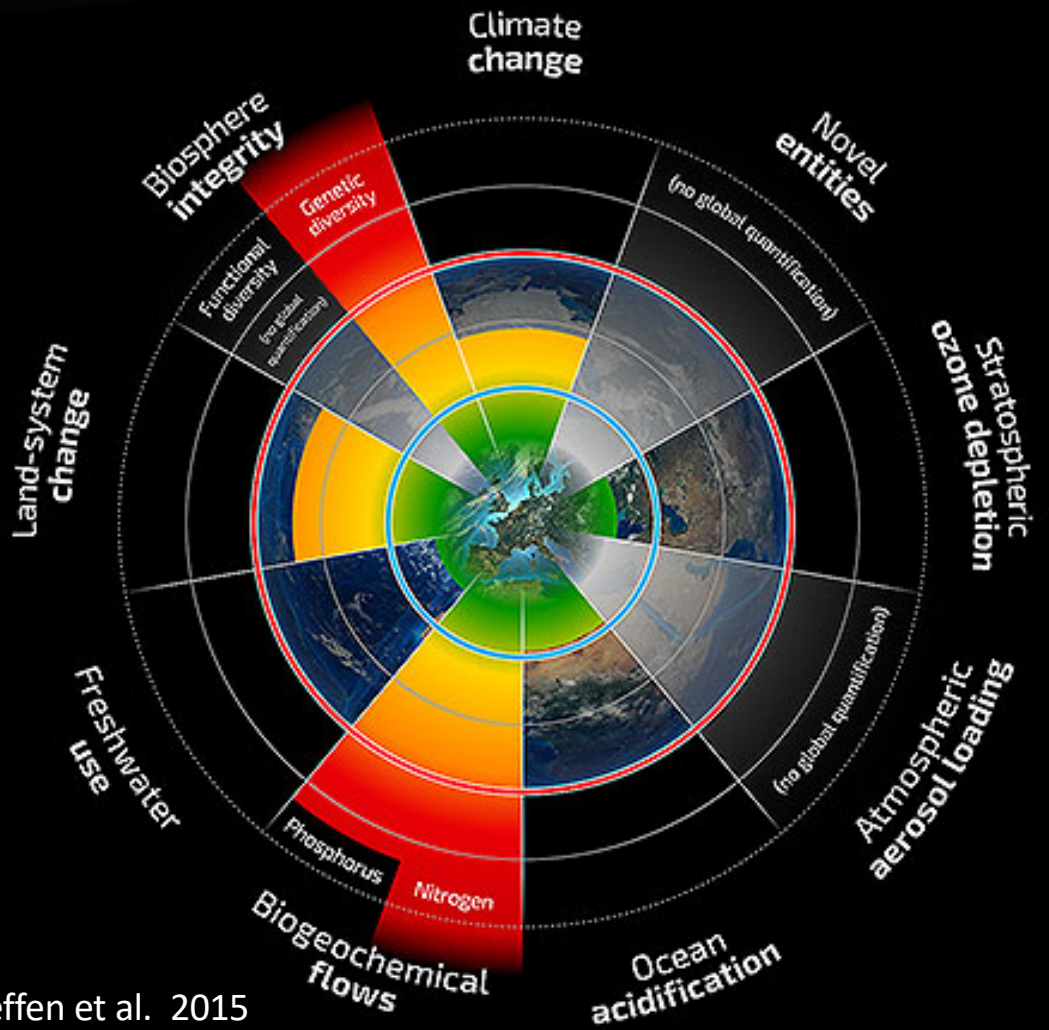
Foodprint: Understanding the Connections Between Food and the Environment

