



# People, Planet, Prosperity: Getting our Food Systems Right

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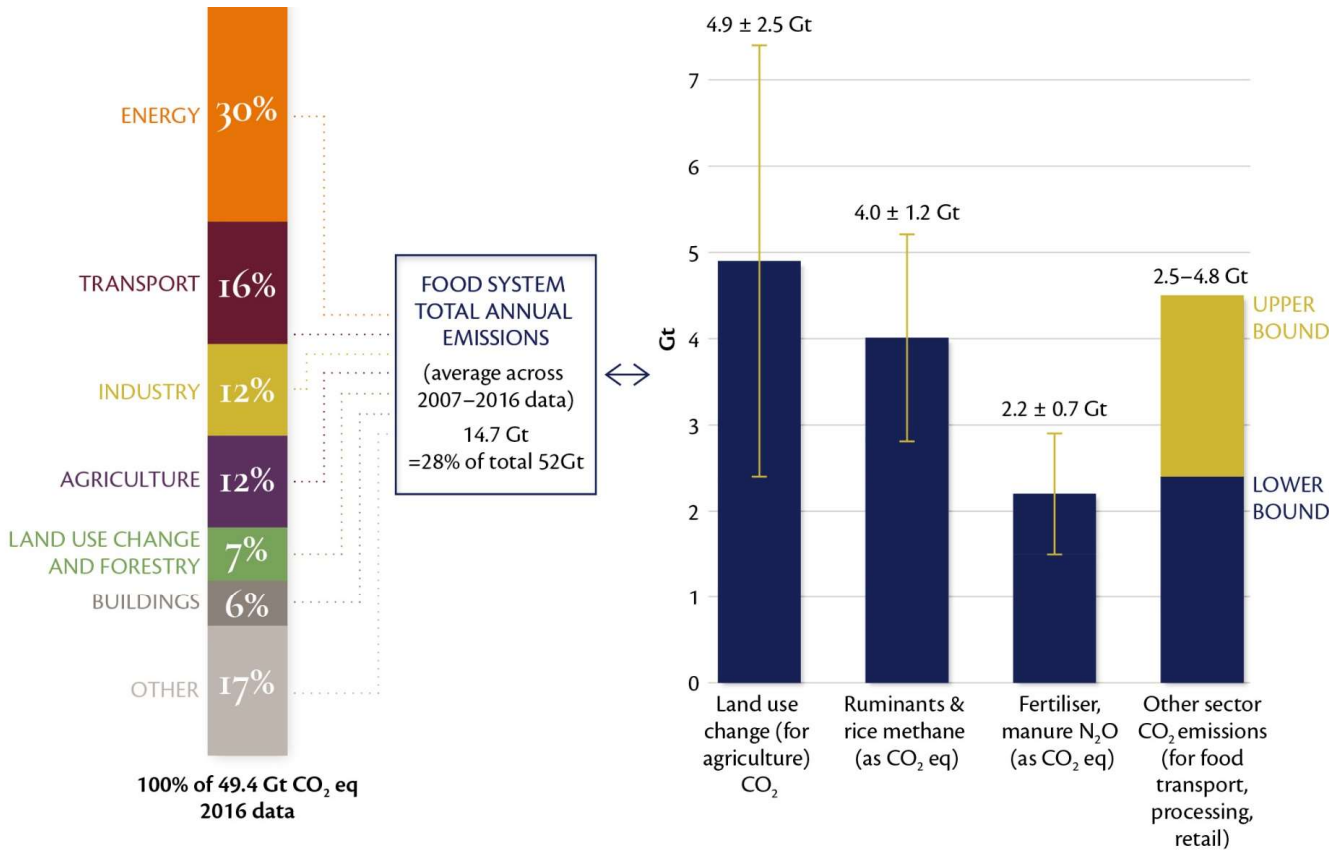
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# DIAGNOSIS OF THE PROBLEM

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# Food systems are damaging the planet: driving climate change



And:

- **Biodiversity loss**
- **Environmental pollution**
- **Reduction in air and water quality**
- **Loss of soil and changing flood risks**
- ...

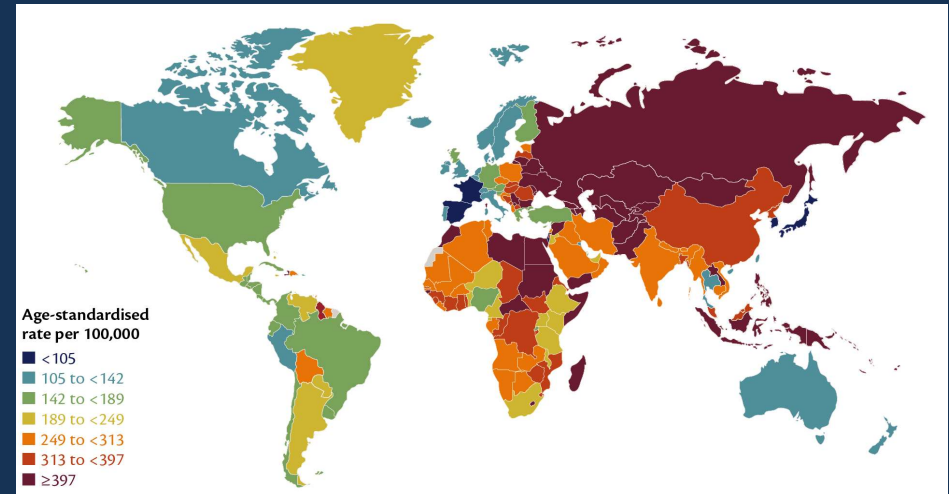
Notes: anthropogenic annual emissions breakdowns by sector (2016 data) and for the food system (average across 2007–2016 data). Given the different time periods the total emissions differ between left and right panels.

Sources: Created using data from World Resources Institute<sup>485</sup> and Intergovernmental Panel on Climate Change (IPCC)<sup>10</sup>

## At the same time, diets continue to damage human health on a vast scale

- One in 10 people in the world is chronically undernourished.
- Impacts of obesity and diet-related NCDs on public health and national finances escalating fast.
- In 2017, poor diets responsible for 11m deaths (cf 1.86m COVID deaths in 2019)

### Age-standardised mortality rate/100,000 population attributable to diet in 2017



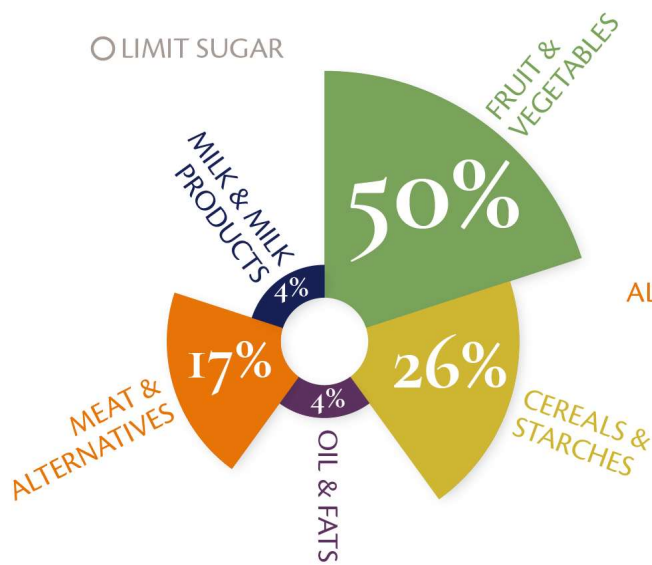
Source: Afshin et al. (2019)

Sub-optimal diets responsible for 20% of premature (disease-mediated) mortality worldwide and 20% of all disability-adjusted life years (DALYs).

