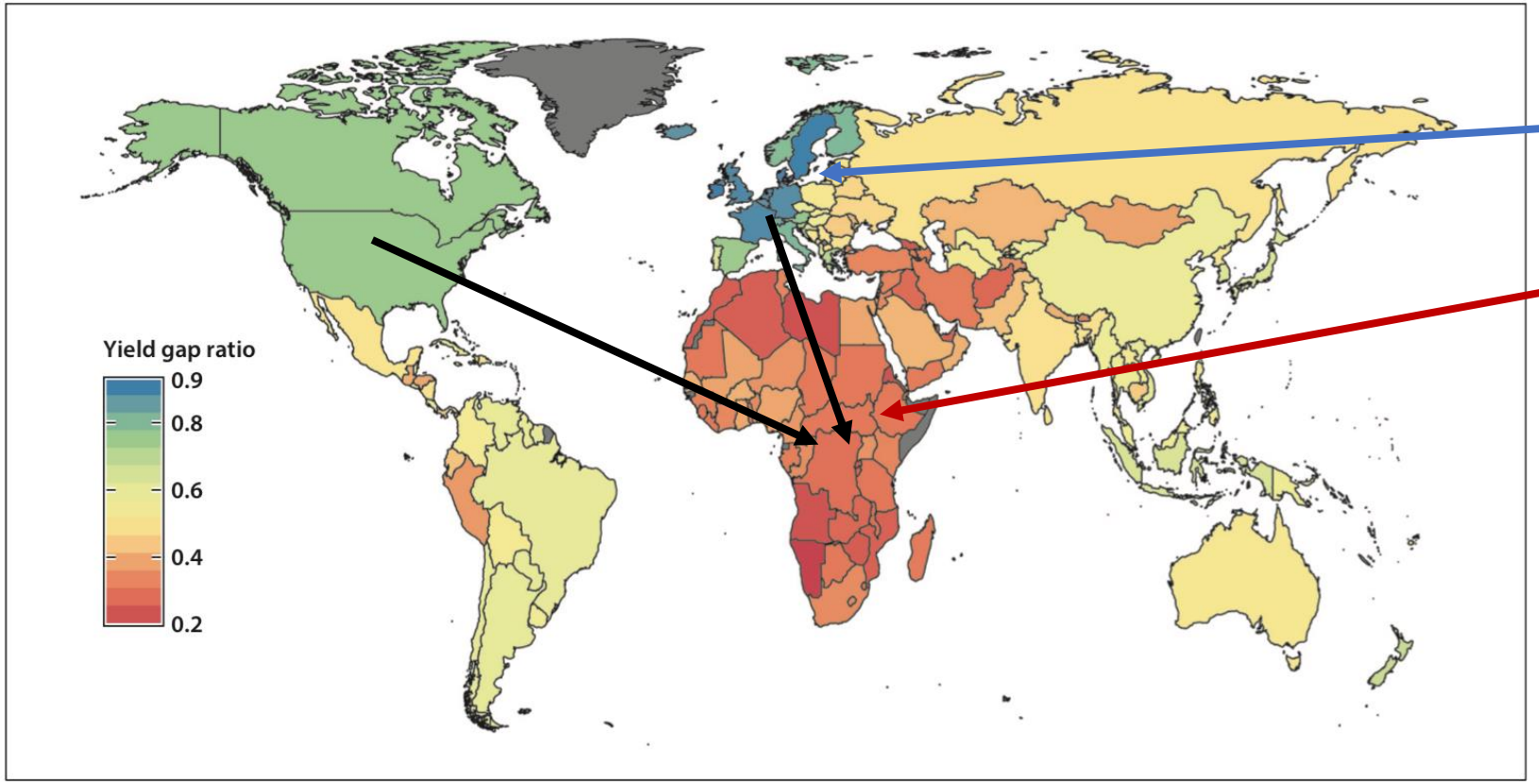
Change in food production. Possible?



Strategy 3

Sustainably intensify food production to increase high-quality output

Yield gap – difference between actual and attainable yields



More sustainability

Sustainable Intensification

Global redistribution of fertilizers (N & P)

Figure 5

Existing crop yield gaps. Shown is the ratio of current yields to potential yields, as estimated by 92 (see also **http://www.yieldgap.org/water-productivity**). A ratio of 0.2 indicates that a nation, on average, has crop yields 20% of what that nation is capable of yielding. Low ratios indicate large yield gaps, or the difference between current yields and potential yields. Countries in gray are missing data on either current yields or potential yields.

Source: Clark et al. 2018 Annual Review of Env. Resour.

Strategy 4

Strong and coordinated governance of land and oceans

Areas of improvement include:

Land:

Protect natural ecosystems

Land expansion only into managed lands

Global coordination to minimize ”deforestation leakage”

Restoration of degraded lands

Oceans:

Harmful subsidies to fisheries removed

Ecosystem based management to protect marine biodiversity

10% of marine areas closed to fisheries

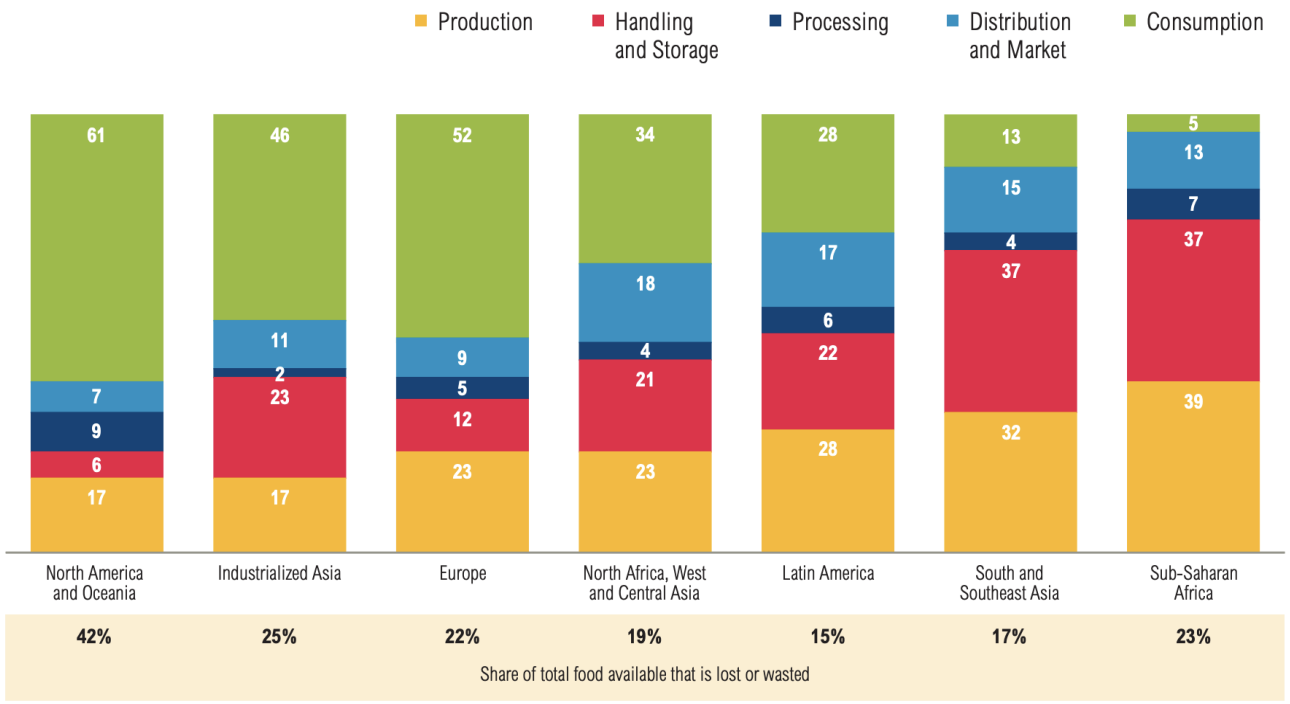
Closure of the high seas to enhance fish stocks

