
Food Systems

basic concepts and futures

John Ingram

Food Systems Programme Leader

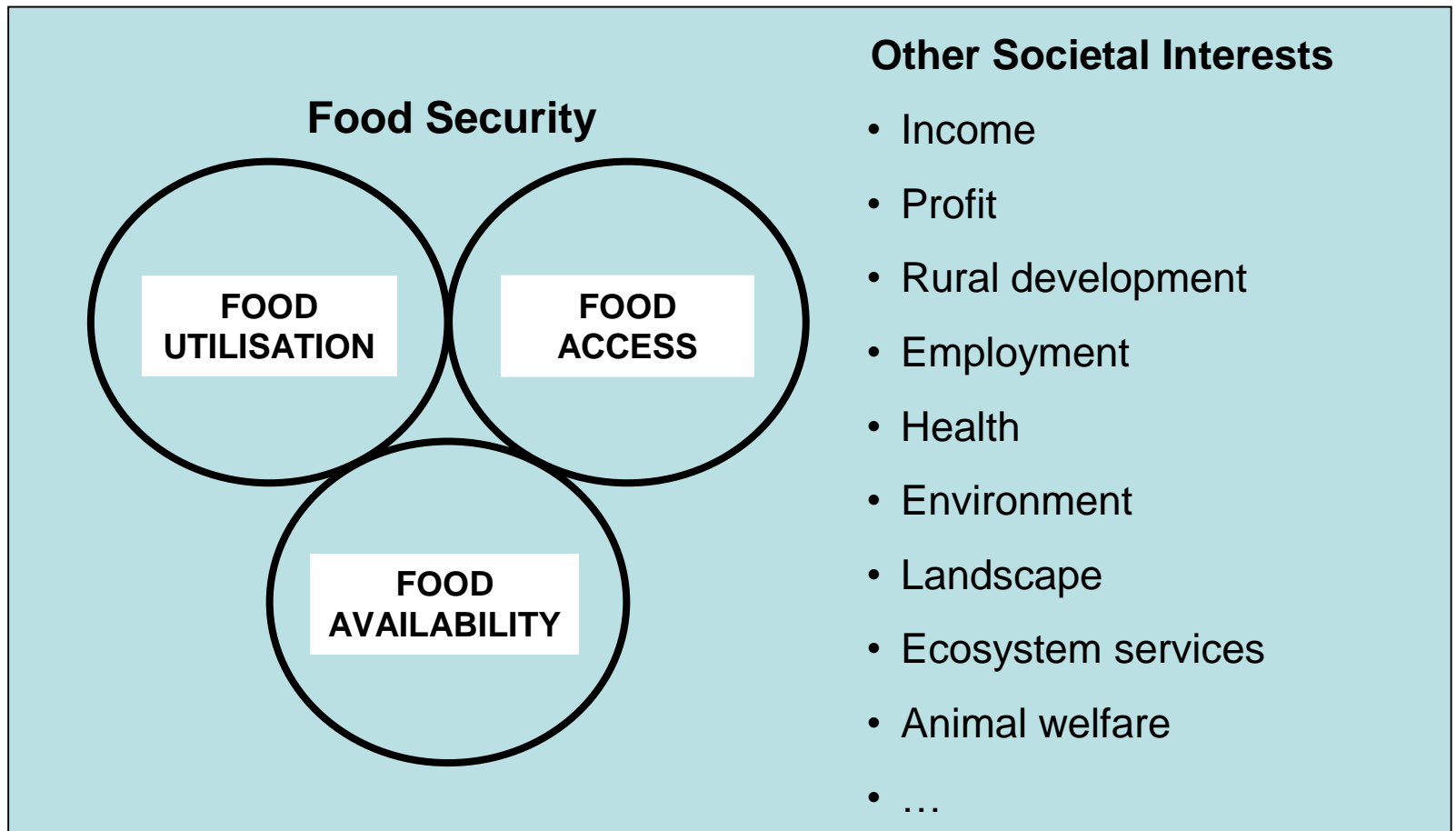
Environmental Change Institute

University of Oxford

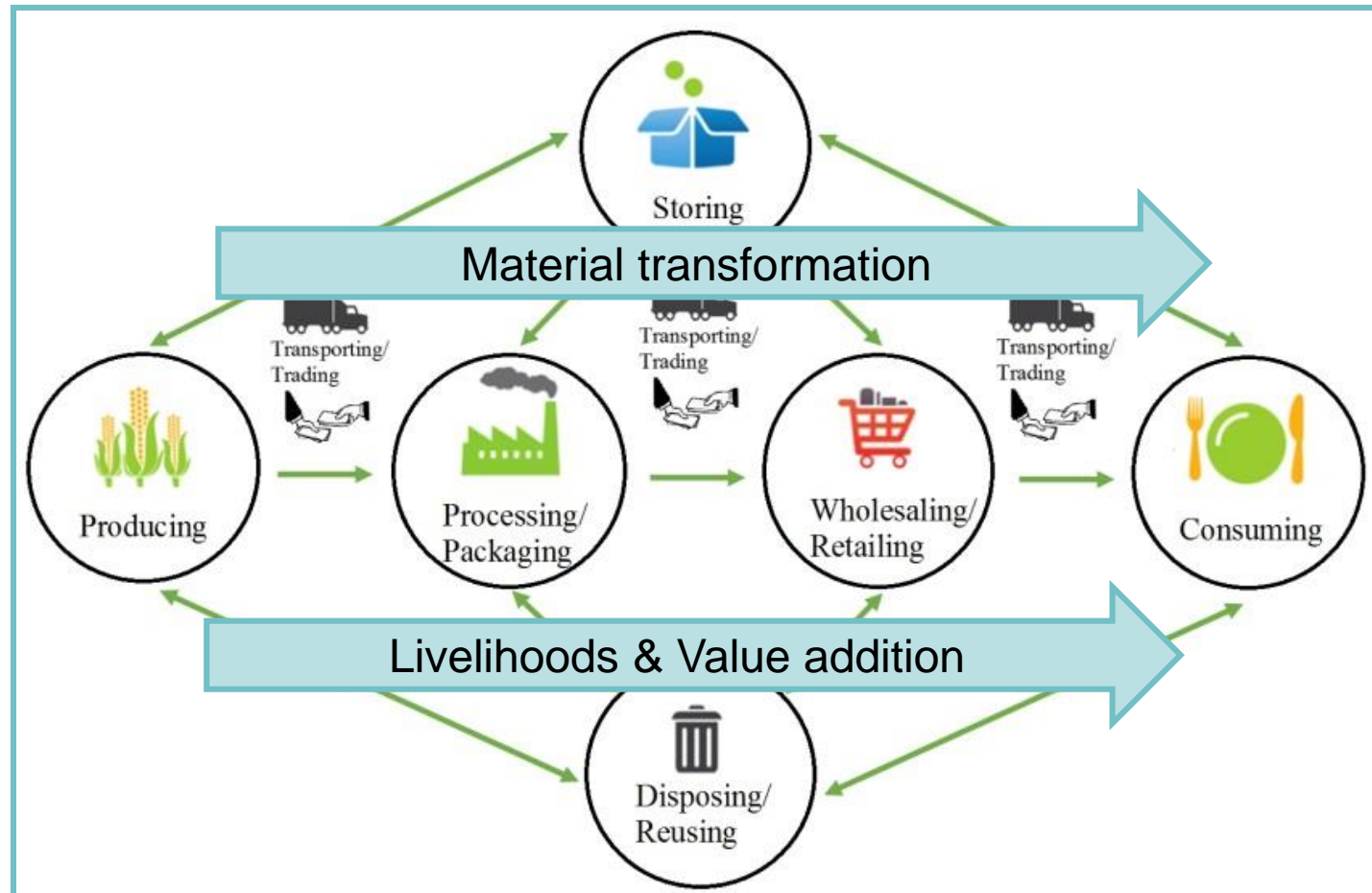
Environmental Change Institute



What do we want from Food Systems?