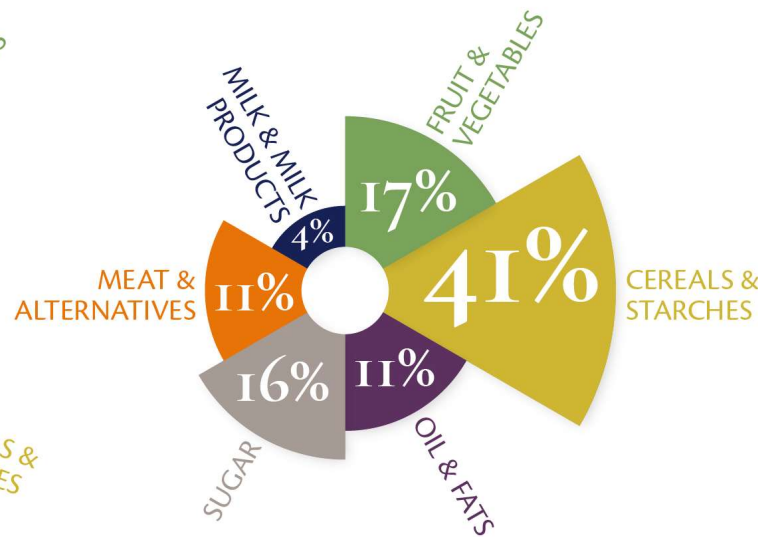
Source: Afshin et al. (2019), Swinburn et al. (2019)

# There is a fundamental mismatch between what is grown and optimal diets globally

How we should be eating  
(Harvard's healthy eating plate model)



What we are actually producing  
(According to 2011 FAO)



“Today, if everyone were to try to access all the foods needed for high quality, nutrient-rich, diets (e.g. fruits and vegetables, or fish, nuts, or pulses), they would not be able to do so”

*Global Panel (2020)*

# Global patterns play out locally: Economic value of UK food system



Defra 2018 data: food statistics pocketbook

**£120.2bn**

The agri-food sector contribution to national Gross Value Added in 2018.

**4.1m**

People employed in the agri-food sector in Q4 2019, 13% of GB employment.

**4.7%**

Food and non-alcoholic beverage price fall in real terms between 2009 and March 2020.

**£234bn**

Total consumer expenditure on food, drink and catering in 2019.

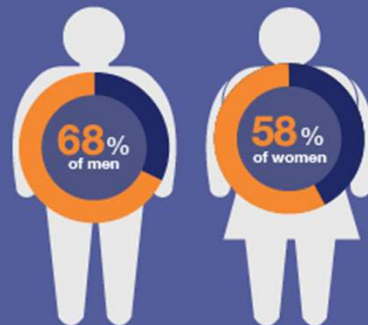
**£23.6bn**

The value of food and drink exports in 2019.



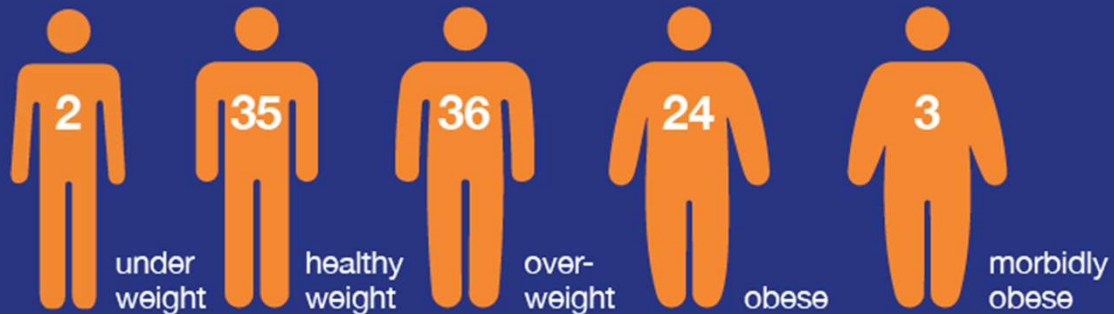
| Cost  | Indicative costs  |
|---|---|
| Pollution from fertilisers  | £5bn (2011, Defra)  |
| Pollution from GHGs   | £3bn (2017, GHG at ETS)   |
| Silting of water courses  | £61m (IDB budget 2015-16: NAO)  |
| Contamination from manure run off (e.g. <i>Campy</i> ) and pesticides | ~£20m per year (pesticides, NAO 2010, cost to water companies)                                |
| Anti-microbial resistance   | £180m direct NHS costs (HSC SC) (x 40%)?  |
| Food safety (microbes and fraud)                                      | £9bn COI (FSA, 2018) + £12bn fraud (NFU mutual)   |
| Food and packaging waste  | 2.2m T plastic waste (POST note 605) @£300 per tonne= £600m<br>Food waste = £19bn (WRAP 2020) |
| Mental health and well-being (e.g. loss of biodiversity)              | ????  |
| Dietary ill health (healthcare, social and mental)                    | £30-50bn (HMG and NHS figures)  |

In 2015  
**63%**  
of adults in England  
were **overweight  
or obese**



In England, the prevalence of obesity among adults rose from 14.9% to 26.9% between 1993 and 2015

Of every  
**100 adults**  
in England  
there are...

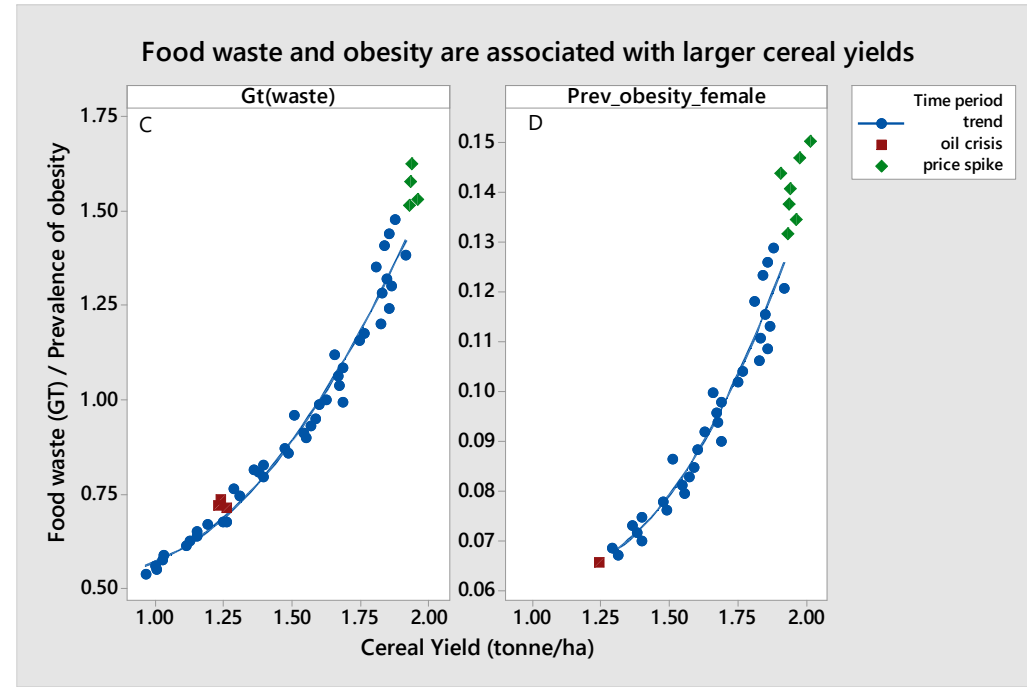
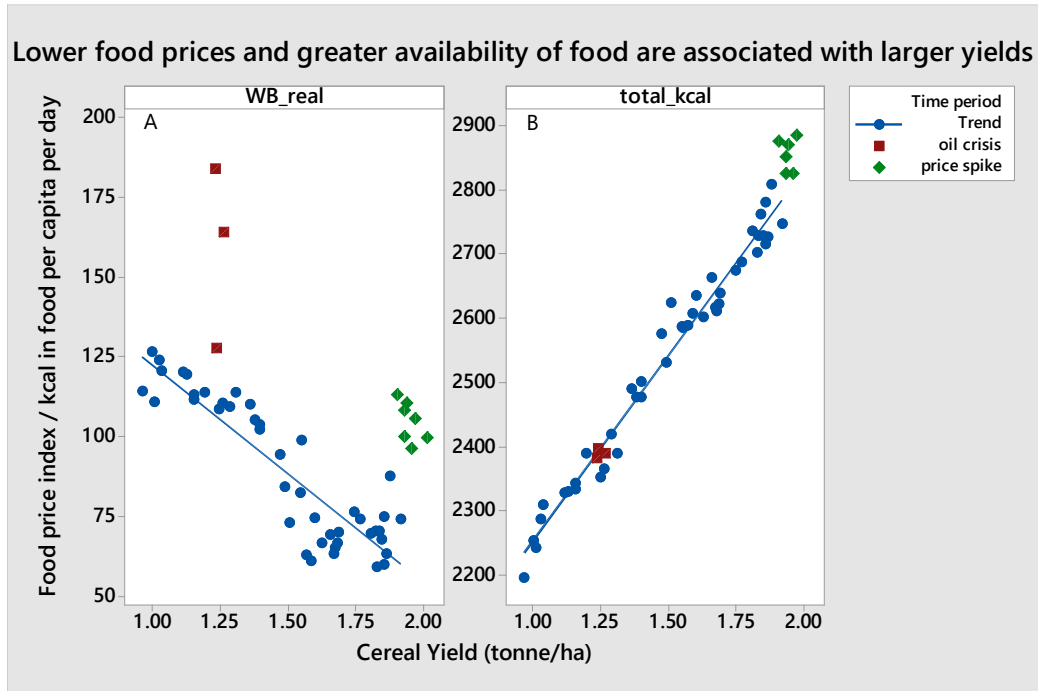