Strategy 5

At least halve food losses and waste, in line with UN Sustainable Development Goals

Areas of improvement include:

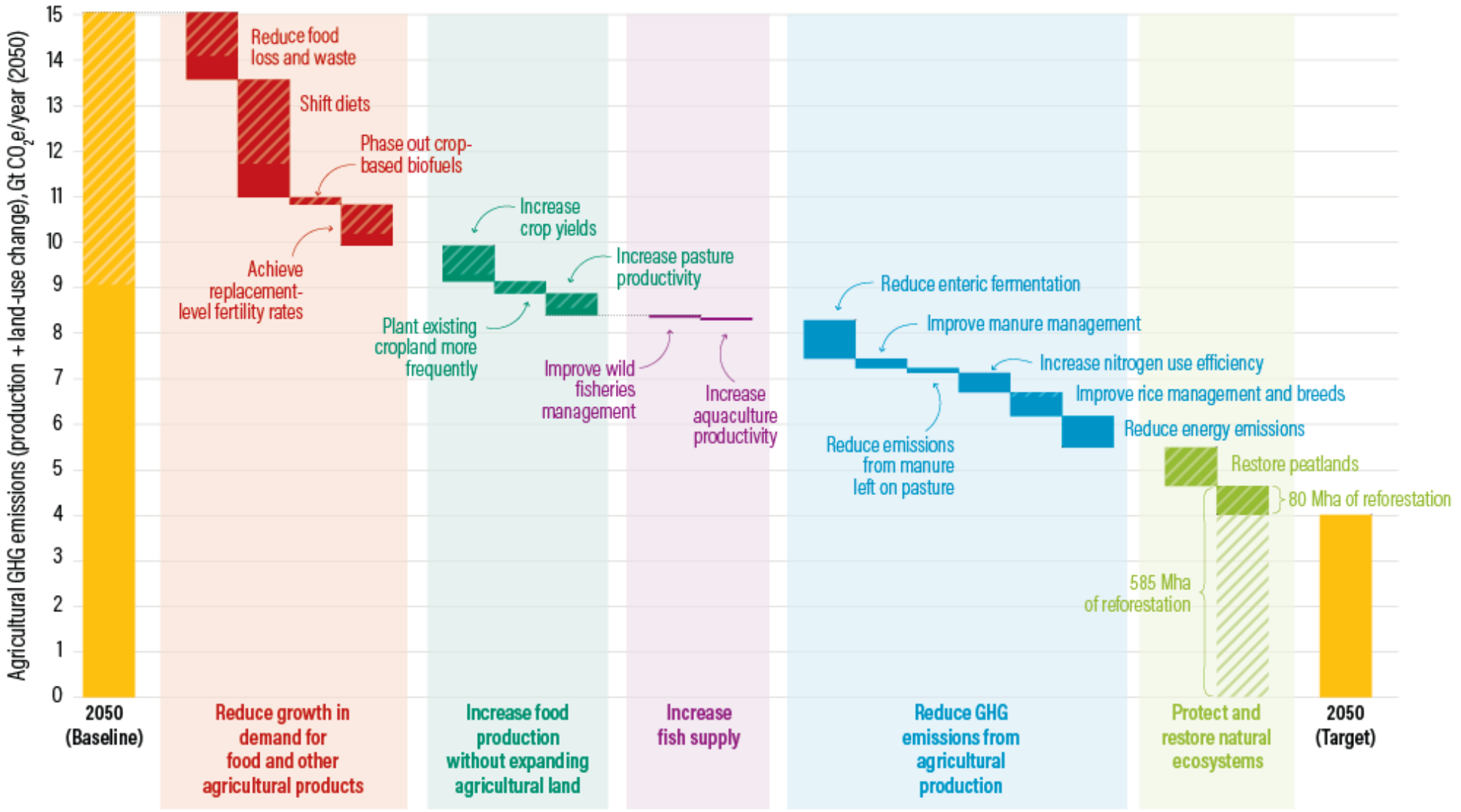
Infrastructure, storage across value chain
Packaging and processing technology
Food labelling, Food safety policies,
Information and education campaigns



In *low income countries* most food loss at production stage

In *high income countries* food loss at consumption stage

World Resources Institute: 5-course menu of solutions



Note: Solid areas represent agricultural production emissions. Hatched areas represent emissions from land-use change.

Source: GlobAgri-WRR model, as presented in Searchinger et al. Creating a Sustainable Food Future, World Resources Institute, 2018

