



# Food systems futures and how change may happen

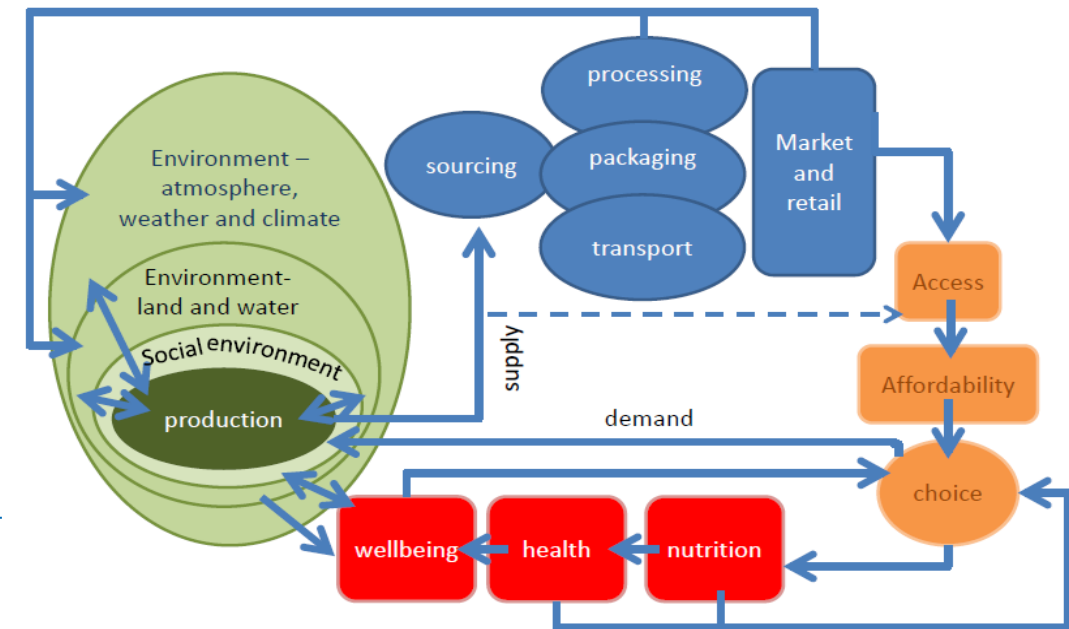
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# WHAT IS FOOD SECURITY?

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“Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”. (World Food Summit, 1996)



**“9 meals from anarchy” & “hunger challenge” food security:** is the short term supply of food assured to allow people to eat when they are hungry?