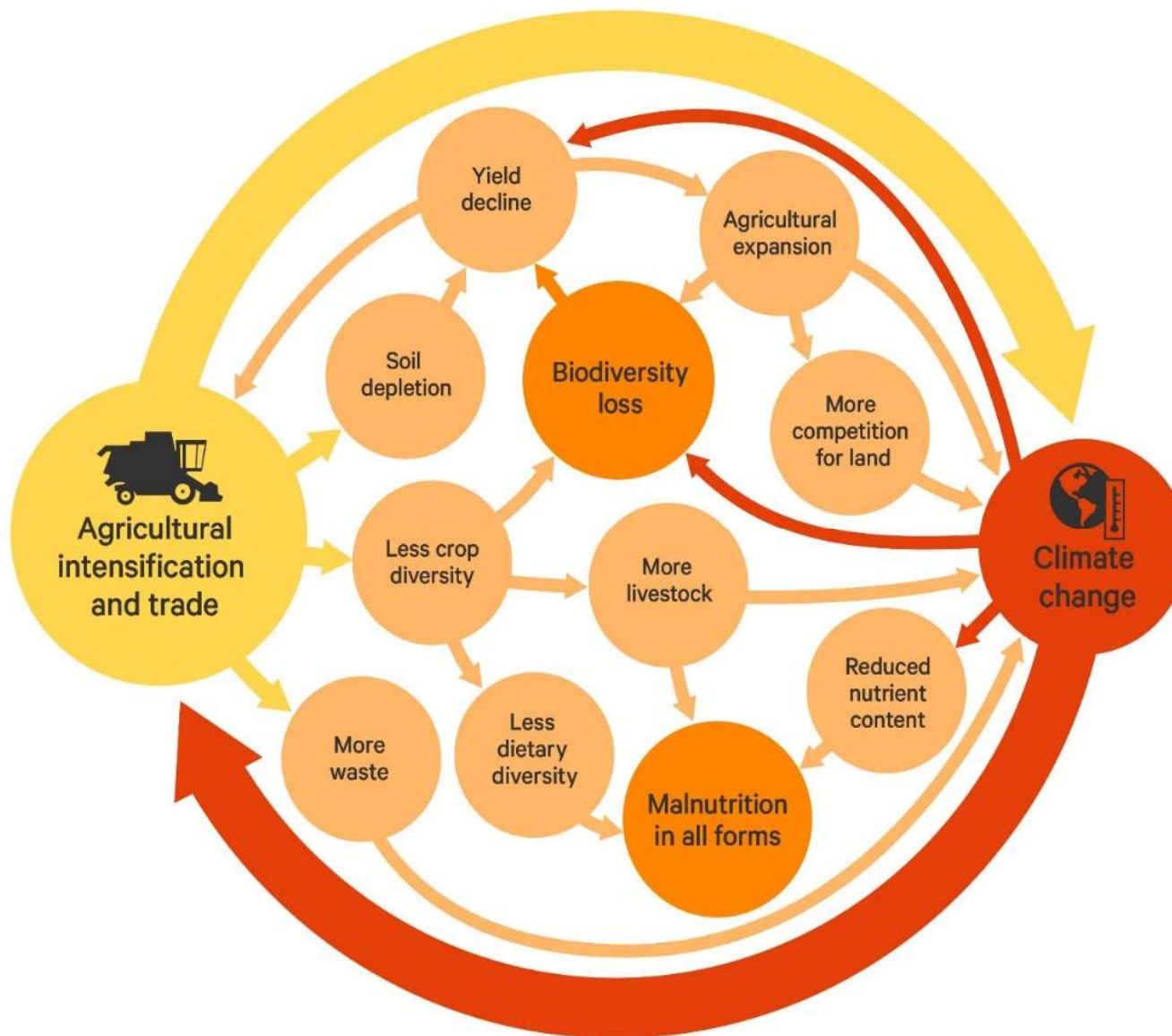
# WHY ARE WE WHERE WE ARE?

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# Is cheaper food a public good? The experience over 60 years



The “cheaper food paradigm” (CFP) drives interlocking vicious circles



Source: Benton et al forthcoming  
Chatham House report



## The food system needs to change: but to what?



### *“Business as usual”*

- Continued focus on productivity (“sustainable intensification”) as prime driver of agriculture
- More, cheaper, food driving more waste and ill health
- Drives more climate change; greater impacts on yields
- Creates greater need for land for climate mitigation
- Intensifies competition for land, water, energy, inputs
- Less biodiversity, more uniformity, erosion of soils and natural capital
- Less resilience to perturbations (locally or through global markets)