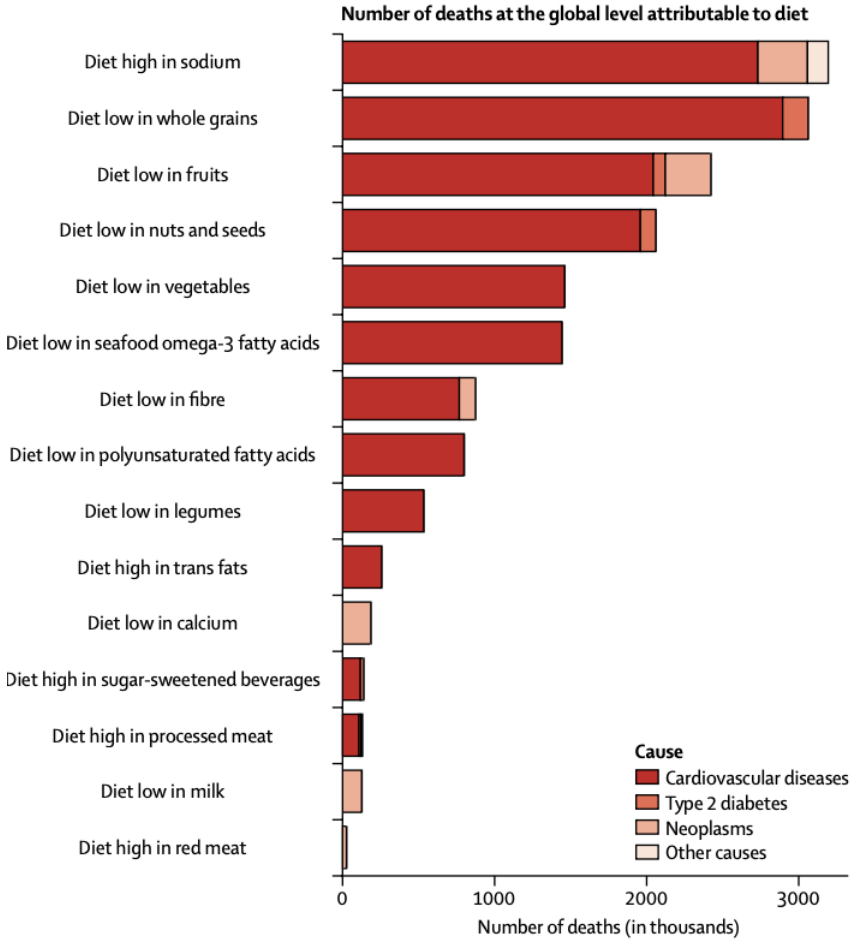
My take:
The need for more nuance…

The EAT Lancet did not…

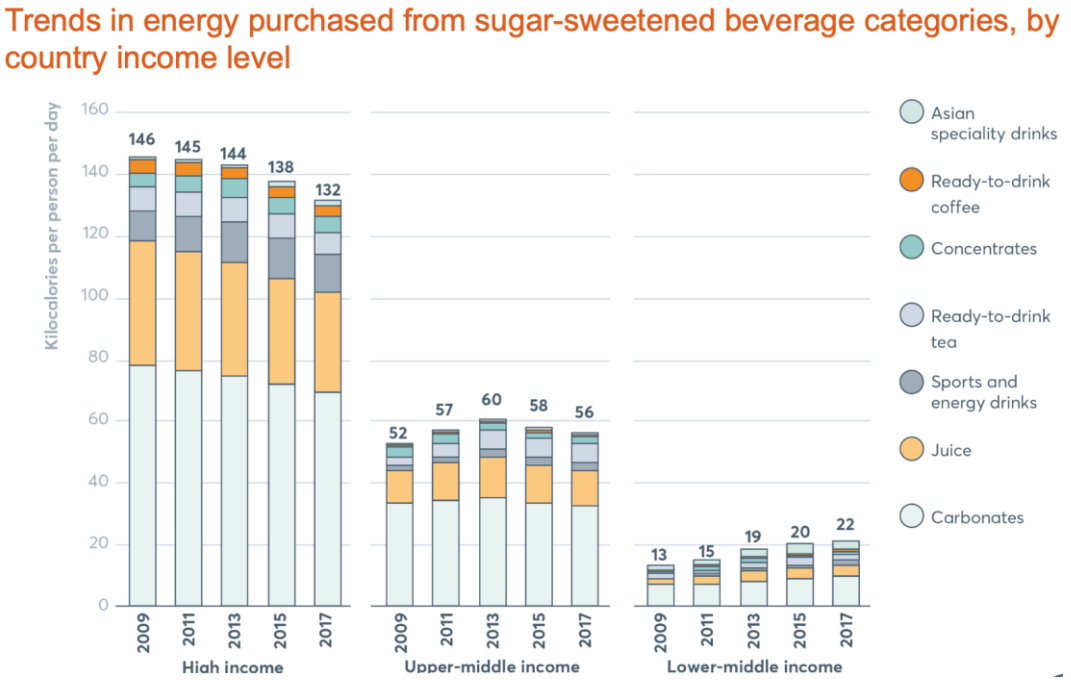
1. Address confusion of sustainable diets and the epidemiology to support
2. Tackle the inequities and the vulnerable in food systems
3. Take on the entirety of food systems
4. Focus on who will feed us and their livelihoods
5. Examine the actors, especially, consumers
6. Consider the local social determinants, and the trade-offs

1. Diet space is complex…and so is disease burden

11 million deaths are attributable to dietary risk factors



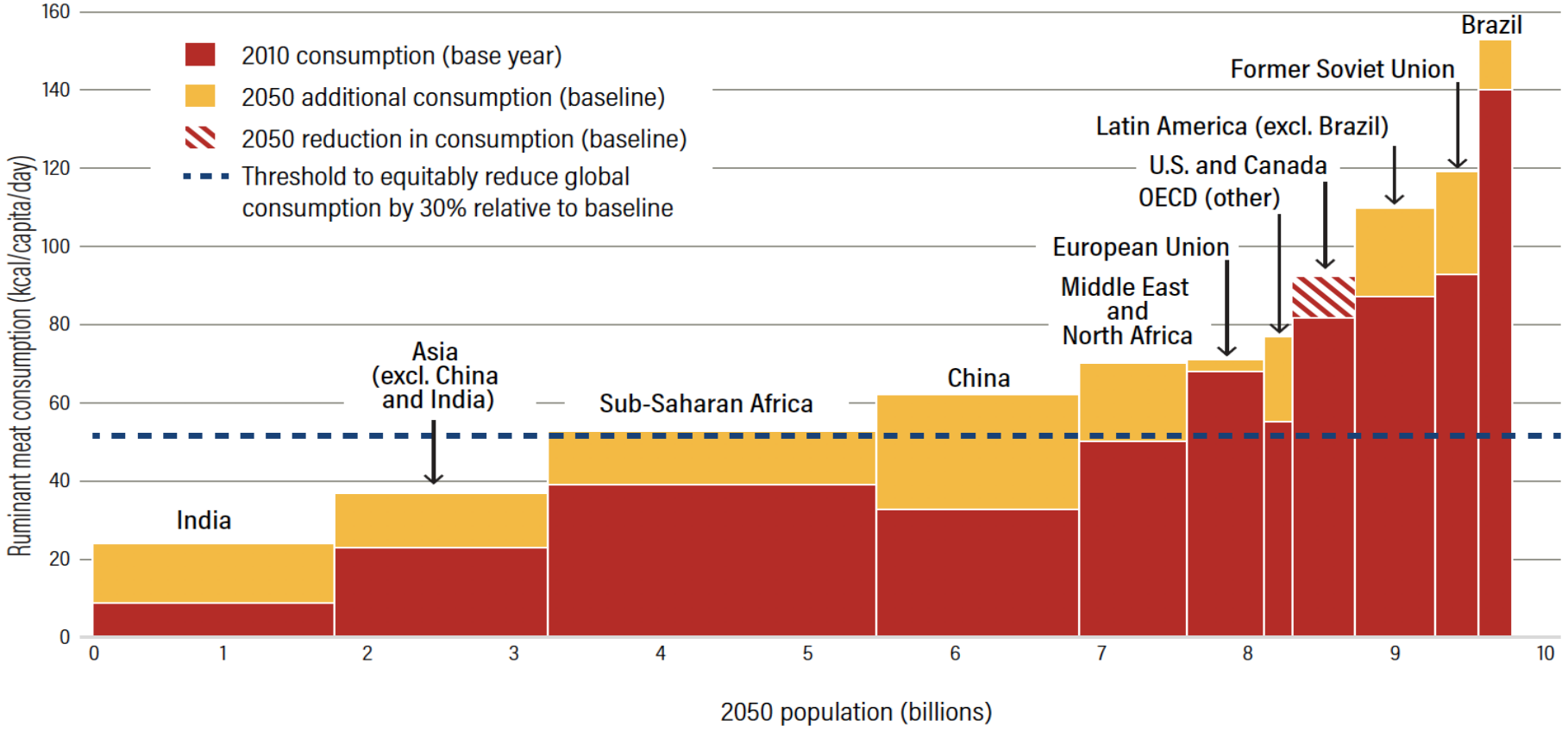
69% packaged foods aren't aligned with healthy diets



Source: GBD 2017 Diet Collaborators. Health effects of dietary risks in 195 countries, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *The Lancet. In Press.* Development Initiatives, Global Nutrition Report 2018.