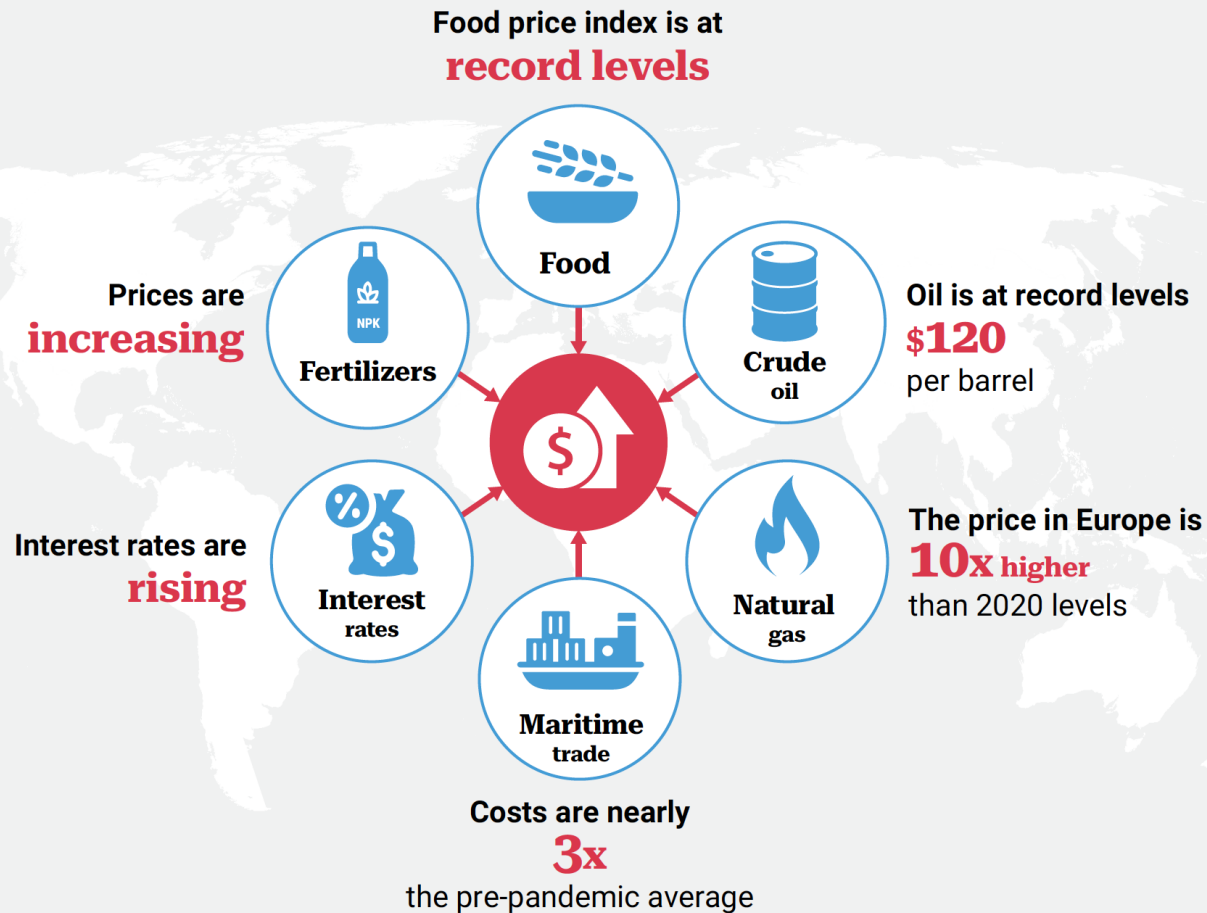
**“market-led” food security:** can the market supply the sorts of food people like to eat, cheaply? The cheap-food focus ignores the costs externalised to the environment and health systems.

**“Sustainable” food security:** can the market be structured to supply food that people like and want, and that underpins a healthy diet, and is supplied sustainably (i.e. costs are not levied on health and environment)?