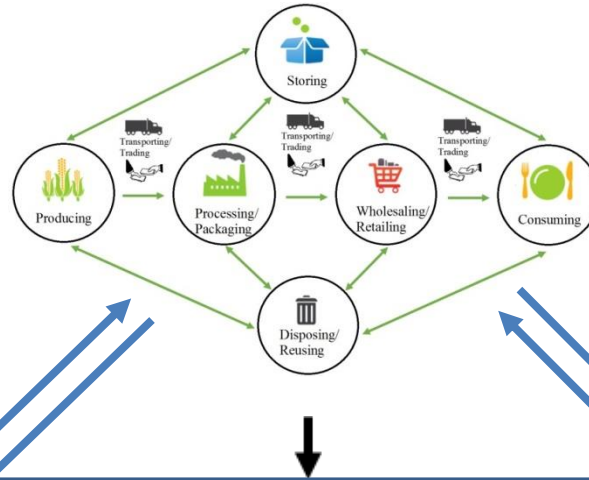


So Food Systems include a range of social and economic 'Activities'



Social, Economic, Political and Biophysical Environments

Food System *Activities* give rise to multiple Food System *Outcomes*

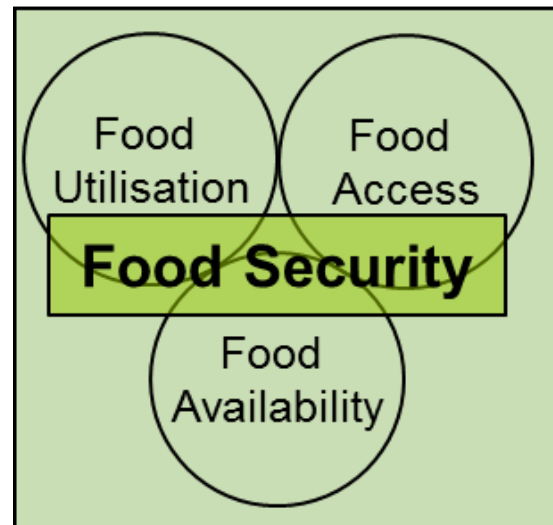


Trade-offs to be aware of!

Synergies to exploit!

Socioeconomic Outcomes

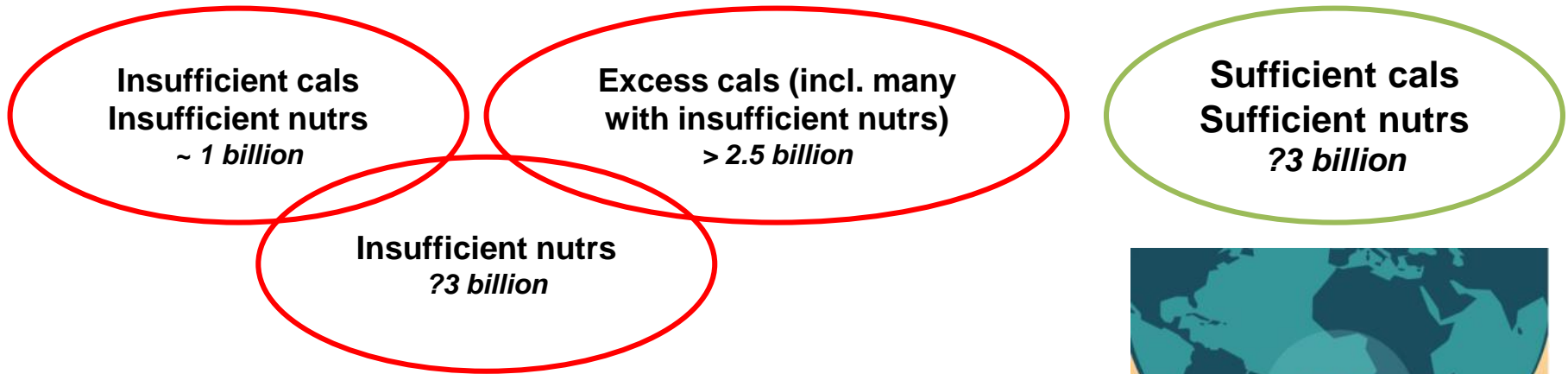
- Income
- Employment
- Health
- Social capital
- Political capital
- Ethics
- ...