Session 1

Food and the Planetary Boundaries

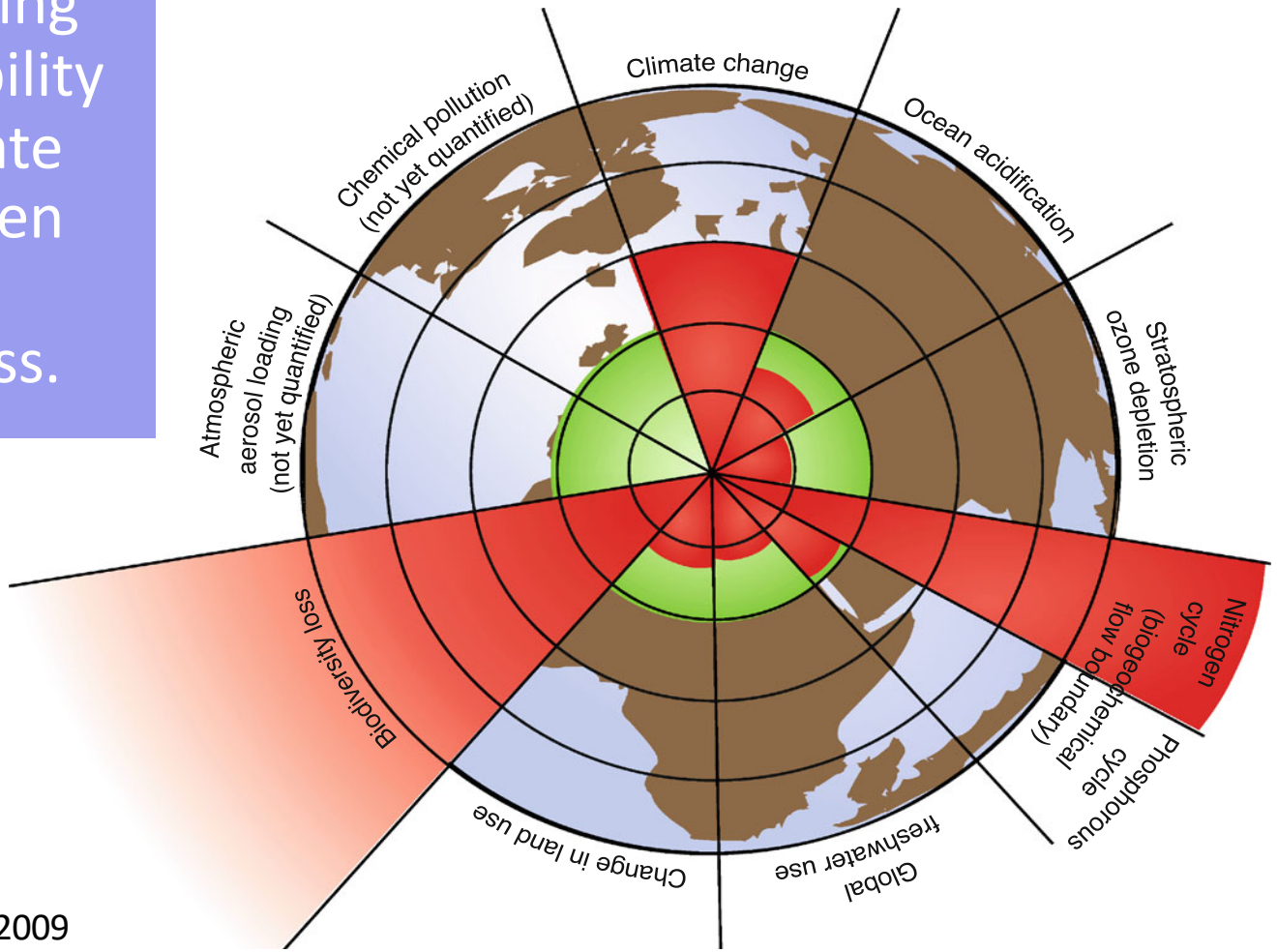
Planetary Boundaries: A Safe Operating Space for Humanity



Source: Steffen et al. 2015

We are already exceeding global sustainability limits for climate change, nitrogen and phosphorus cycling, land use change, and biodiversity loss.

As of 2009, we were already exceeding global sustainability limits for climate change, nitrogen cycling, and biodiversity loss.



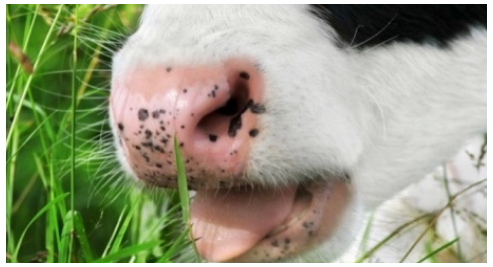
Source: Rockstrom et al, Nature, 2009

Food plays a major role in environmental sustainability:

70% of freshwater use is for agriculture.

Biodiversity loss is driven primarily by habitat loss, climate change, and pollution.