# Domestic food systems are exposed to risks arising from fragile and highly interconnected global systems

## Vicious cycles are emerging



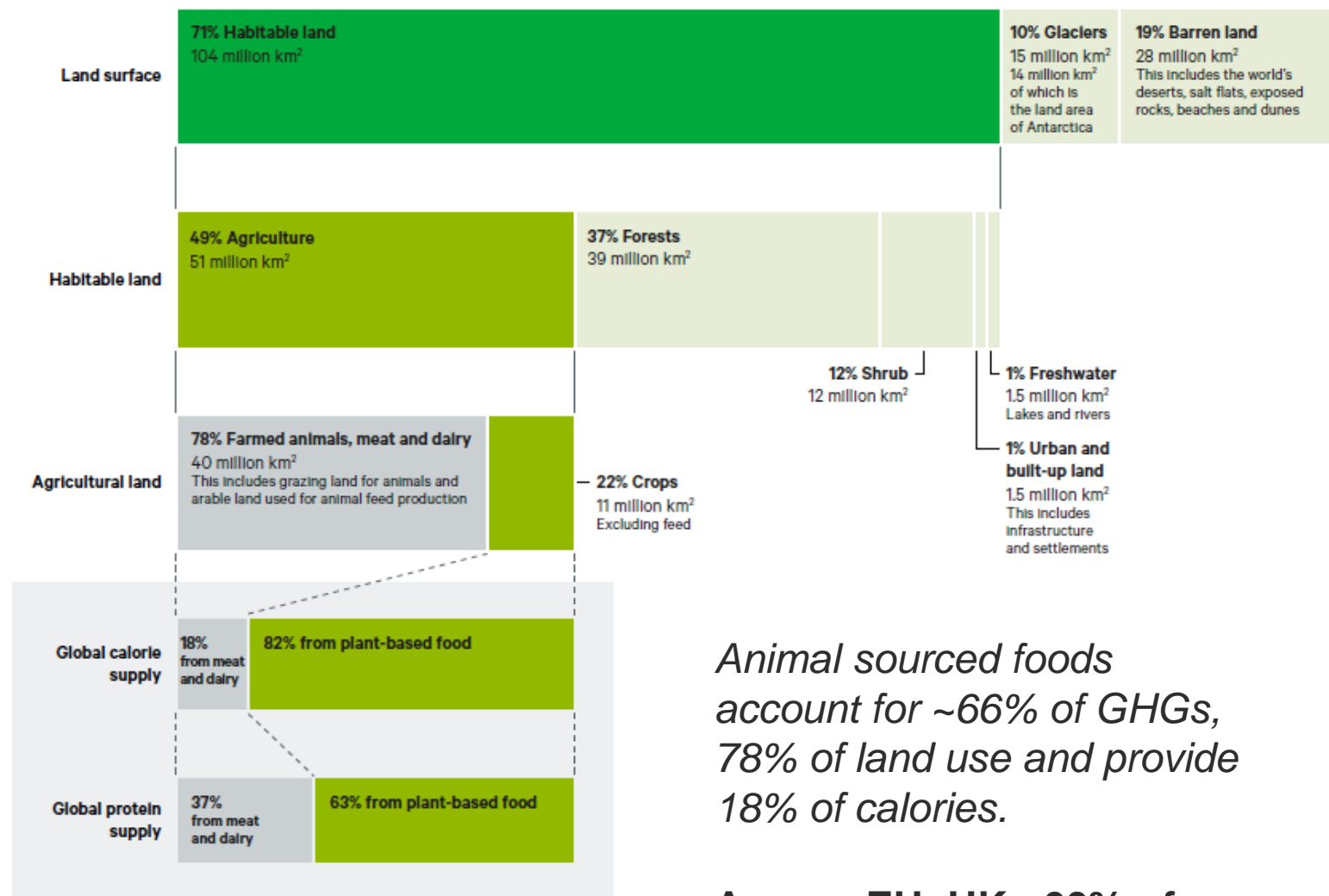
2022's crisis arises from climate x COVID x geopolitics and, looking ahead, likely more crises will arise year-on-year

# THE NEED FOR TRANSFORMATION

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# Food-systems are unsustainable

- Food systems are a major driver of climate change and ecological disruption.
- Conversion of native habitats/ecosystems to farmland.
- Creation of monocultural landscapes (with little space for nature).
- Pollution arising from pesticides, fertilizers and manure.
- *Poor diets are now the no 1 cause of global ill health*



*Animal sourced foods account for ~66% of GHGs, 78% of land use and provide 18% of calories.*