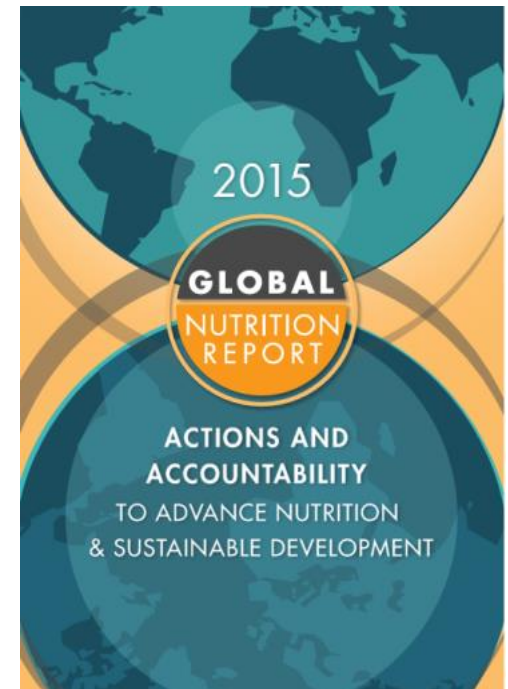
Environmental Outcomes

- Climate change
- Water availability
- Water quality
- Biodiversity
- Biogeochemistry
- Soil degradation
- ...

We know the *current* global food security 'situation'



- **“Triple Burden of Malnutrition”**
Different, overlapping forms of malnutrition the ‘new normal’ (IFPRI 2015)



We know the *current* global environmental 'situation'

- Soil **33% degraded**
- Fresh water **20% aquifers overexploited**
- Biodiversity **60% of loss**
- Marine resources **29% over-fished; 61% fully-fished**
- Fossil fuels **30% of all fossil fuel use**