Chemical pollution

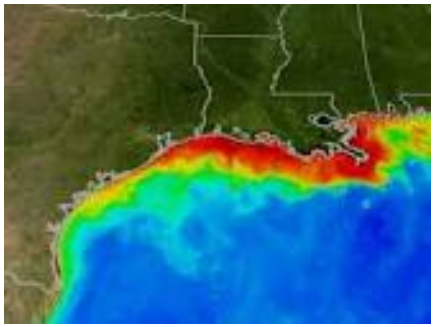


14-18% of global greenhouse gases derive from livestock alone. (U.N.)

50% of US land is used for agriculture.

Antibiotic resistance is rising.

By far, the largest source of nitrogen pollution is fertilizer.



Can we feed 10 billion people healthy diets within the planetary boundaries?

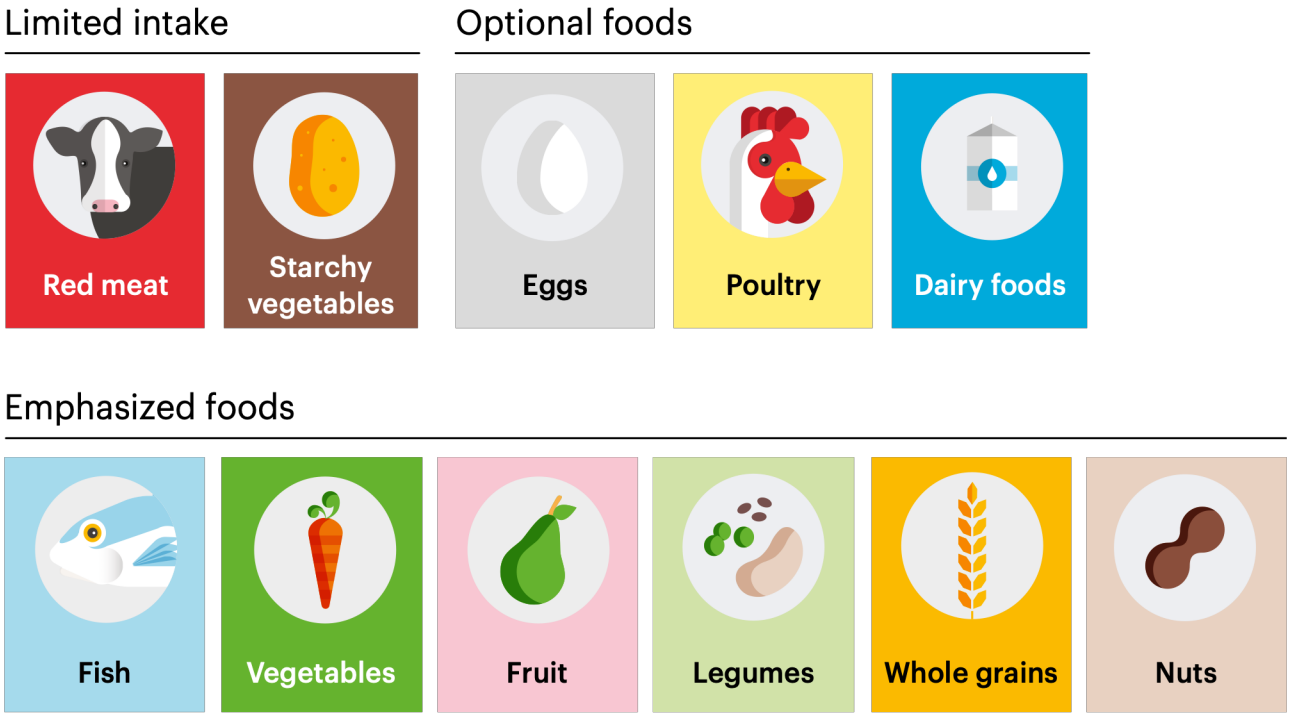
Willett et al. 2019. Food Planet Health. Healthy diets from sustainable food systems.

Figure 1

An integrated agenda for food in the Anthropocene recognizes that food forms an inextricable link between human health and environmental sustainability. The global food system must operate within boundaries for human health and food production to ensure healthy diets from sustainable food systems for nearly 10 billion people by 2050.

Food systems link health and environmental sustainability.

For each food group, a health-based target was set



Willett et al. 2019. Food Planet Health. Healthy diets from sustainable food systems.