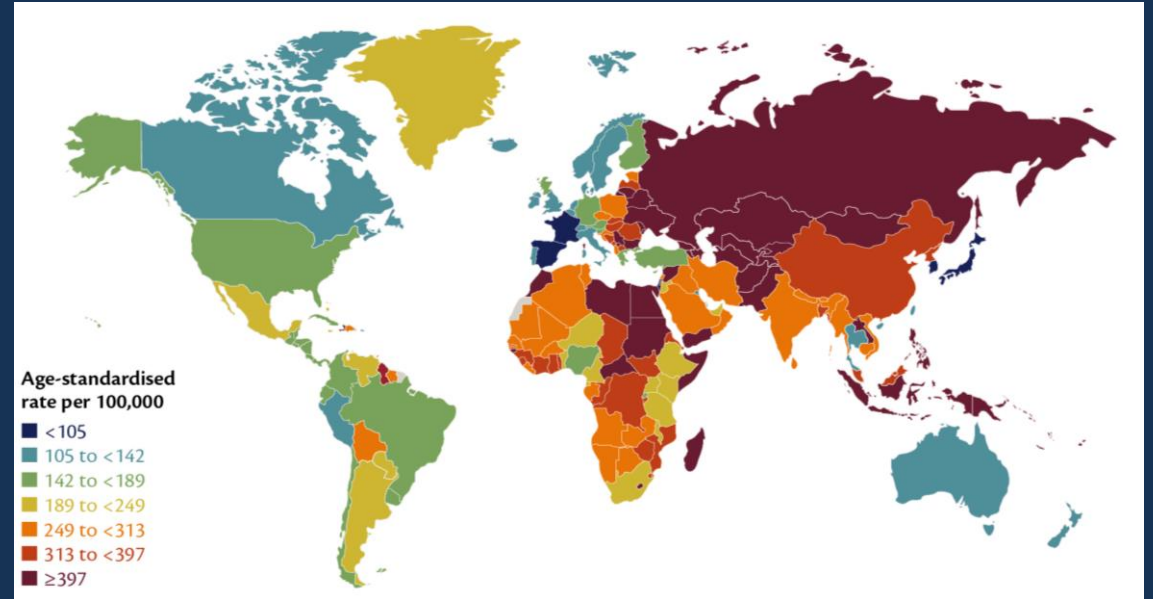
**Across EU+UK >60% of grain now grown for feed**



# 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 2020; UK total deaths from COVID ~250/100000)

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)

○ LIMIT SUGAR

MEAT &  
ALTERNATIVES

A truly sustainable food system won't arise from simply producing the same stuff in a different way:

Primary question not "how do we grow more?" but "what should we grow, how, how much and where?"



“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)*





*“Sustainable” intensification & land sparing to meet inevitably increasing global food demand*

*Agro-ecological approaches (land sharing) and land-sparing enabled by demand-reduction through adopting healthy, sustainable, low-waste consumption.*

# CONTESTED VISIONS FOR A “SUSTAINABLE FOOD SYSTEM”

...each version is based on sets of assumptions, which are mainly *ideological not “fact”*

# Core issues at the heart of the debate

<b>Sustainable Ag Version 1</b>
“Sustainable” intensification & land sparing to meet inevitably increasing global food demand
<b>Key Assumptions</b>
Demand is exogenous and <b>will increase</b> as population size and wealth increase
Growing market demand <b>requires</b> productivity growth to raise supply
Dietary change is <i>difficult</i> and <b>not</b> the preserve of policy
The potential for technologically led sustainable intensification is <b>large</b>
Land sparing is <b>enabled</b> by sustainable intensification

# Core issues at the heart of the debate

## Sustainable Ag Version 2

Agro-ecological approaches (land sharing) and land-sparing enabled by demand-reduction through adopting healthy, sustainable, low-waste consumption.

## Key Assumptions

Demand **can** be changed and should be shaped by social needs through regulatory change leading to structural change in markets

The current unsustainability of farming is a form of **market failure** that can be corrected

A **healthy** diet is also a (more) **sustainable** one

Agro-ecological approaches can supply sufficient nutrients to “feed the world” **if consumption patterns change**

Agro-ecological approaches are **more sustainable** than sustainable intensification

# Contrasting visions of “sustainable agriculture”: is beef bad?

(Schader C et al. 2015 J. R. Soc. Interface 12: 20150891)

## Maximising production efficiency (Version1)

- Sustainable intensification (maximising agricultural output efficiency on farm)
- Dietary change devolved to “consumer choice” based on LCA hierarchy (beef to chicken to beans), eating from “more efficient” intensive systems



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## Maximising systemic efficiency (Version2)