2. All things are not equal in meat

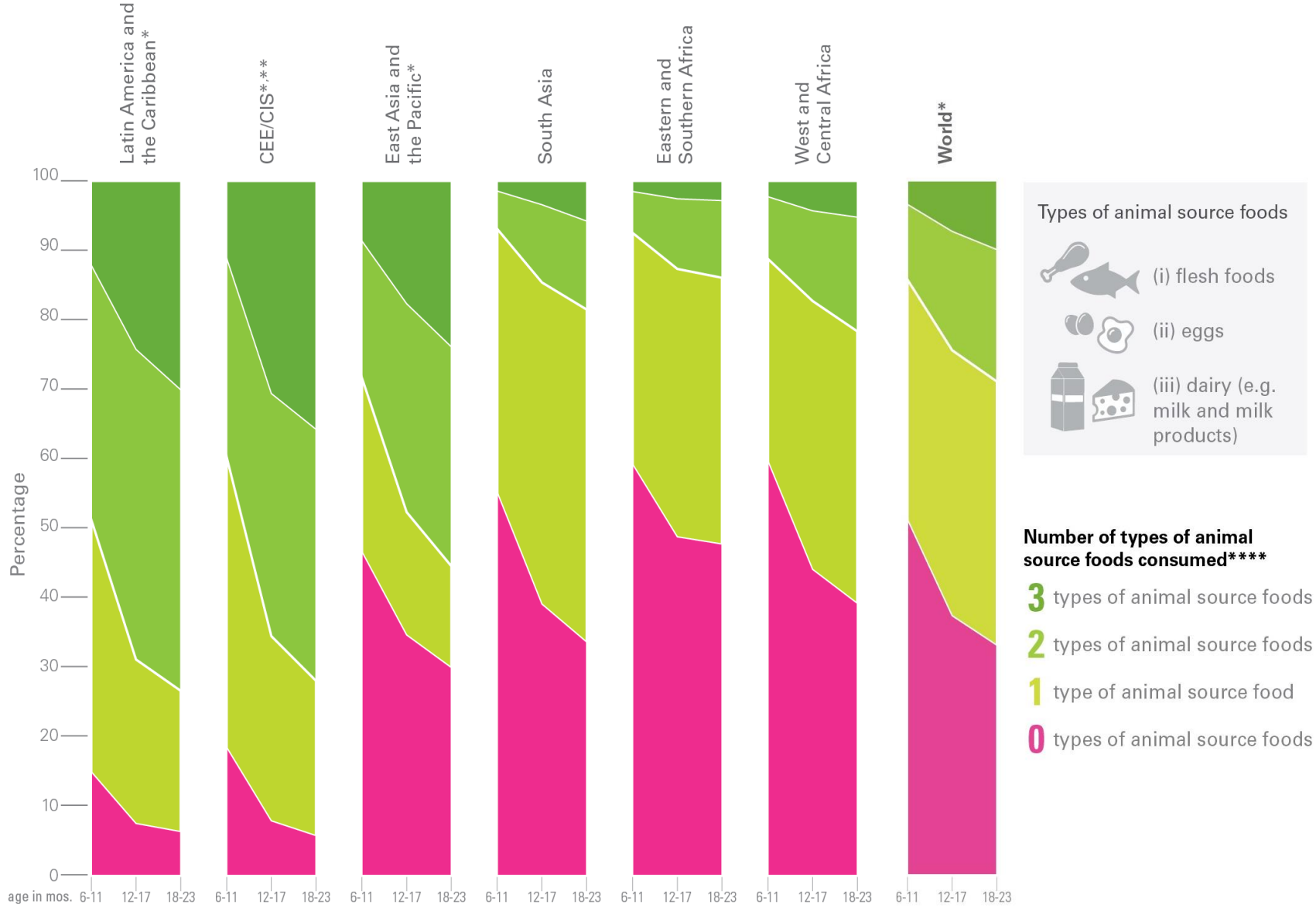
Limiting ruminant meat consumption to 52 calories/person/day in all regions reduces the GHG mitigation gap by half and closes the land gap



Source: GlobAgri-WRR model, with source data from FAO (2017a); UNDESA (2017); FAO (2011b); and Alexandratos and Bruinsma (2012).

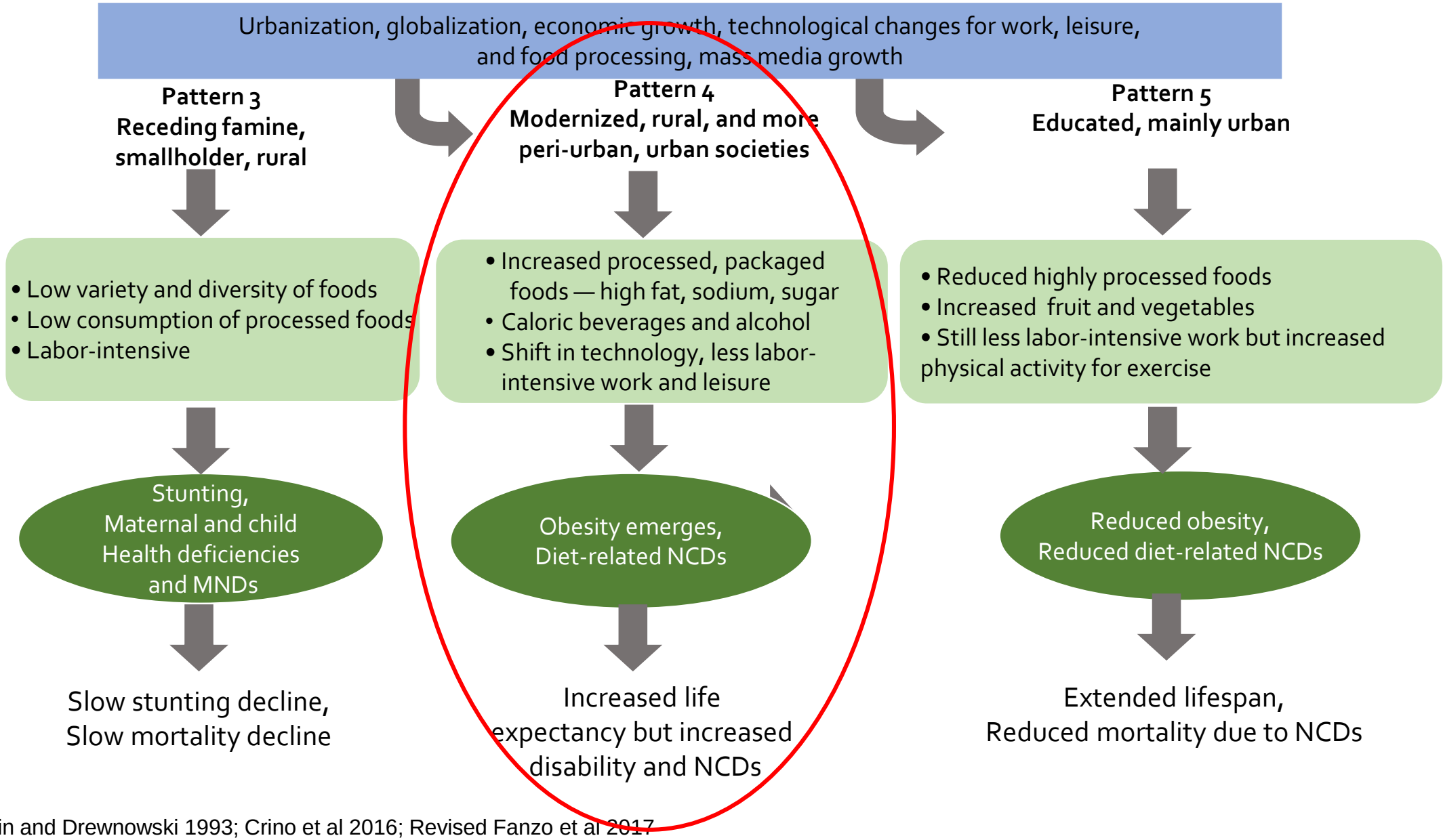
Source: FAO Stat 2018; GlobAgri model with source data from FAO, depicted by Ranganathan et al. 2016. Width of bars represents region's population; WRI Creating a Sustainable Food Futures 2018 Report