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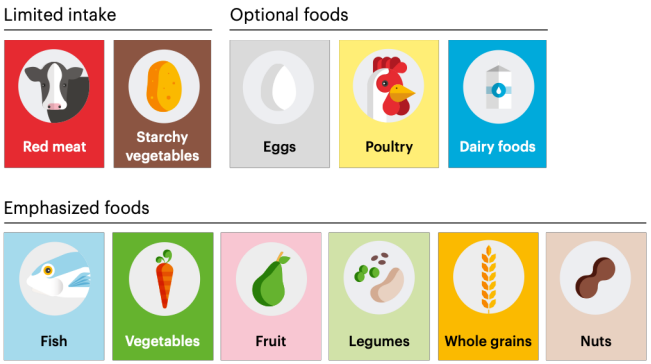
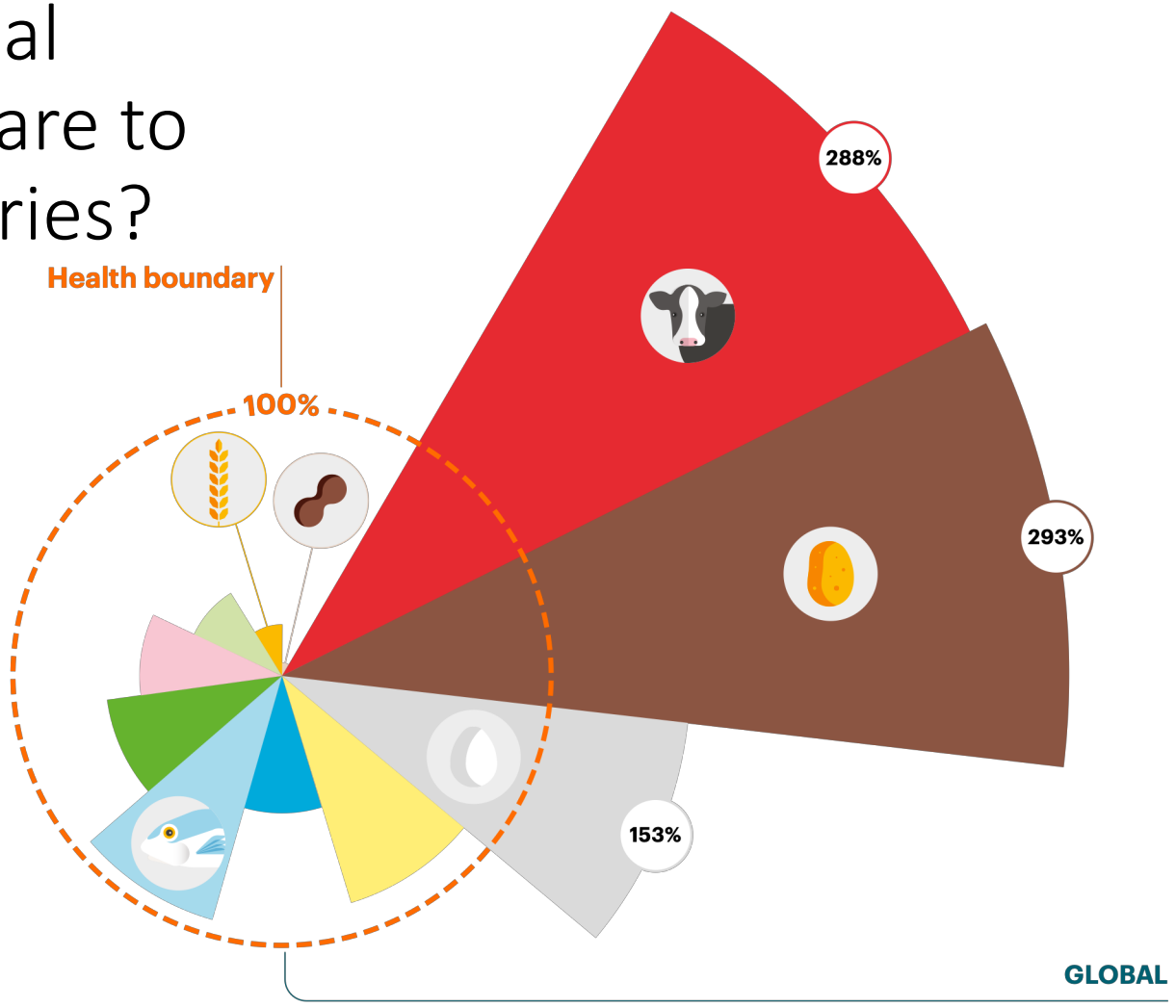
	Macronutrient intake grams per day (possible range)	Caloric intake kcal per day
Whole grains		
Rice, wheat, corn and other	**232**	**811**
Tubers or starchy vegetables		
Potatoes and cassava	**50** (0–100)	**39**
Vegetables		
All vegetables	**300** (200–600)	**78**
Fruits		
All fruits	**200** (100–300)	**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**

Table 1
Scientific targets for a planetary health diet, with possible ranges, for an intake of 2500 kcal/day.