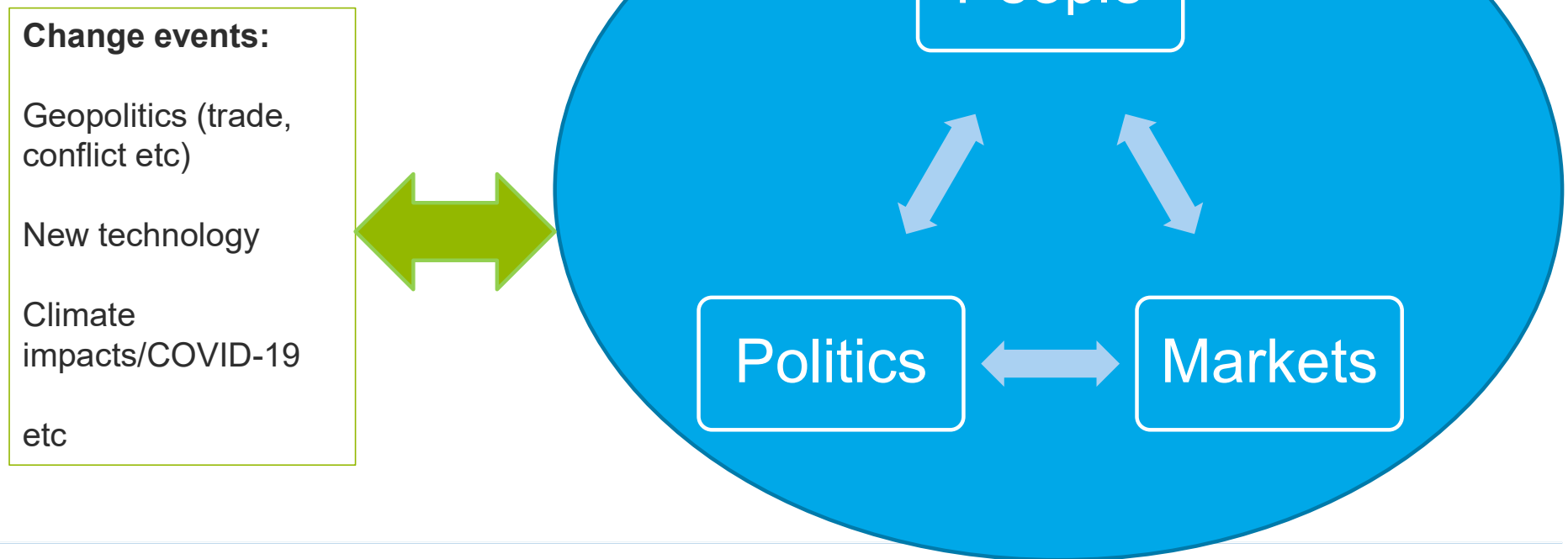
### *“Business unusual”*

- Greater focus on system efficiency - healthy diets, sustainable (low waste) food systems
- Greater recognition of *values* associated with food, not just price, higher farm-gate prices
- Different diets driving more diversified agriculture; allowing more circular ag (e.g. mixed farms)
- More multi-functional landscapes (fewer monocultural landscapes), more rural employment
- Efficient food system makes space for land-based climate mitigation and reduces climate drivers
- More resilient landscapes (food systems)

# WHAT MAY DRIVE CHANGE?

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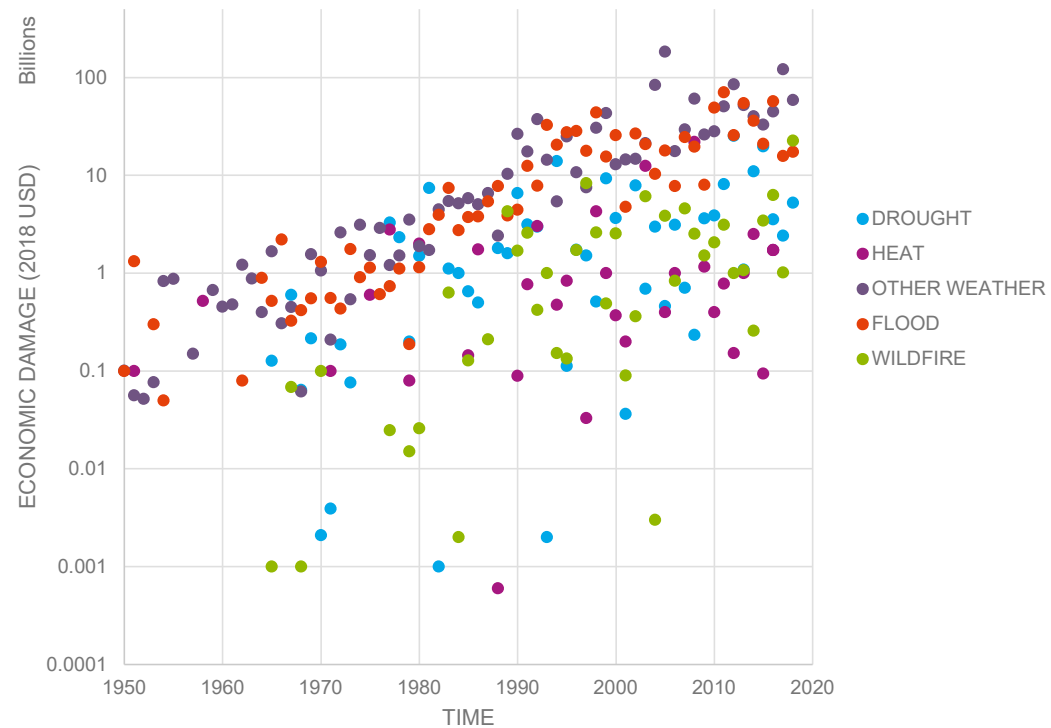
# What may change the food system?



# People and their attitudes

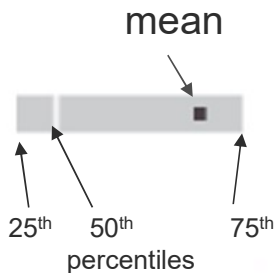
**People increasingly recognising the link between food, agriculture and environment**