Access to animal source foods is highly inequitable



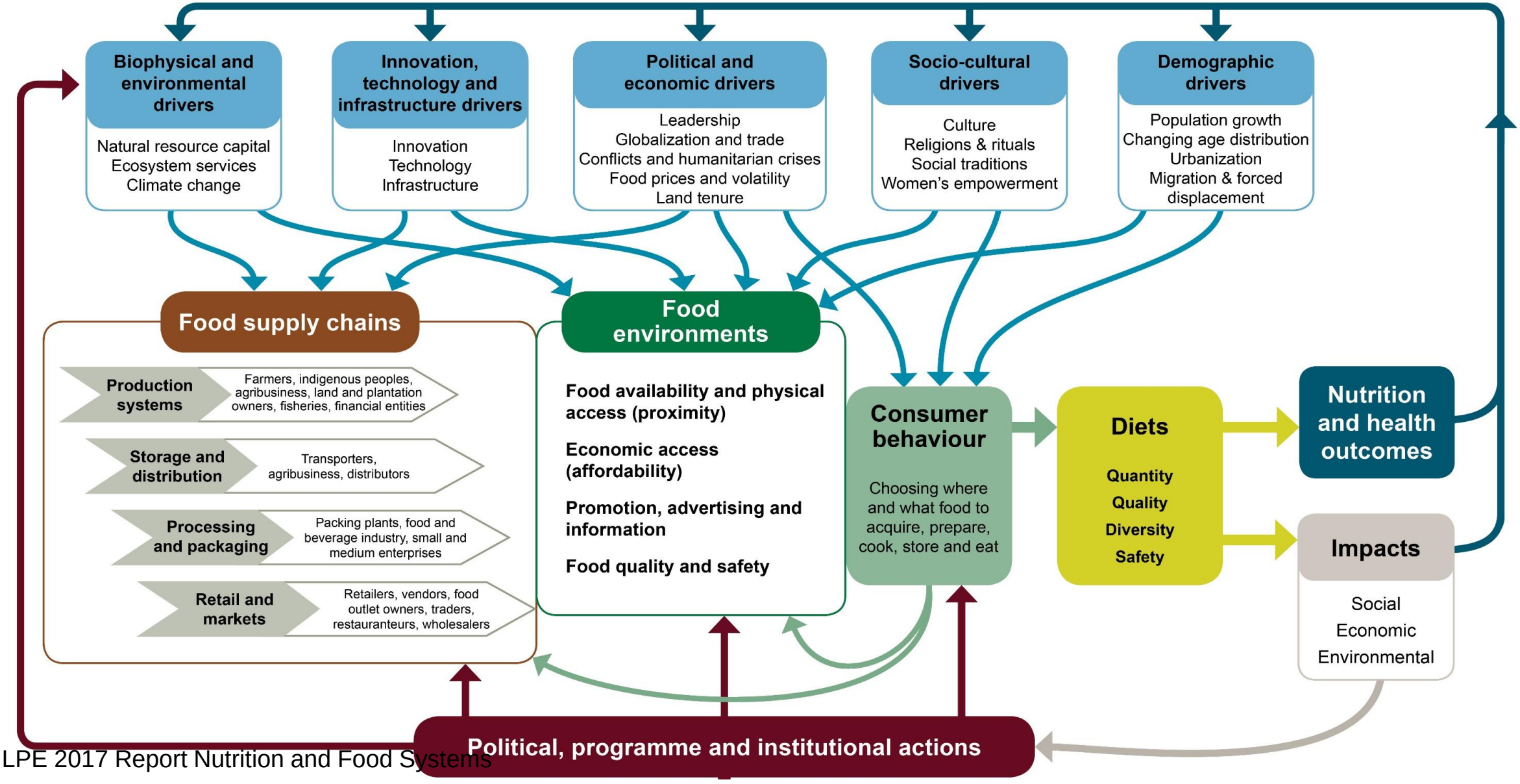
Source: UNICEF 2018 IYCF Indicators: https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding/

Transitions are happening in inequitable ways



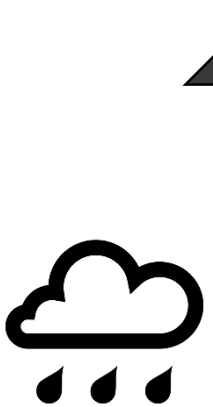
Source: Popkin and Drewnowski 1993; Crino et al 2016; Revised Fanzo et al 2017

3. Disruptions across the entire food system



HLPE 2017 Report Nutrition and Food Systems

Effects of climate change on value chains



• Heat and water stress
• Pests
• Diseases

• Pathogens, mycotoxins
• Cold storage needs

• Food prices

• Consumption
• Intestinal nutrient absorption

Production → Storage → Marketing and Retail → Consumption and Utilization

• Yields
• Nutritional Value

• Food waste

• Food availability

• Nutritional needs

Food chains that are climate-smart AND more nutrition-smart

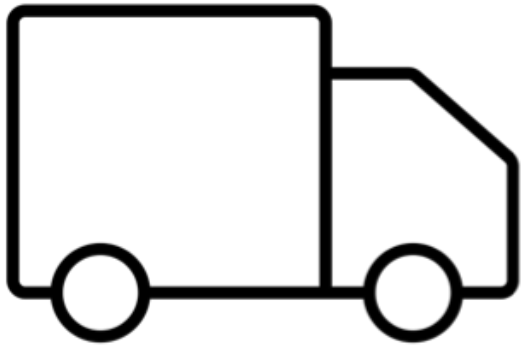
More evidence-based research

AND

Specific guidance

ON

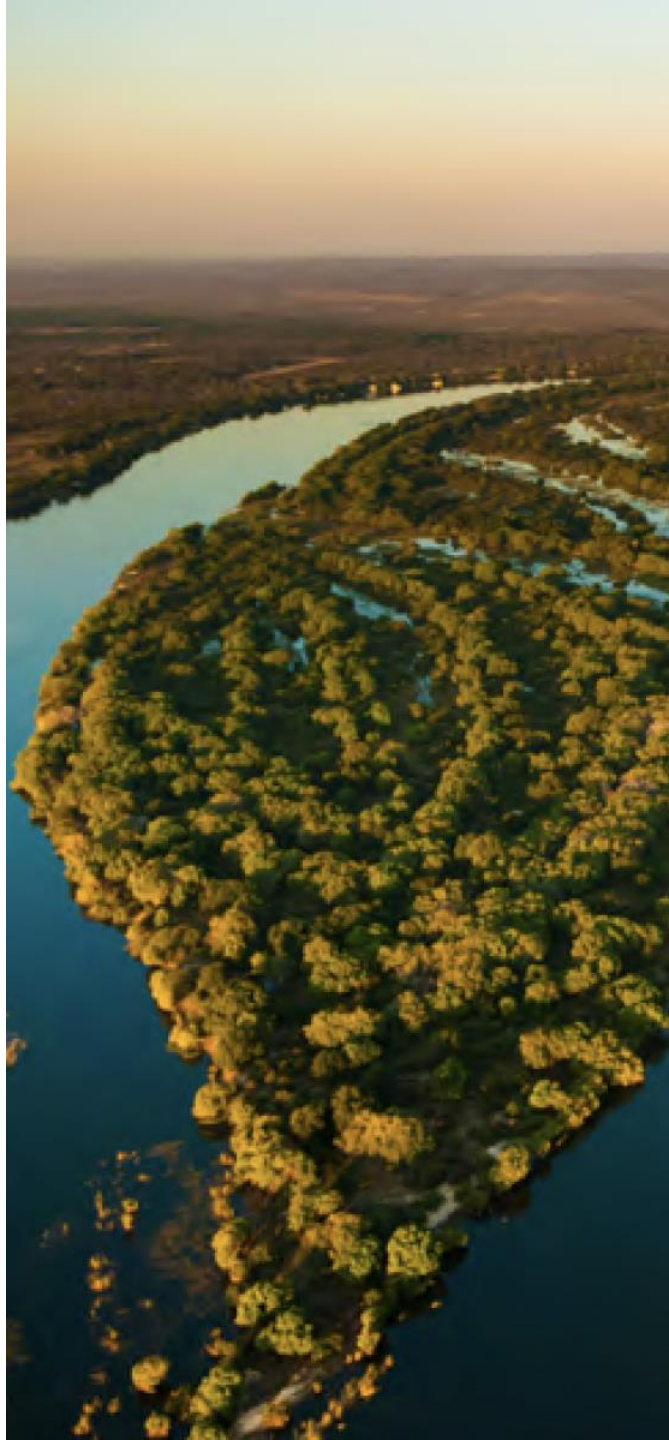
Mitigating and Adapting to CC at EACH step of the food value chain