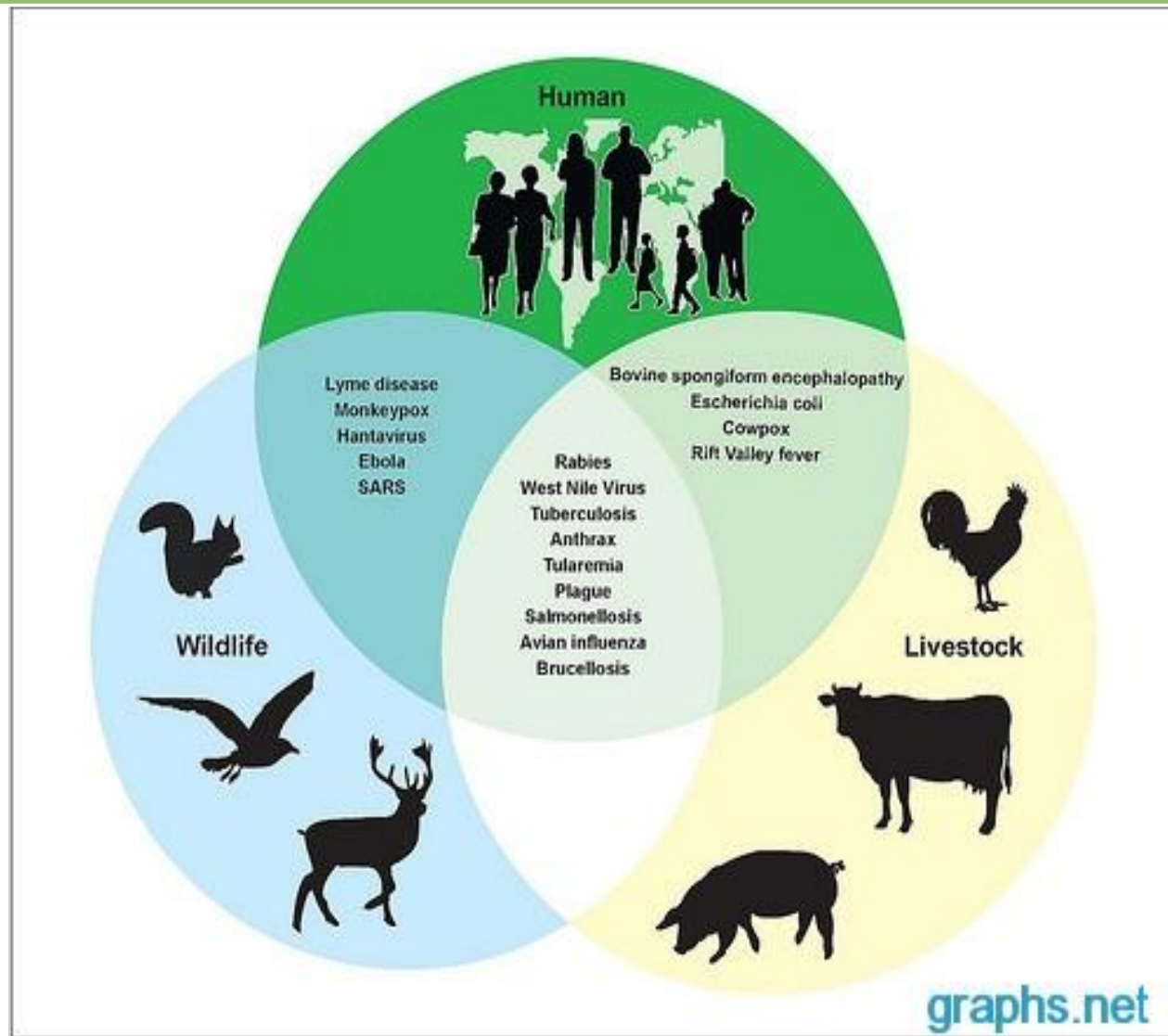
And **24% of total GHG emissions**

And **pollution: chemicals, plastics, litter, ...**



We know the *current* concerns about animal-human interactions

- Zoonotic disease extent, impact, spread: Global connectivity => greater impact.
- Links between human and animal prophylaxis, e.g. AMR