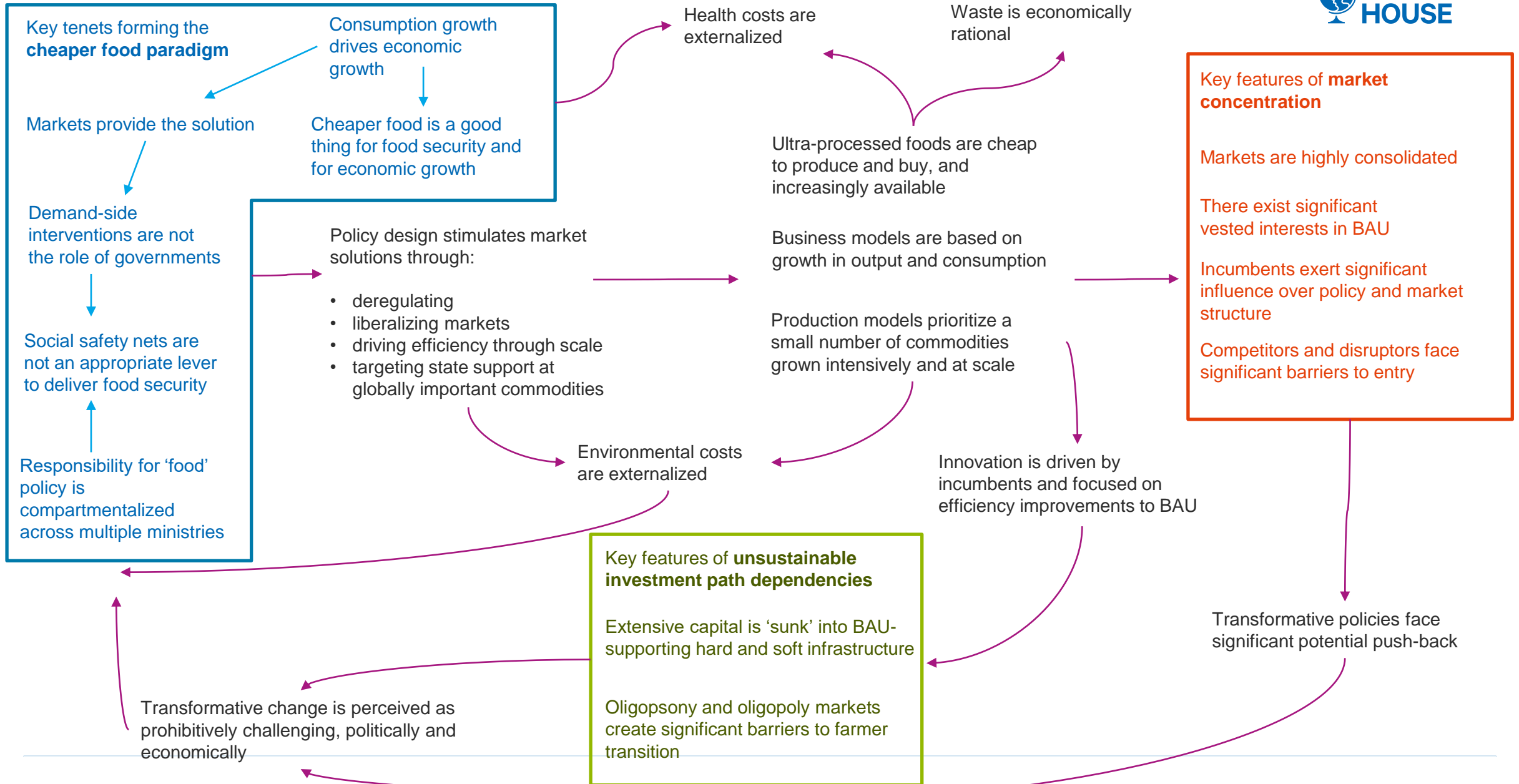
- Integrated agricultural landscapes (land sharing) – diverse, heterogenous, vital role for ruminants
- Dietary change based more on market restructuring to encourage “less but better” (less beef, but beef from agro-ecological approaches, avoiding grain-fed livestock)



# LOCK-INS

The food system has a lack of functional resilience but a lot of structural resilience

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# Market concentration has arisen deliberately



## Inputs

50%



### Seeds

4 companies control 50% of the market: Bayer, Corteva, ChemChina/Syngenta, and BASF