4. Don’t forget about *who* will continue to feed the world

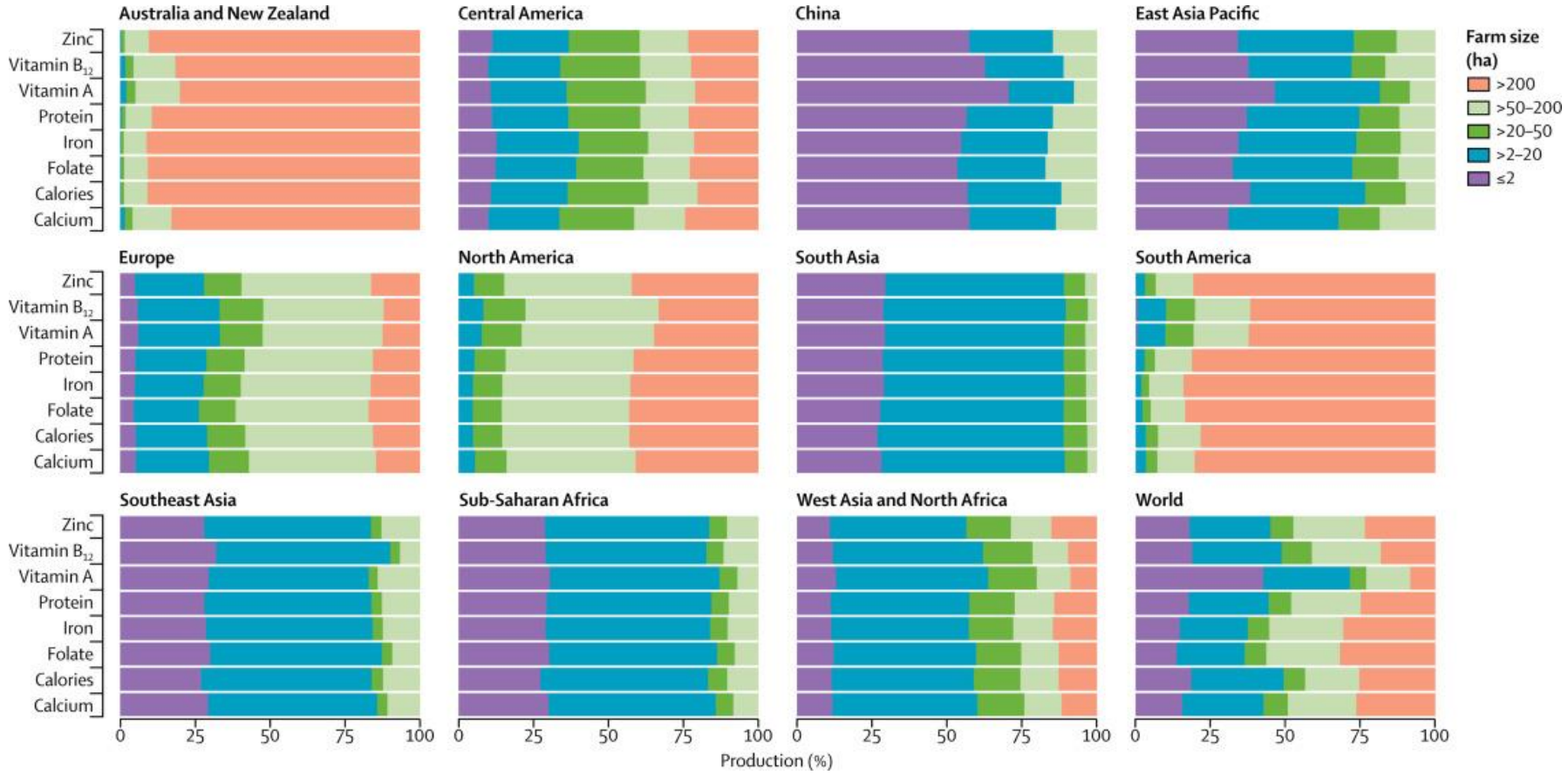
“Twelve thousand years have passed since we began to transform from forager: to settled farmer. It took several thousand years of learning and culture before the transition was nearly complete. The twists of nature that human ingenuity devised have ratcheted up, step by step, our dominance as farmers on the planet. **Now we are transforming from farmers to urbanites. Our newest experiment- to feed massive numbers of people from the work of a few-is just beginning. The outcome is yet to be seen**.”

– *Ruth DeFries, The Big Rachet*



Support Small and Medium Holder Farmers

53-81% of micronutrients in the food supply are produced by small and medium farms. These farms make up 84% of all farms and 33% of the land areas globally and are more predominant in Asia and sub-Saharan Africa



Source: Herrero, M., Thornton, P. K., Power, B., Bogard, J. R., Remans, R., Fritz, S., ... & Watson, R. A. (2017). Farming and the geography of nutrient production for human use: a transdisciplinary analysis. *The Lancet Planetary Health*, *1*(1), e33-e42.

Engage and empower women in on- and off-farm opportunities

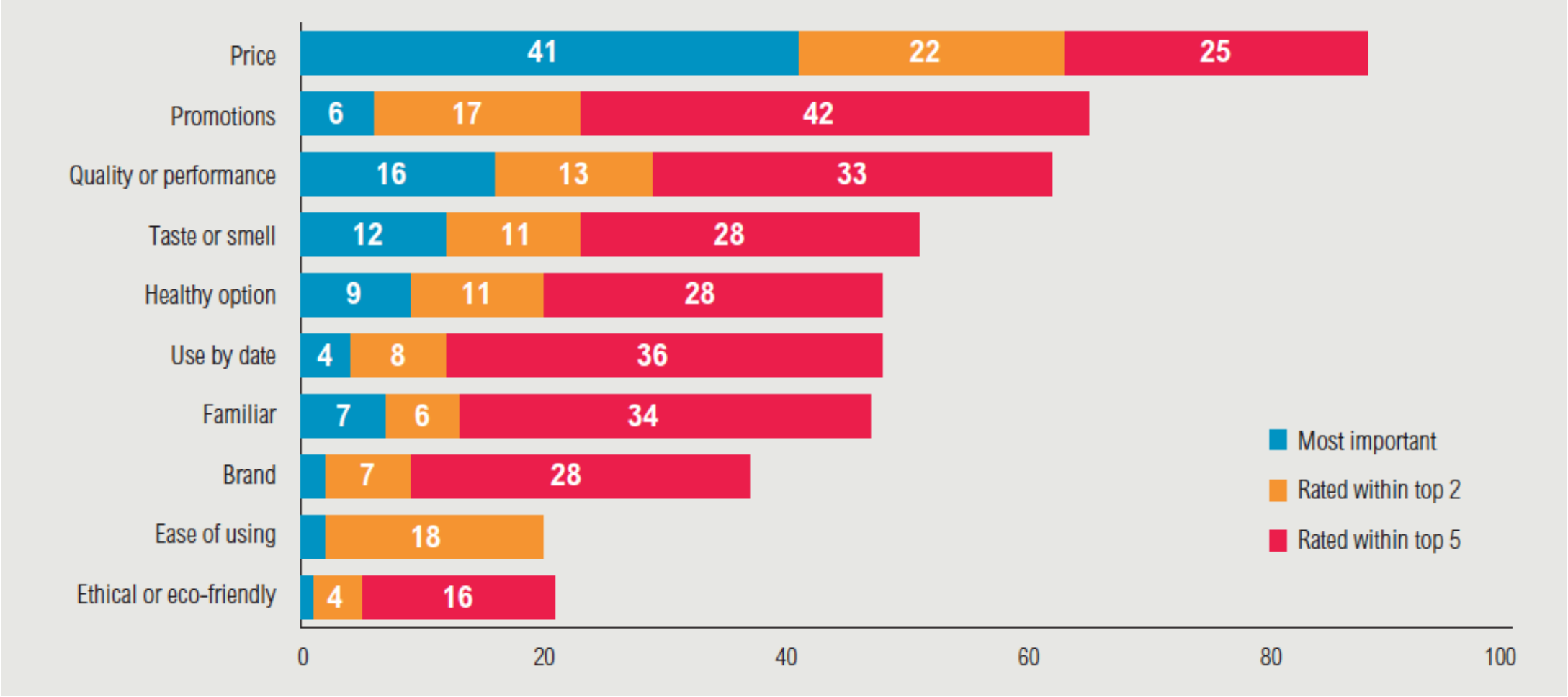
- **Increases in social capital**
  - Means of gaining information and access to new technologies and farming practices
  - Social networks that may be accessed in times of hardship
- **Increases in access to credit**
  - Greater ability to invest in infrastructure and to smooth consumption or production shocks
- **Increases in human capital and access to education, health and nutrition resources and services**