Climate-related insurance costs have increased ~100x in 50 years

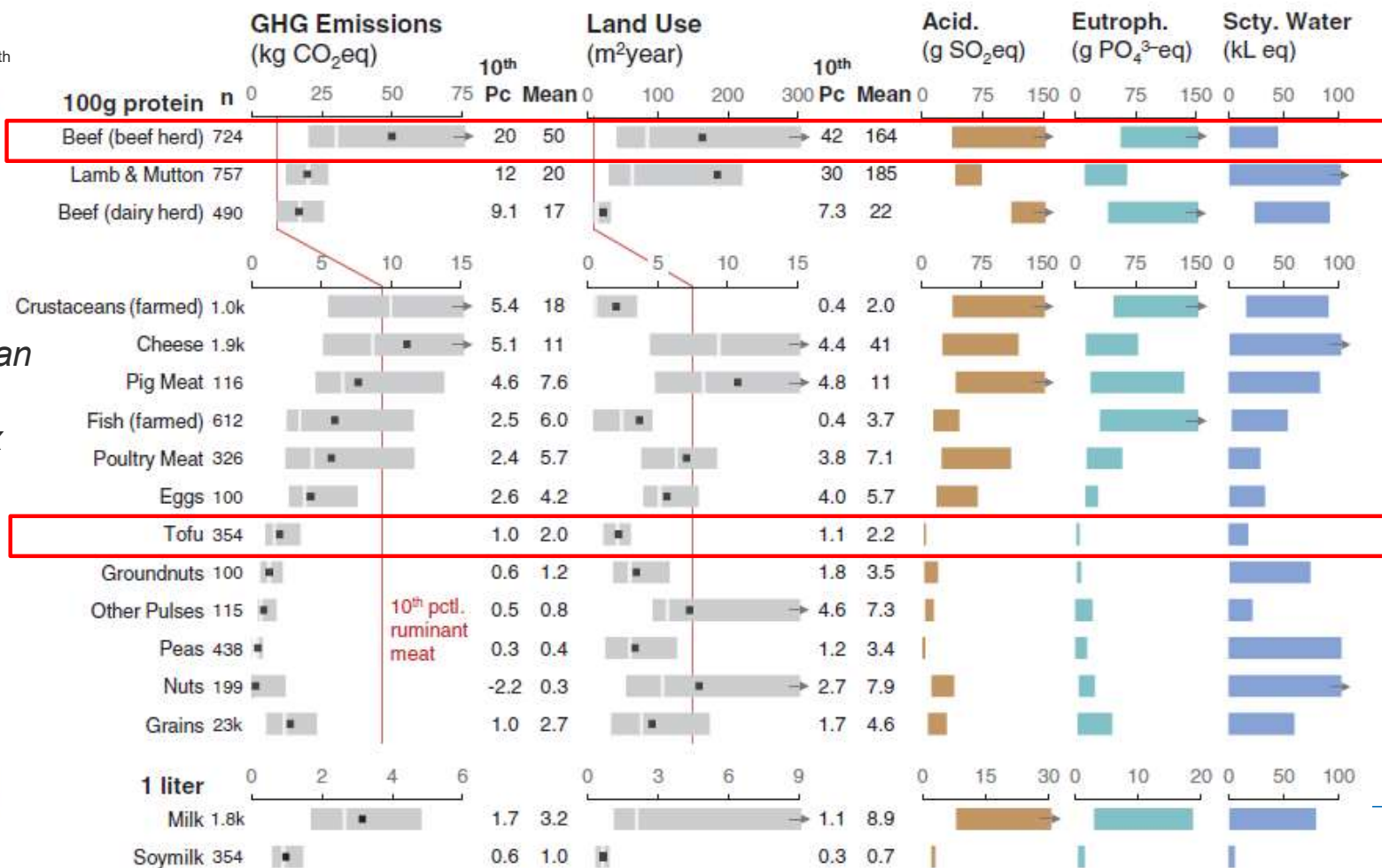


# Food's footprints are different

Poore & Nemacek (2018) doi: 10.1126/science.aaq0216



*A kilo of Tofu emits on average 25x more GHG than a kilo of beef, and takes 75x more land to produce*



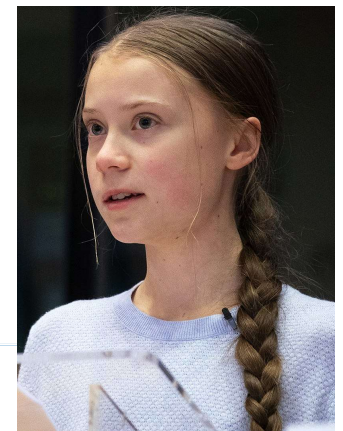


## People and their attitudes: diets

- **Dietary change identified as key for health, biodiversity, climate**
  - **To a first approximation relative to today's diet: a healthier diet is also a more sustainable one (diverse, rich in plants, whole grains; lower meat (especially processed) and ultra-processed calories)**
- **Attitudes can shift fast (“social tipping points”)**

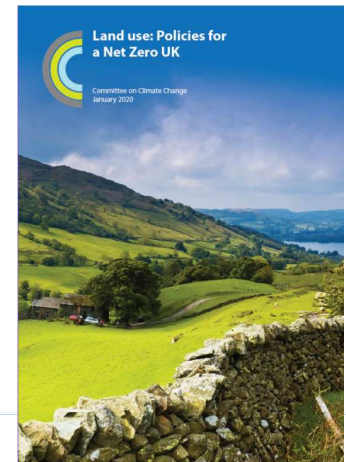


How we should be eating  
(Harvard's healthy eating plate model)



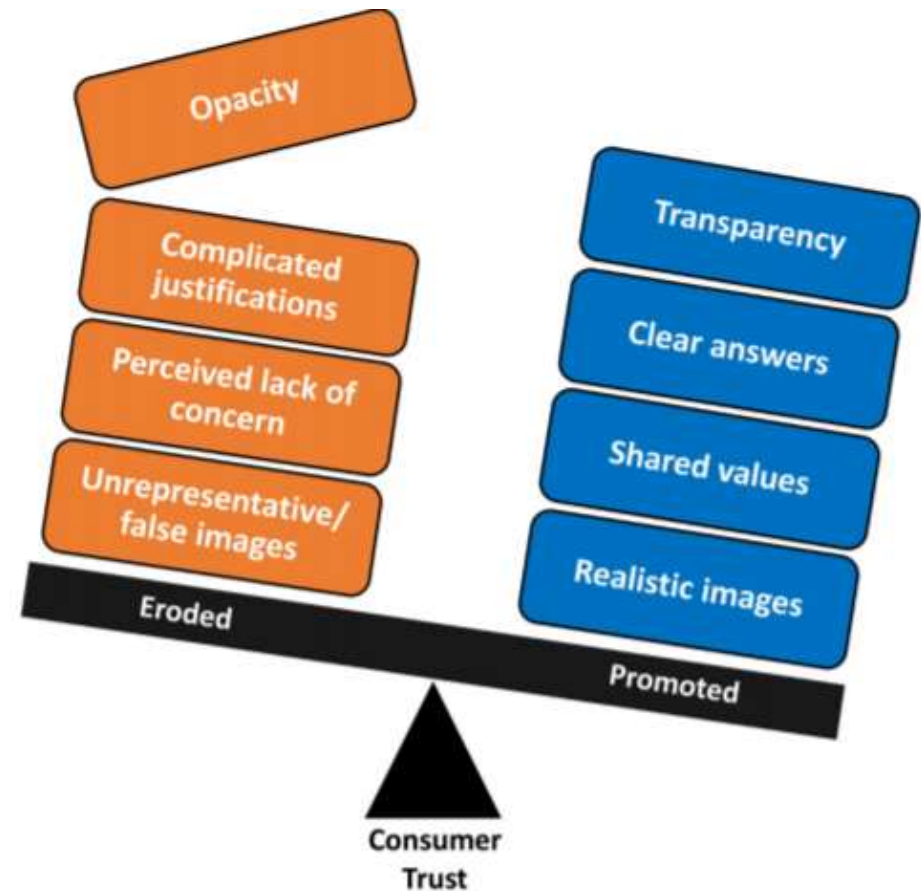
## Politics

- **Recognising the costs on the whole economy from the food system indicates that we need significant change**
- **Need to reconcile trade-offs between “*food-for-wellbeing*” and “*agriculture-to-drive-economic-growth*”**

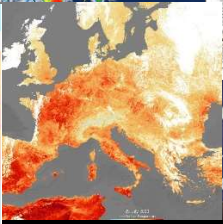
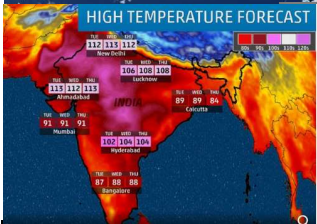
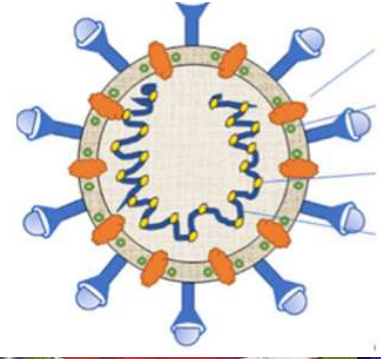