## Trading

40%



### Traders

10 major traders control 40% of the global market: Cargill, COFCO Corp, Archer Miller Daniels (ADM), Wilmar, Bunge, Itochu, Louis Dreyfus Company, Viterro, Olam International, and Conagra

34%



### Food and beverage processors

10 major processors account for 34% of global sales: PepsiCo, Nestle, JBS, Anheuser-Busch InBev, Tyson Foods, Mars, Archer Miller Daniels (ADM), Coca-Cola, Cargill, and Danone

## Processing

10%



### Retailers

10 major retailers account for 10% of global sales: Walmart, Schwarz Group, Kroger, Costco, Carrefour, Aldi Sud, Tesco, Seven and I Holdings, Ahold Delhaize, and Rewe Group

60%



### Agrochemicals

4 companies control 60% of the agrochemical market: Bayer, Corteva, ChemChina/Syngenta, and BASF

40%



### Farm machinery

4 companies account for 40% of global sales: Deere & Company, Kubota, CNH Industrial, and AGCO

# WHAT SHAPES THE FUTURE?

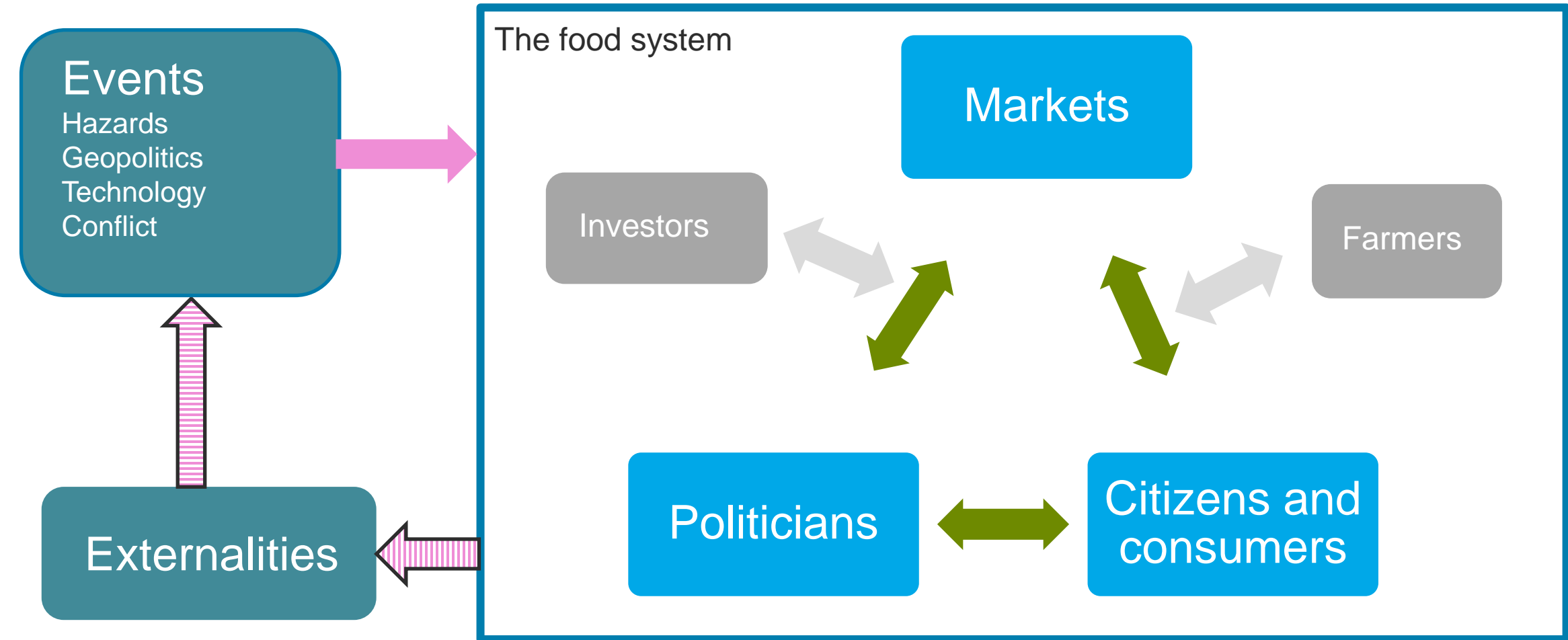
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# What shapes the future?