5. Who plays a role? Individuals, industry or state?

- **Don’t leave it to the individual:** There is a lack of evidence for individuals taking action, and attitude-action gaps are evident. Public understanding of the environmental and nutritional impacts of food is low.
- **Don’t leave it to industry goodwill or enlightened self-interest:** Some in the food industry are acting but their efforts alone are not enough.
- **Governments need to govern:** Policy makers need to create a strong regulatory and fiscal framework, and international trade needs to reflect the importance of sustainable healthy diets.
- **CSOs** can cultivate movements, coalitions & networks among citizens and communities.

Price, quality, and taste are important to consumers

Factors influencing consumer product choice, percentage of UK shopper responses



Source: Ranganathan et al. Shifting Diets for a Sustainable Food Future, World Resources Institute, 2016.

Sustainable Alternatives & Reformulations

"Perhaps the main reason nutrition has thrust planetary health into public consciousness is the role of food in culture. Food is essential to life, and diet and culture form the very fabric of life."

-- Editors, Lancet Planetary Health "More than a diet."

6. Consider the local context and its determinants and the trade-offs

We must address the underlying ***social determinants*** that impact our health and the planet. Every country is impacted by poverty but its determinants may be different, or the same…

Racial disparities
Incarceration & gun violence
Drugs and alcohol abuse
Food insecurity
Obesity and diabetes

Tribal disparities
Social unrest & border conflict
Herb abuse
Food and water insecurity
Stunting and wasting

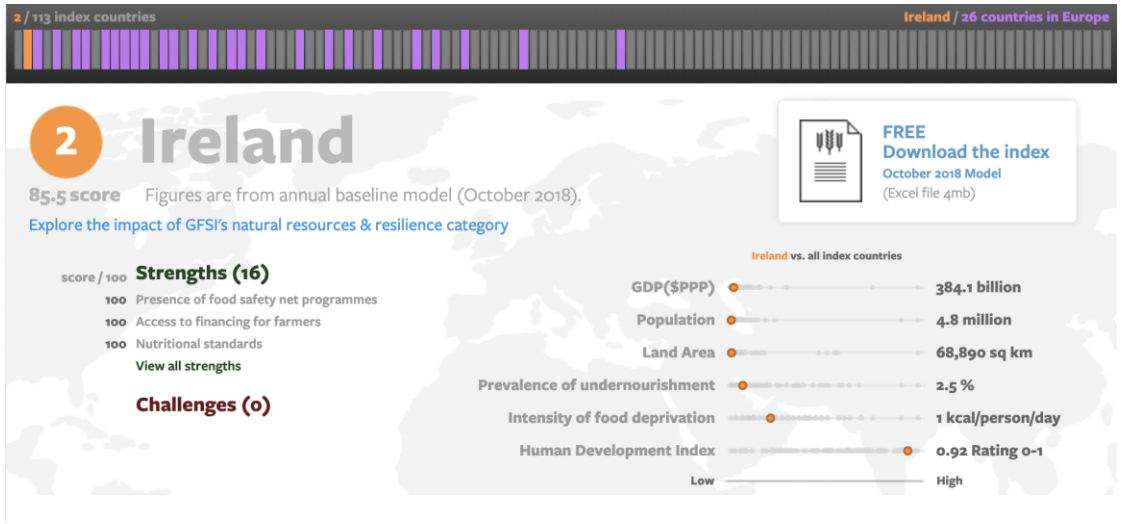
An exceptionally murderous city

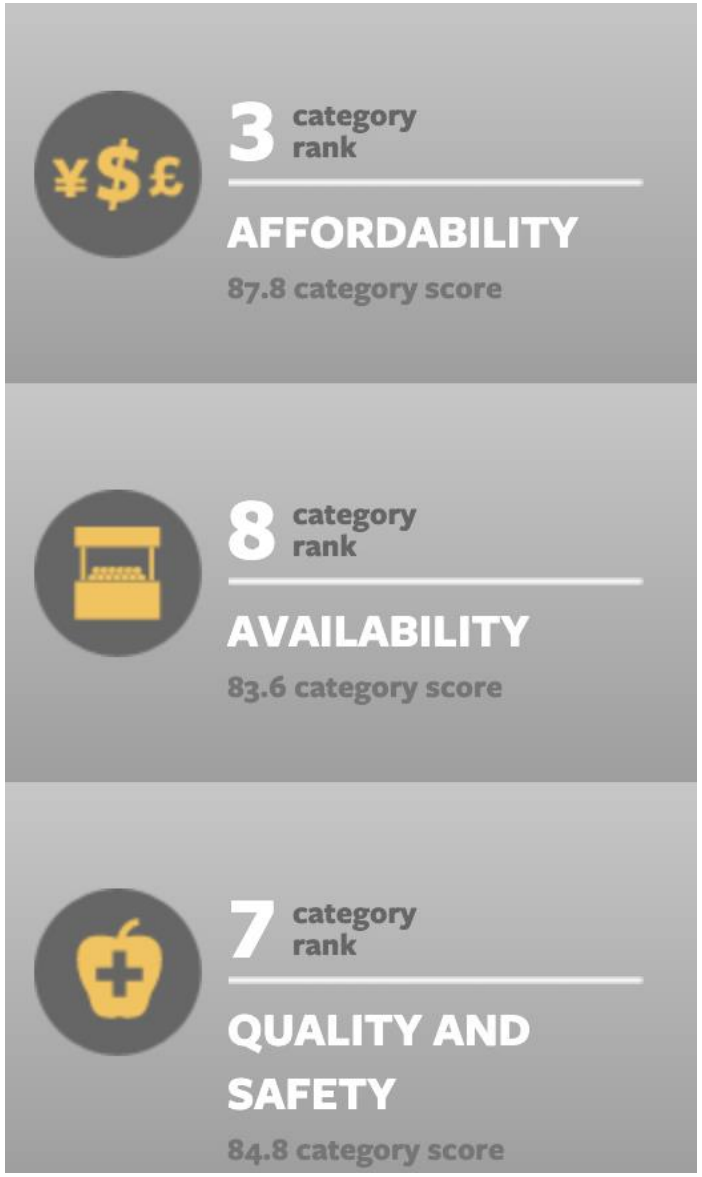
Crime and despair in Baltimore

As America gets safer, Maryland's biggest city does not

What does it all mean for Ireland?