- Increasing risk of disease emergence with the rapid changes at the A-H interface.



And we know the *current* ethical concerns

- Child labour
- Animal welfare
- Workers rights
- Inter-generational legacy
- Food waste
- Farmer welfare and safety
- ...

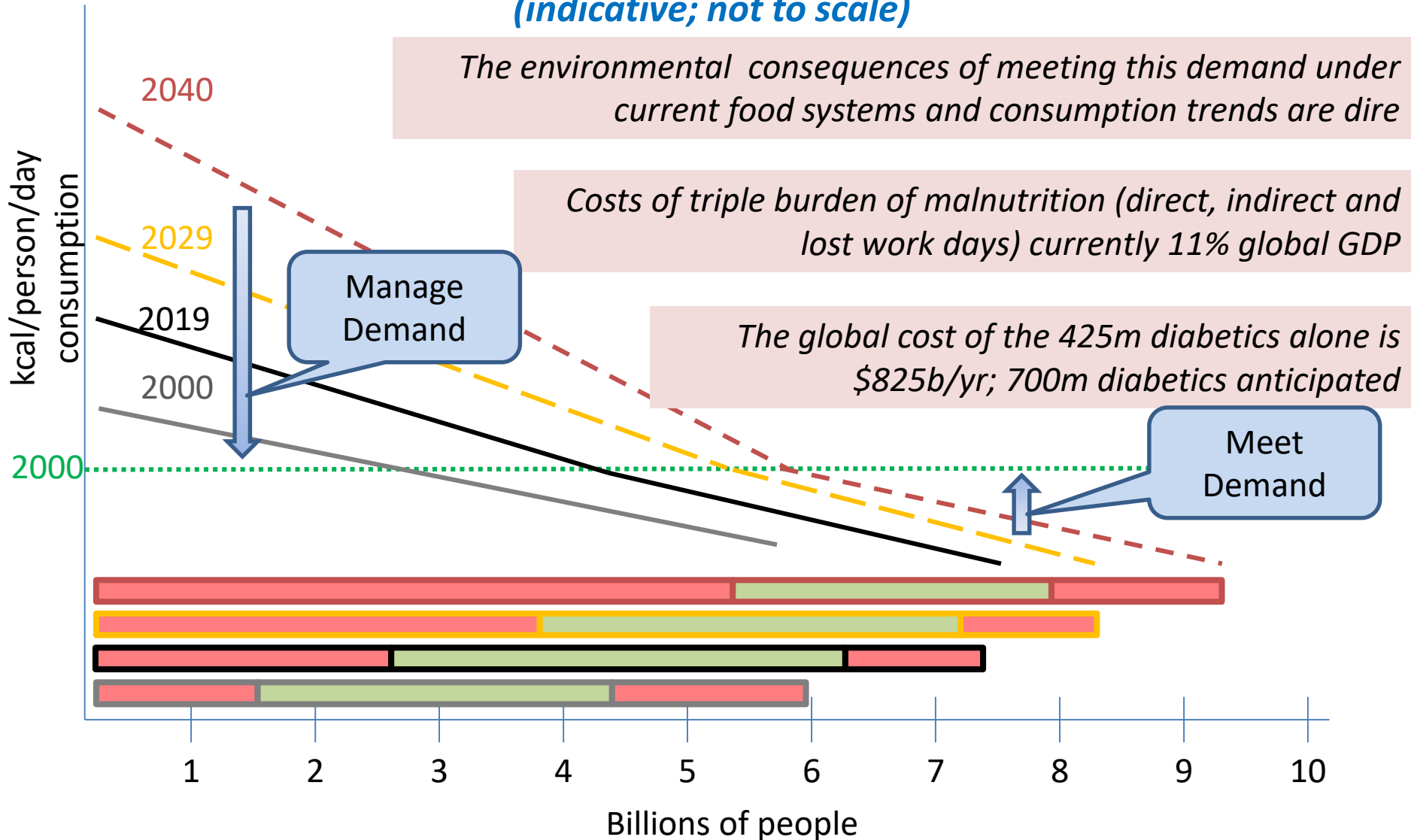
But what's coming down the track?