# 4 LEVERAGE POINTS – AND 14 TYPES OF LEVERS - FOR CHANGE

The food system has a lack of functional resilience but a lot of structural resilience

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# Leverage Point 1

Lever	Instruments and interventions	Objective(s)	Lock-ins addressed		
			1	2	3
Leverage point 1: Changing the structure of the market					
Regulate practices that incur significant environmental and social costs	Regulation of environmentally harmful corporate practices; regulation of health-harming corporate practices; regulation of financial speculation	Create a legal mechanism through which to prohibit harmful practices and to hold agribusinesses accountable for paying the costs of non-compliance			
Rebalance incentive structures	Taxation; agricultural subsidy reform	Increase the economic rewards of responsible corporate practice; increase the costs of irresponsible practice			
Stimulate demand for net-positive practices and products	Sustainable trade policy; common international standards on net-positive practices and products; regulation of the food environment; consumer incentives; R&D investment; private-sector investment	Reduce barriers to entry for businesses committed to more sustainable, health-enhancing practices, and for citizens looking to eat more sustainable and healthily			
De-risk change for market actors	Enabling regulatory environments for net-positive innovation; financial support for net-positive innovation; contractual changes to enable net-positive innovation	Tackle regulatory, financial and behavioural barriers to change			
Promote greater market competition	Competition law; windfall tax	Lower the barriers to entry for smaller and/or disruptive businesses; disrupt cycles of increasing consolidation among large agribusinesses			

1= governments and intergovernmental organizations, 2= farmers and citizens, 3= investors and large agribusinesses



# Leverage Point 2

Lever	Instruments and interventions	Objective(s)	Lock-ins addressed		
			1	2	3
Leverage point 2: Building market transparency					
Codify corporate requirements on disclosure and due diligence	Disclosure requirements; due diligence requirements; improvements to ESG data	Build greater transparency of the externalities of corporate practices and products; strengthen the evidence base for sustainable investment			
Limit the scope for 'greenwashing'	Common standards for 'sustainable' corporate activity; independent benchmarking of corporate and investor performance	Differentiate between incremental and transformative corporate action; increase external pressure on corporates to pursue sustainable transition			
Limit the scope for the misuse of corporate influence	Regulation of corporate influence on political processes; regulation of 'green killer' acquisitions	Limit opportunities for market consolidation to stifle sustainable transition			

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# Leverage Point 3

Lever	Instruments and interventions	Objective(s)	Lock-ins addressed		
			1	2	3
Leverage point 3: Unlocking political change					
Build citizen pressure for transformative change	Awareness-raising; public interest litigation; an enabling environment for citizen-led advocacy	Heighten citizens' awareness of 'hidden' externalities; build broad support for change; reduce the political risk of change; increase the reputational risk of inaction			
Foster ambition for transformative change through multilateral processes	Commitments under MEAs; delivery across MEAs	Set pathways and parameters for national-level action; heighten multilateral pressure for change			
Create the conditions for a just transition	Social safety nets; changes to education and training	Mitigate the risk of unintended, negative impacts; build broader support for change			