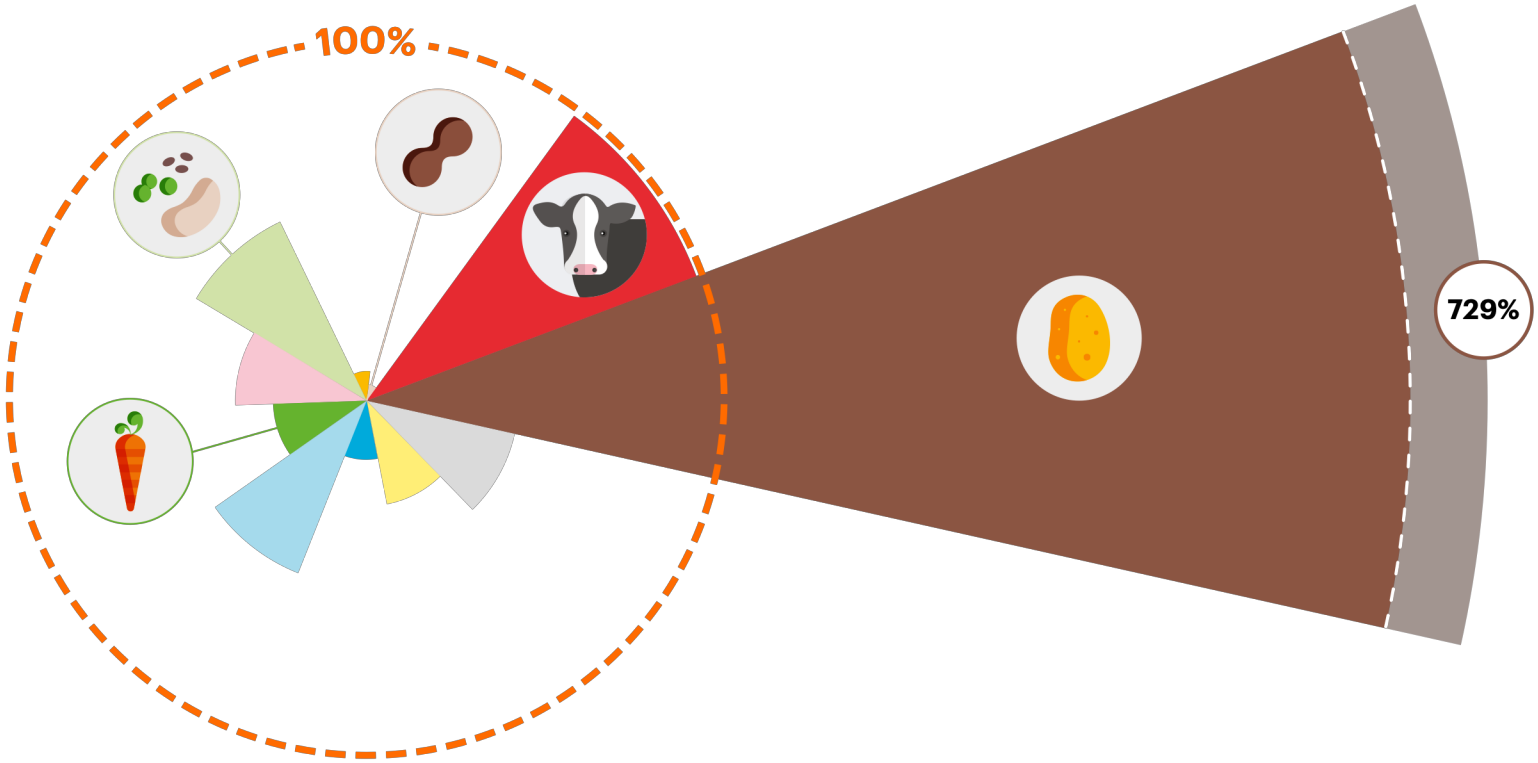
How does the global average diet compare to the health boundaries?