Looking ahead...

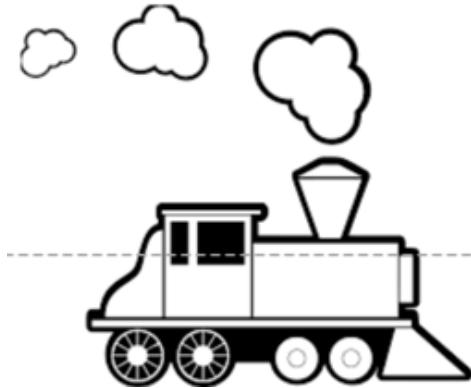
Calorie consumption

(indicative; not to scale)



Food System Stresses and Shocks

“Stream Trains”



Easily perceived drivers and trends that will influence change - direct and indirect

“Black Swans”



Unimagined, rare and/or unpredictable events that have a big impact

Food System Stresses and Shocks

Stress <i>pressure or tension exerted on a system</i> <i>[Steam Trains]</i>	Shock <i>sudden surprising event affecting a system</i> <i>[Black Swans]</i>
Demography	
Social & cultural norms	
Natural resource degradation	
Climate change	
Urbanisation	
Automation	
Science & technology	
Geopolitics	

Food System Stresses and Shocks

Stress <i>pressure or tension exerted on a system</i> <i>[Steam Trains]</i>	Shock <i>sudden surprising event affecting a system</i> <i>[Grey Swans]</i>
Demography	Trade wars
Social & cultural norms	Election and Referenda results
Natural resource degradation	Food scares
Climate change	Extreme weather
Urbanisation	Conflict
Automation	Geophysical events
Science & technology	
Geopolitics	

So how can novel foods help?

It depends...

1. What are the future social and economic 'conditions' within which a novel product could be brought to scale?
2. How will these conditions determine the
 - Viability
 - Efficacy
 - Winners and losers