## Markets

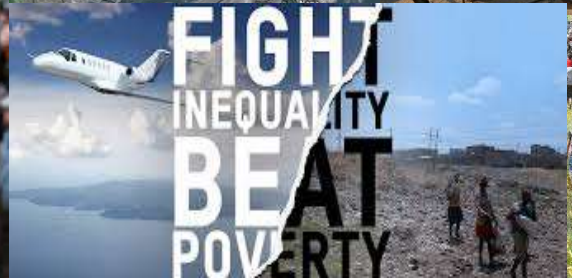
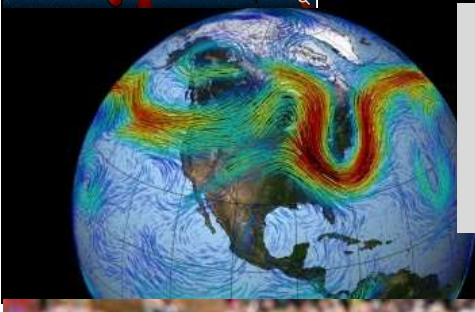
- **Consumers' license more complex than price, but has often been based on trust rather than data**
- **Increasing potential for transparency may affect business models**
- **As may more volatile supply chains**







*Events happen that reshape markets, politics and people*







**T**urbulent  
**U**ncertain  
**N**ovel  
**A**mbiguous

# THE NEED FOR RESILIENCE

The only certain thing about the future is its uncertainty



## Properties of resilience

**Redundancy (i.e. not maximally efficient, not “just-in-time”)**

**Modularised or distributed (i.e. not centralised, no Single Point of Failure)**

**Diversified (income arises from multiple pathways/products)**

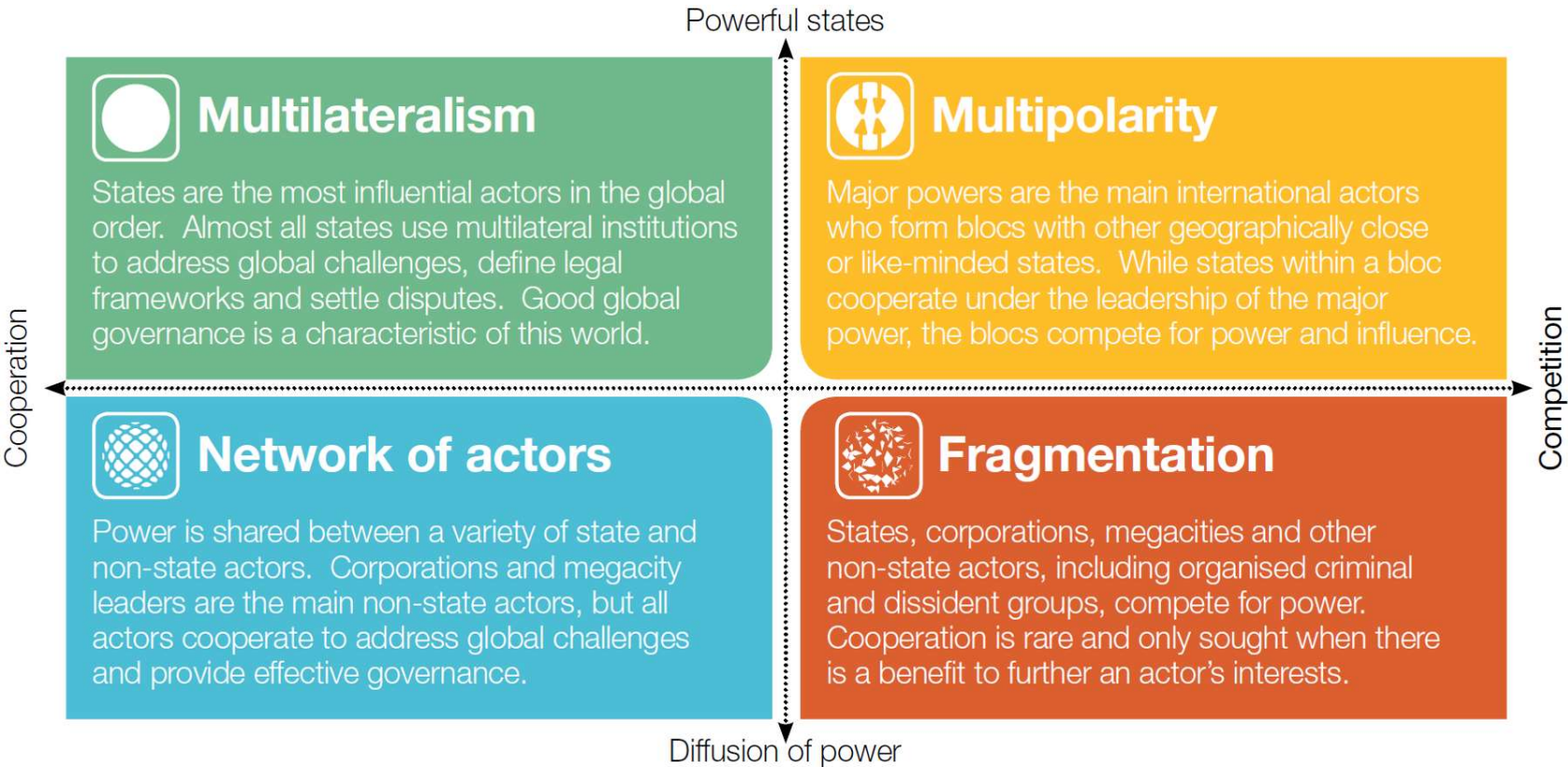
**Flexibility or substitutability (operations can shift and markets respond to alternates)**