Willett et al. 2019.
Food Planet Health.
Healthy diets from sustainable food systems.

How does the Sub-Saharan Africa average diet compare to the health boundaries?



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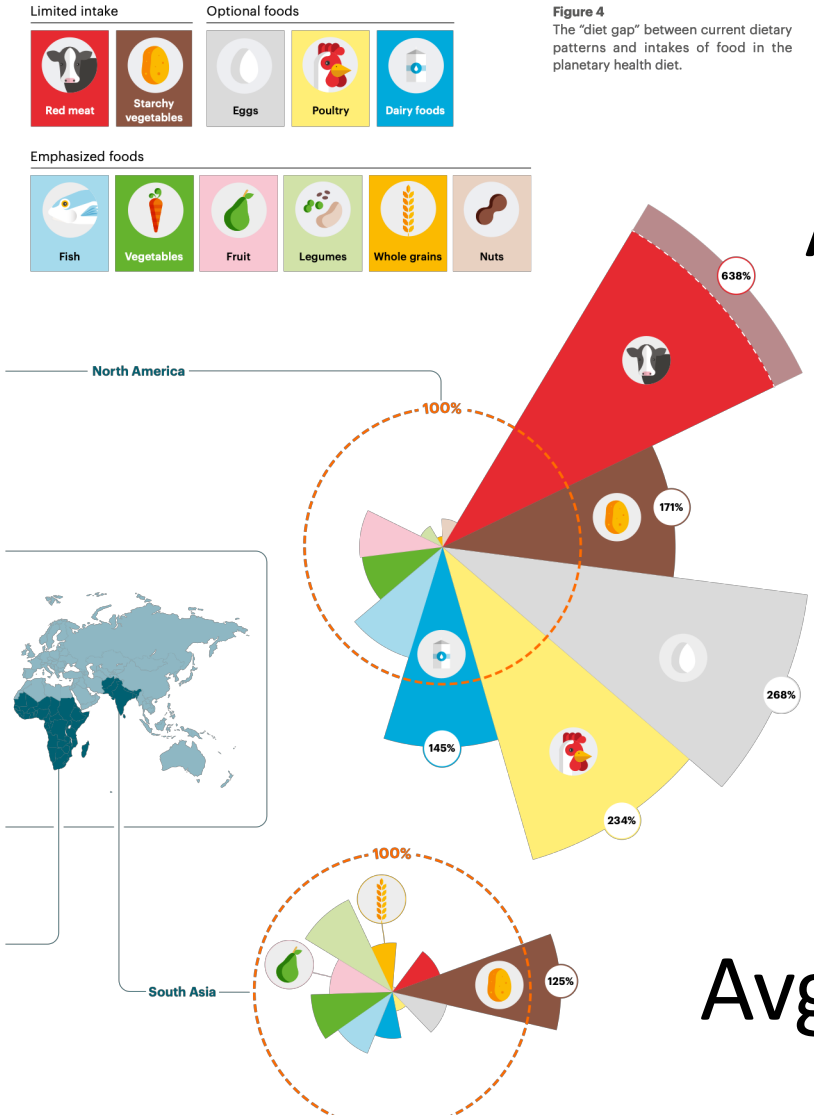

Figure 4
The "diet gap" between current dietary patterns and intakes of food in the planetary health diet.

Avg. North American diet

Willett et al. 2019. Food Planet Health. Healthy diets from sustainable food systems.

Avg. South Asian diet

Each row is a scenario. Variations in production, waste, and diet are modeled for sustainability.

Production	Waste	Diet	GHG emissions	Cropland use	Water use	Nitrogen application	Phosphorus application	Biodiversity loss
Food production boundary			5.0 (4.7–5.4)	13 (11.0–15.0)	2.5 (1.0–4.0)	90 (65.0–140.0)	8 (6.0–16.0)	10 (1–80)
Baseline in 2010			5.2	12.6	1.8	131.8	17.9	100–1000
Production (2050)	Waste (2050)	Diet (2050)						
BAU	Full waste	BAU	9.8	21.1	3.0	199.5	27.5	1,043
BAU	Full waste	Dietary shift	5.0	21.1	3.0	191.4	25.5	1,270
BAU	Halve waste	BAU	9.2	18.2	2.6	171.0	23.2	684
BAU	Halve waste	Dietary shift	4.5	18.1	2.6	162.6	21.2	885
PROD	Full waste	BAU	8.9	14.8	2.2	187.3	25.5	206
PROD	Full waste	Dietary shift	4.5	14.8	2.2	179.5	24.1	351
PROD	Halve waste	BAU	8.3	12.7	1.9	160.1	21.5	50
PROD	Halve waste	Dietary shift	4.1	12.7	1.9	151.7	20.0	102
PROD+	Full waste	BAU	8.7	13.1	2.2	147.6	16.5	37
PROD+	Full waste	Dietary shift	4.4	12.8	2.1	140.8	15.4	34
PROD+	Halve waste	BAU	8.1	11.3	1.9	128.2	14.2	21
PROD+	Halve waste	Dietary shift	4.0	11.0	1.9	121.3	13.1	19