Scenario analyses help

Sources of Uncertainty when thinking about the Future



Ignorance

Understanding is limited



Surprise

The unexpected and the novel can alter directions



Volition

Human choice matters

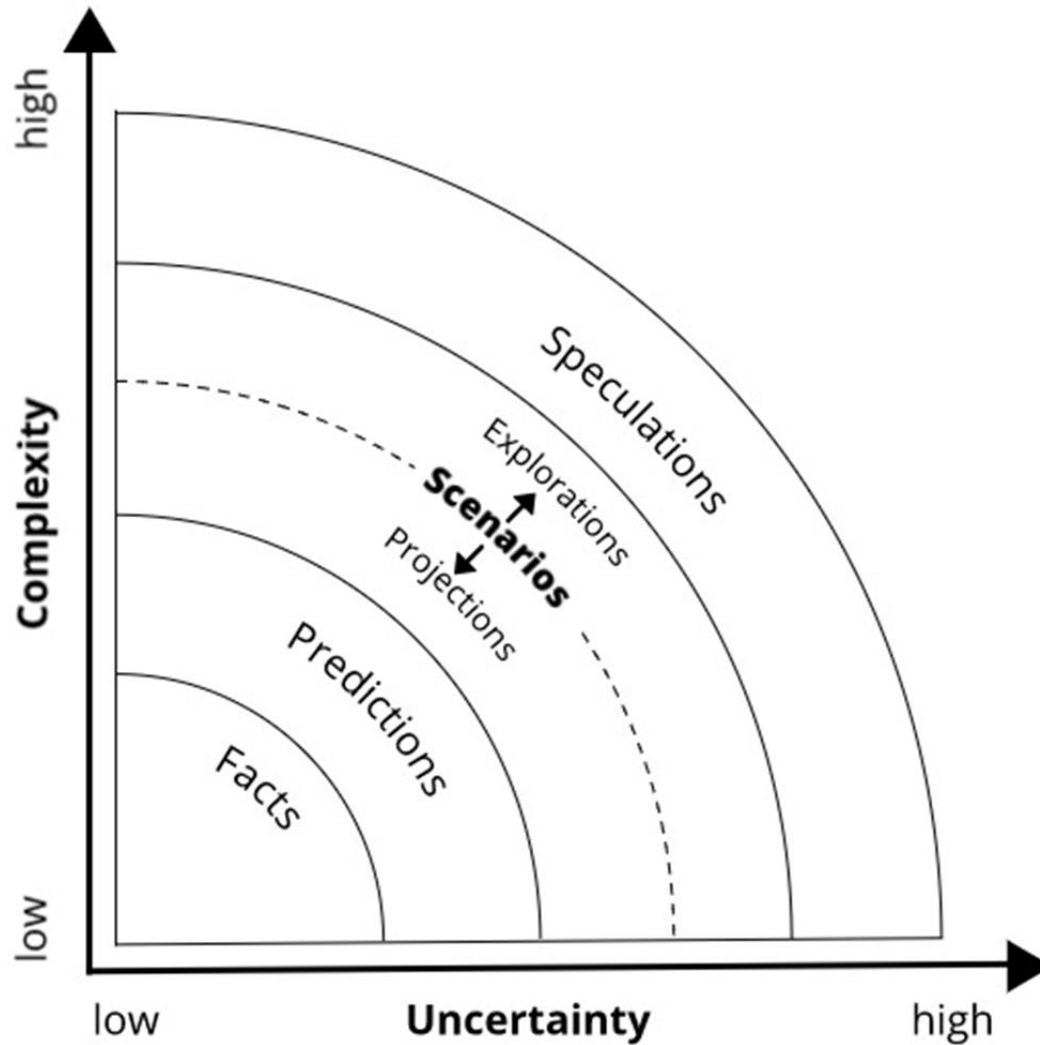
Scenario Definitions

Plausible stories about how the future might unfold from existing patterns, new factors and alternative human choices. The stories can be told in the language of both words and numbers (Raskin 2005).

Plausible alternative futures, each an example of what might happen under particular assumptions (MA 2005).

Plausible descriptions of how the future may develop, based on a coherent and internally consistent set of assumptions about key relationships and driving forces (Nakicenovic 2000).

Methods for looking into the future



Possible purposes of a scenarios exercise

1. Science / Research

- ✓ to integrate information from different fields
- ✓ to explore possible developments

2. Education / Public Information

- ✓ to educate and teach public on new developments
- ✓ to raise awareness of policy-makers, stakeholders

3. Strategic Planning / Decision Support

- ✓ to gather different views and to identify issues
- ✓ to frame strategic issues, to identify alternatives
- ✓ to support policy measure development

➤ **The nature of stakeholder involvement depends on purpose**