<https://www.foresight4food.net/>

# SCENARIOS: THE FUTURES OF FOOD

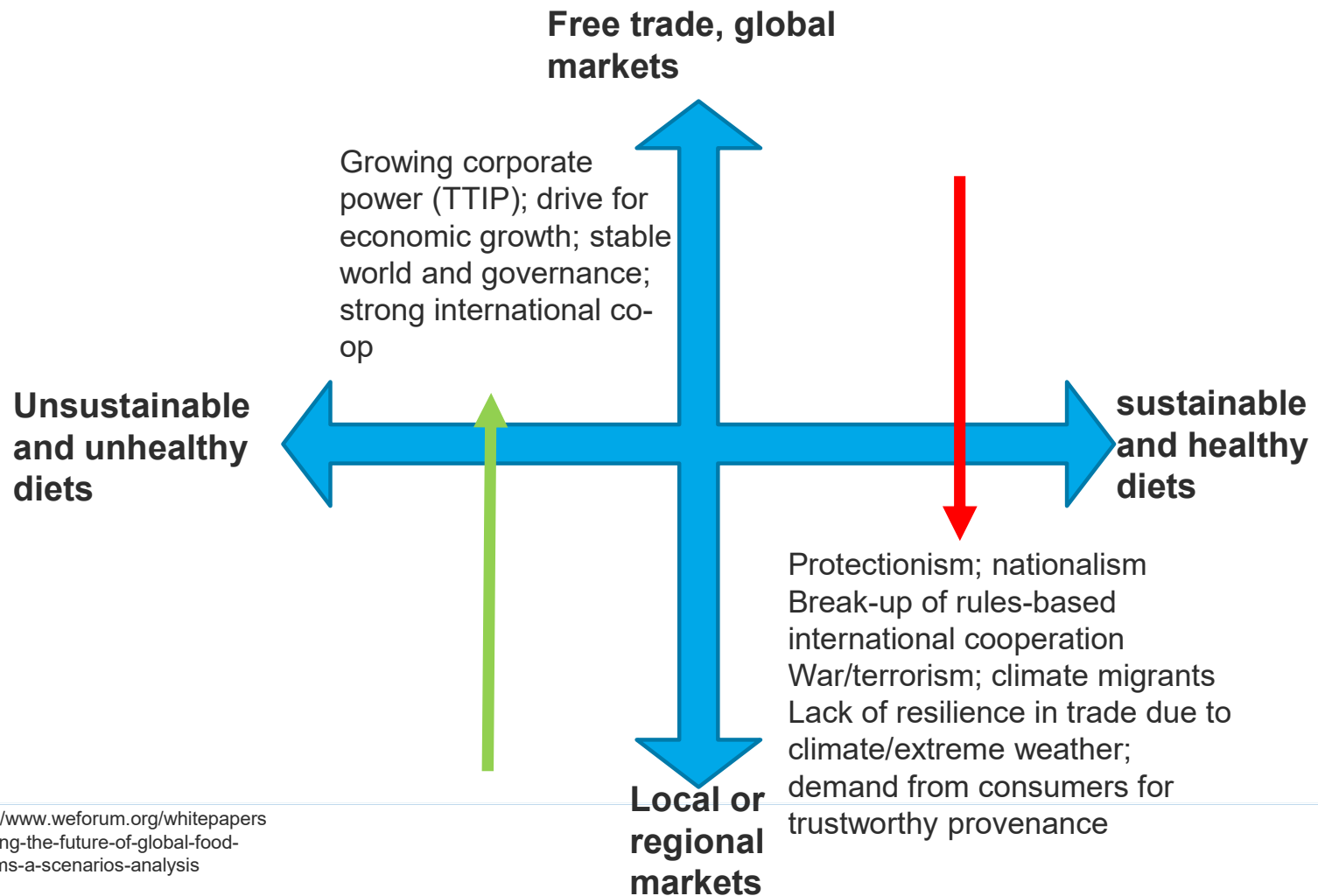


# Scenarios for the future are usually very different from BAU

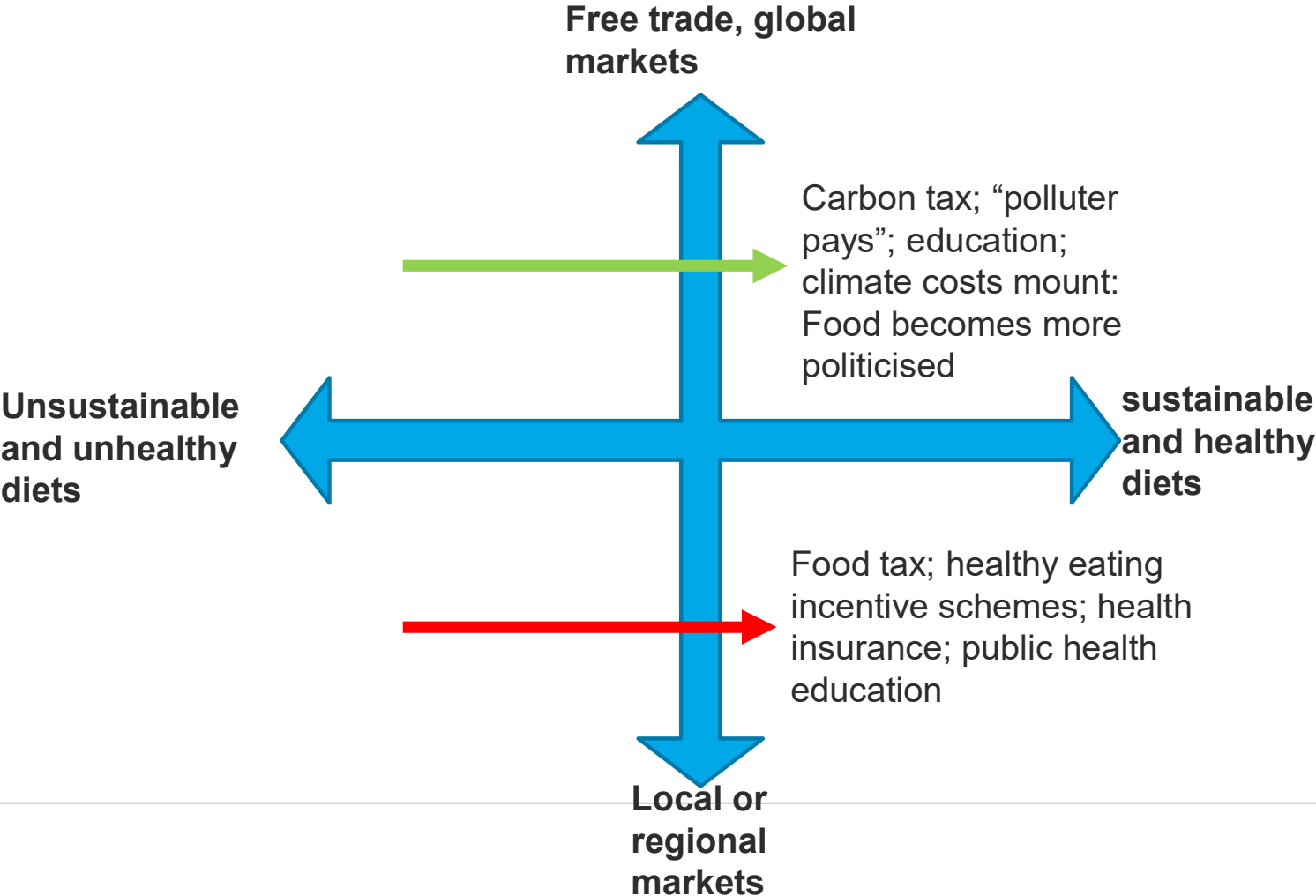


Scenarios for the future of global governance – UK Global Strategic Trends 2018

# Future of food systems



# Alternative futures



# Research and innovation agenda

Free trade, global markets



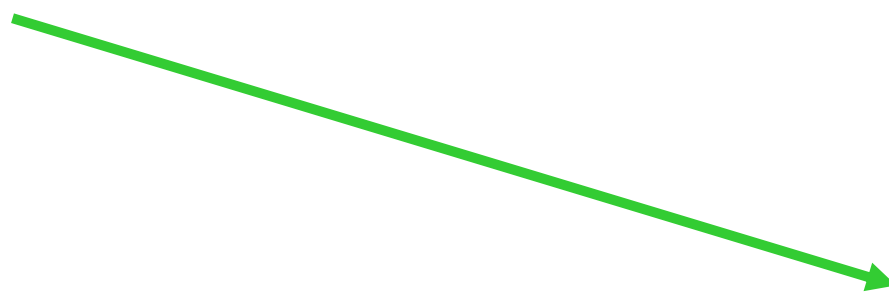
Local or regional markets



Commodity crops, large scale  
Biotechnology and biofortification  
Ultra-processed foods  
Long supply chains  
Lots of robotics