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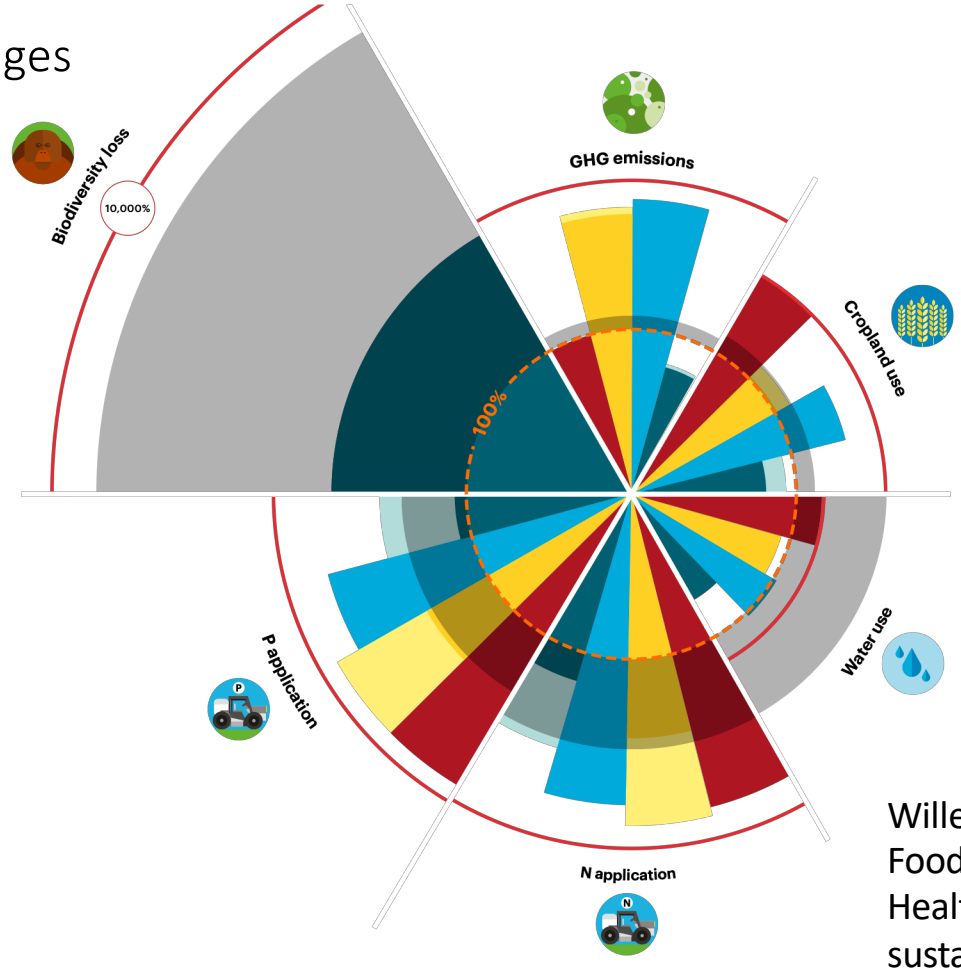
Sustainability of scenarios shown in different color wedges

- Baseline projections of environmental pressures in 2050
- **Dietary Shift**
  Planetary Health Diet
- **Halve waste**
  Reduced food loss and waste
- **PROD**
  Improved production practices
  Standard level of ambition
- **PROD+**
  Improved production practices
  High level of ambition
- **COMB**
  Combination of actions
  Standard level of ambition
- **COMB+**
  Combination of actions
  High level of ambition



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Some varieties of chocolate are currently threatened by climate change!

Why buy Fair Trade?

Environmental Sustainability

Justice for farmers

What do the circles look like to you?