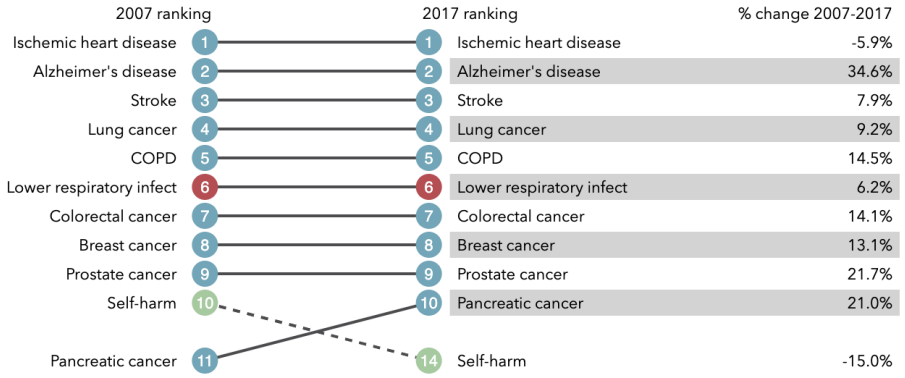
Global Food Security Index of Ireland



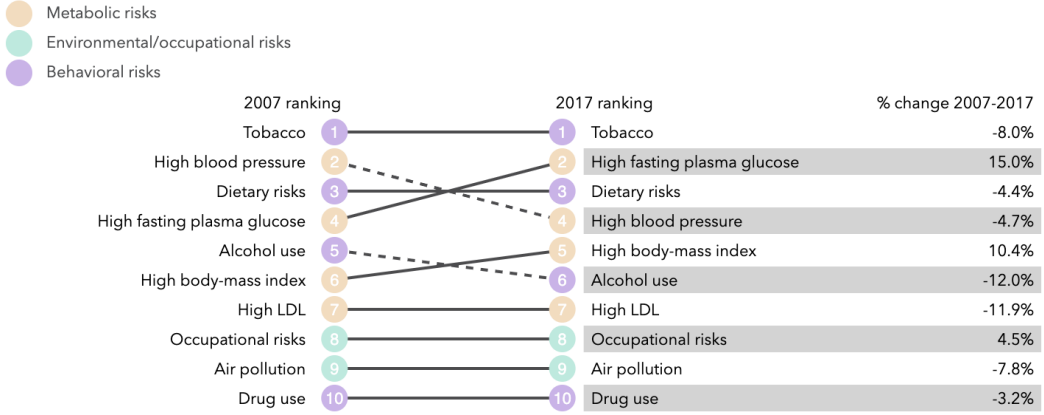


Burden of disease and risk factors for Ireland

What causes the most deaths?



What risk factors drive the most death and disability combined?

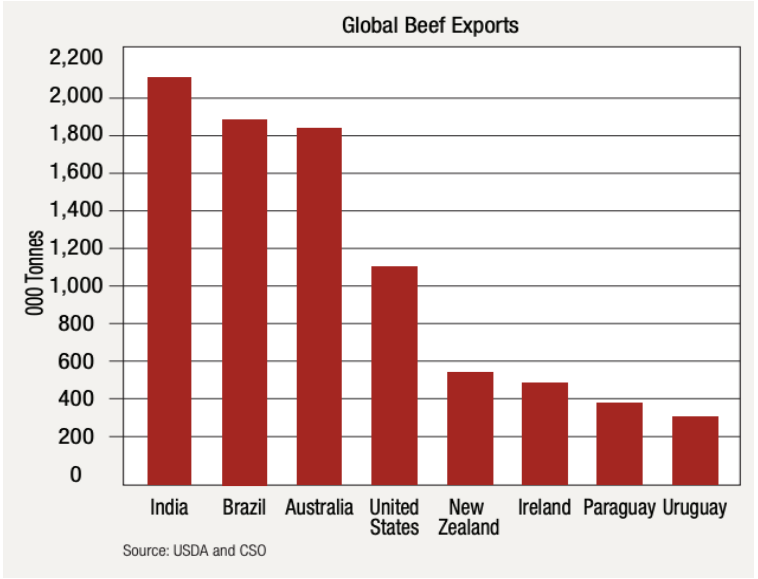


By 2050 Irish agriculture would become “carbon neutral”

- **The plan is to grow the national herd.** By 2030 there will be a 22% increase in dairy cows. Why? Important Irish agriculture output economically, employs a significant amount of people.

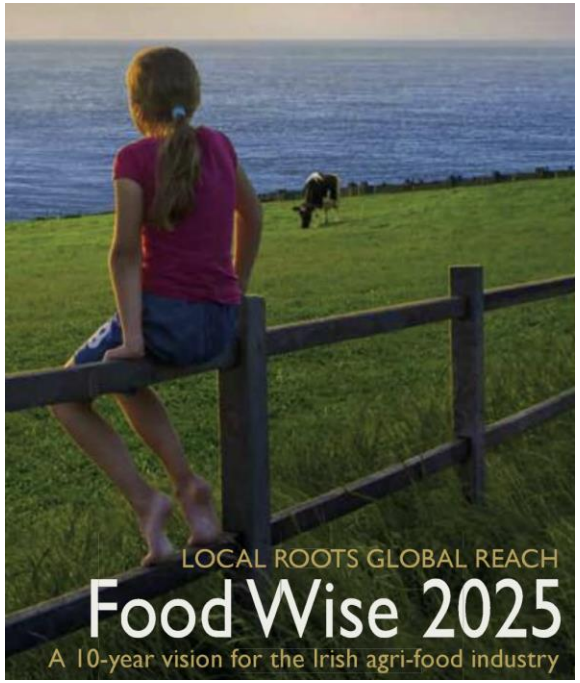
- **More cows = more grass**. To stimulate grass growth, farmers spread synthetic fertilisers; a source of nitrous-oxide.

- **What to do?** Decrease the herd? Technology to reduce methane? Store carbon – in trees, peatlands and grasslands? Use artificial fertilisers? Convert to more bioenergy, more on-farm renewables, more forestry, more restoration of wetlands?



Sustainable Food Systems *Ireland*

A partnership of Irish Government agencies



Food Harvest 2020.

A vision for Irish agri-food and fisheries

Origin Green IRELAND

THE IRISH TIMES

Sun, Apr 21, 2019

The Irish Times view: Making our diets more sustainable

The change called for by a recent 'Lancet' paper is enormous, but it does highlight key issues

Mon, Jan 21, 2019, 05:00

Climate change: Plotting an action plan for Ireland

Political bickering threatens to overshadow Oireachtas committee's radical proposals

Sat, Mar 30, 2019, 06:15

Harry McGee Political Correspondent

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March for Climate Change: students on their way to Leinster House on March 15th. Photograph: Nick Bradshaw

Conclusion

Without a transformation of the global food system, the world risks failing to meet the UN Sustainable Development Goals (SDGs) and the Paris Agreement and the data are both sufficient and strong enough to warrant immediate action.

Widespread multi-sector, multi-level action is needed including: a substantial global shift toward healthy dietary patterns; large reductions in food loss and waste; and major improvements in food production practices.

Thank you!

@jessfanzo