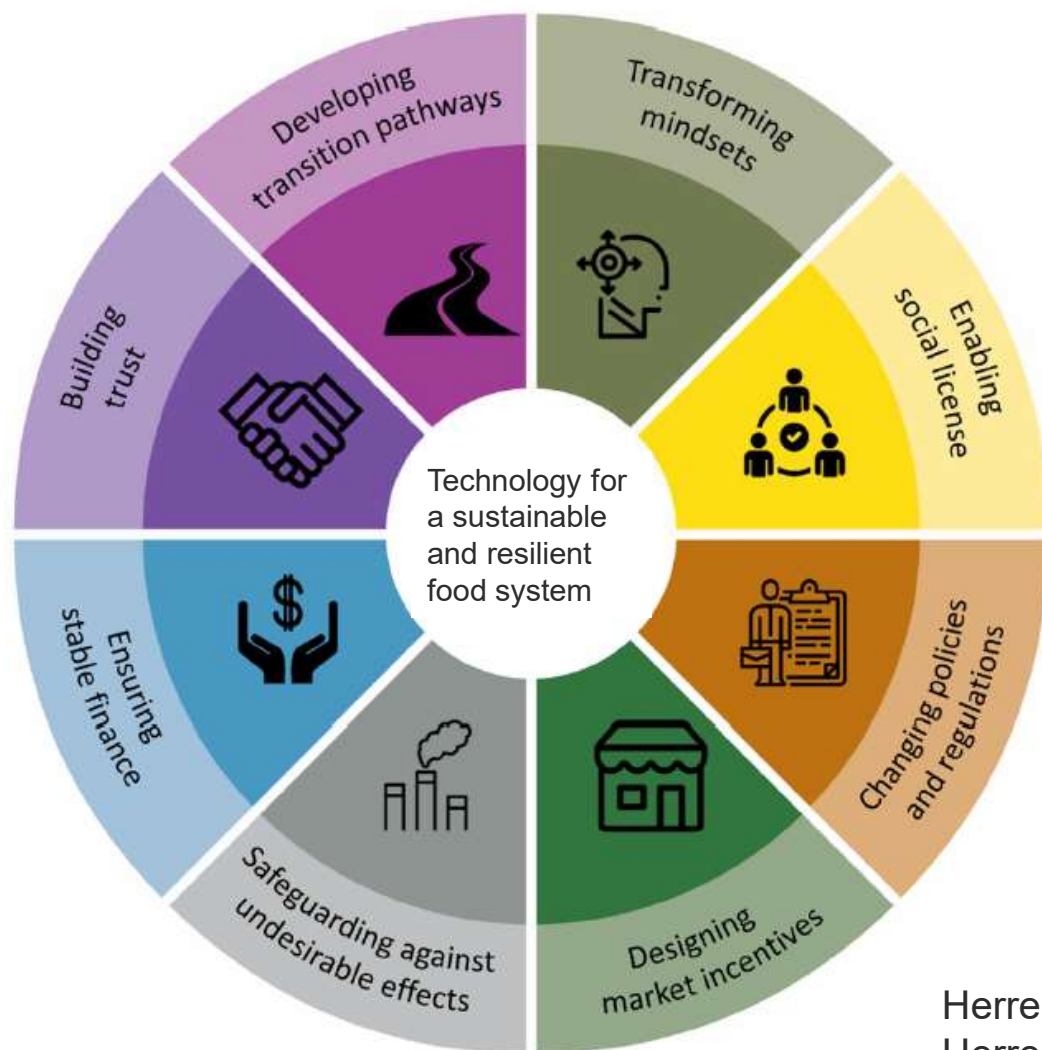


sustainable and healthy diets



More varied diets to provide nutrients  
More varied farming systems, smaller scale  
Less agricultural efficiency and more system efficiency  
Low waste  
Whole foods, cooked at home  
Short supply chains





- **Systemic change is not driven by technology alone but by development of “socio-technical bundles” which require significant change across multiple social, economic and governance arenas**
- **There are no silver bullets: new technologies likely have positive and negative effects depending on the context**

Herrero, M, et al. 2020. *Nature Food* 1: 266–272.

Herrero, M, et al. 2020. *Lancet Planetary Health*

Barrett, C, et al. 2020 *Nature Sustainability* 3: 974-976 29

## Conclusions

- **Multiple drivers of radical change are with us: dietary health, climate change, biodiversity and environmental impacts**
  - **A focus on productivity growth at all costs is no longer tenable**
  - **Farmers need to be rewarded for “less but better” production**
- **The world – and farming's role in it – is increasingly TUNA**
- **Change is likely at multiple timescales (weeks, years, decades)**
- **Change-moments will happen unpredictably through markets, attitudes, climate impacts**
- **Building resilience is a key strategy for being able to adjust to the uncertainty, volatility and multiple plausible futures**
  - **P2P learning (e.g. Innovative Farmers) will be key to adapting**
- **Agricultural technology is key – but there are no silver bullets**
  - **more research is needed on farming systems and local contexts.**



# Thank you!

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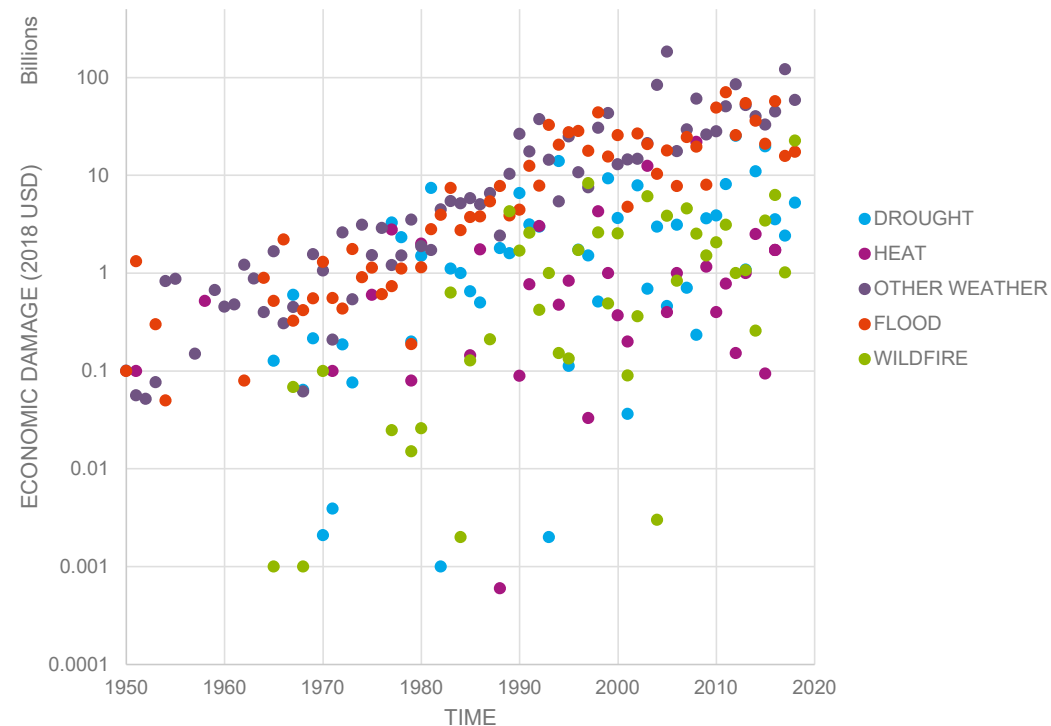


## People and their attitudes

### People showing increasing recognition of:

- Food's role in driving climate change and environmental issues
- Understanding of link between environment and disruption to lives and livelihoods

Climate-related insurance costs have increased ~100x in 50 years





## People and their attitudes: diets

### **Dietary change can play a role in:**

- **Increasing people's health and well-being**
- **Reducing associated risks (e.g. COVID-19, obesity and mortality)**
- **Reducing environmental pressure (climate, waste, biodiversity)**

**To a first approximation, a healthy diet is also a more sustainable one (diverse, rich in plants, whole grains, lower meat, little ultra-processed calories)**

- **Attitudes can shift fast (“social tipping points”)**



- **Policies are broader than ELMS**
    - **NFS, climate change (ZNC), trade, health etc**
  - **Recognising the costs on the whole economy from the food system indicates that BAU is not sustainable**
    - **Healthcare costs, driven by poor diets, suggests we need more “preventative healthcare”: better diets and more exercise**
  - **Increasing need to reconcile trade-offs between food-for-wellbeing and agriculture-to-drive-economic-growth**
-

- **Consumers give social license to markets, and politicians set the rules; market actors act within those to maximise profit.**
- **Consumers' license more complex than price, but has often been based on trust**
  - **Data-driven transparency will likely be key determinant of future trends (e.g. forest-free supply chains; health-positive food)**
  - **Increasing market disruption from climate hazards may disrupt business models**