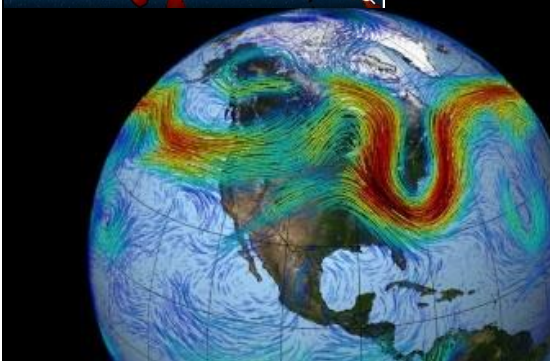
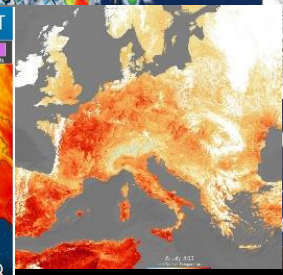
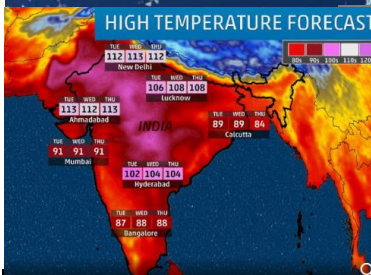
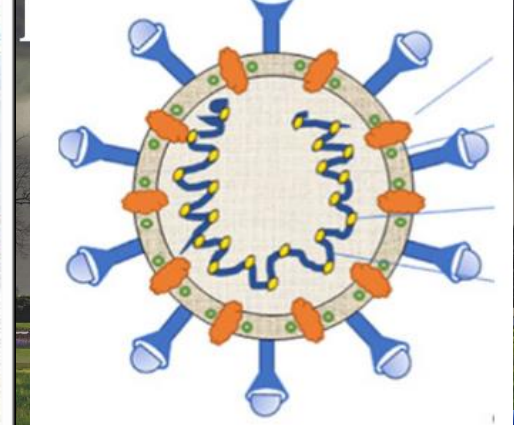
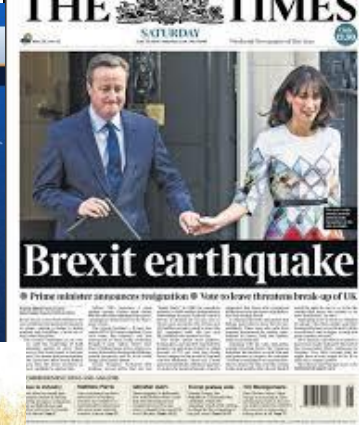
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# Leverage point 4

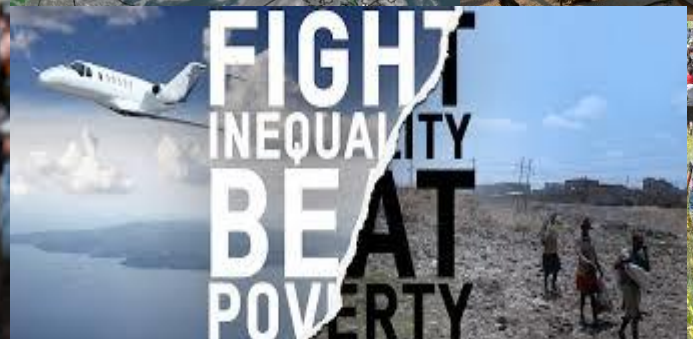
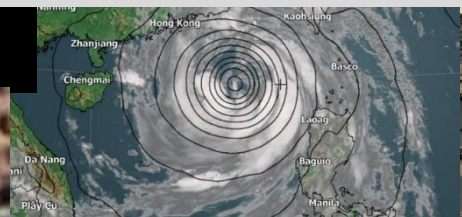
Lever	Instruments and interventions	Objective(s)	Lock-ins addressed		
			1	2	3
Leverage point 4: Mainstreaming a strategic, systems approach to change					
Articulate a clear vision for transition	Science-based targets for food system transformation; institutional commitments to sustainable transition	Build the evidence base for government and corporate strategies for system transformation and sustainable transition; create a more predictable policy and regulatory environment for business			
Create the necessary structures for a whole-of-government or whole-of-institution approach to strategy design	Systems approach to cross-government policy; alignment of corporate incentives with sustainable transition strategy	Embed system transformation and sustainable transition within institutional decision making; overcome siloes of policy and action that inhibit transformative change			
Embed true-cost accounting and system-positive appraisals in decision making	Application of true-cost accounting frameworks to institutional setting; embedding of true-cost accounting in strategic decision making	Enhance understanding at institutional level of environmental and social externalities incurred by policy decisions, investments and corporate practice; drive decision making aligned with institutional strategies for system transformation and sustainable transition			

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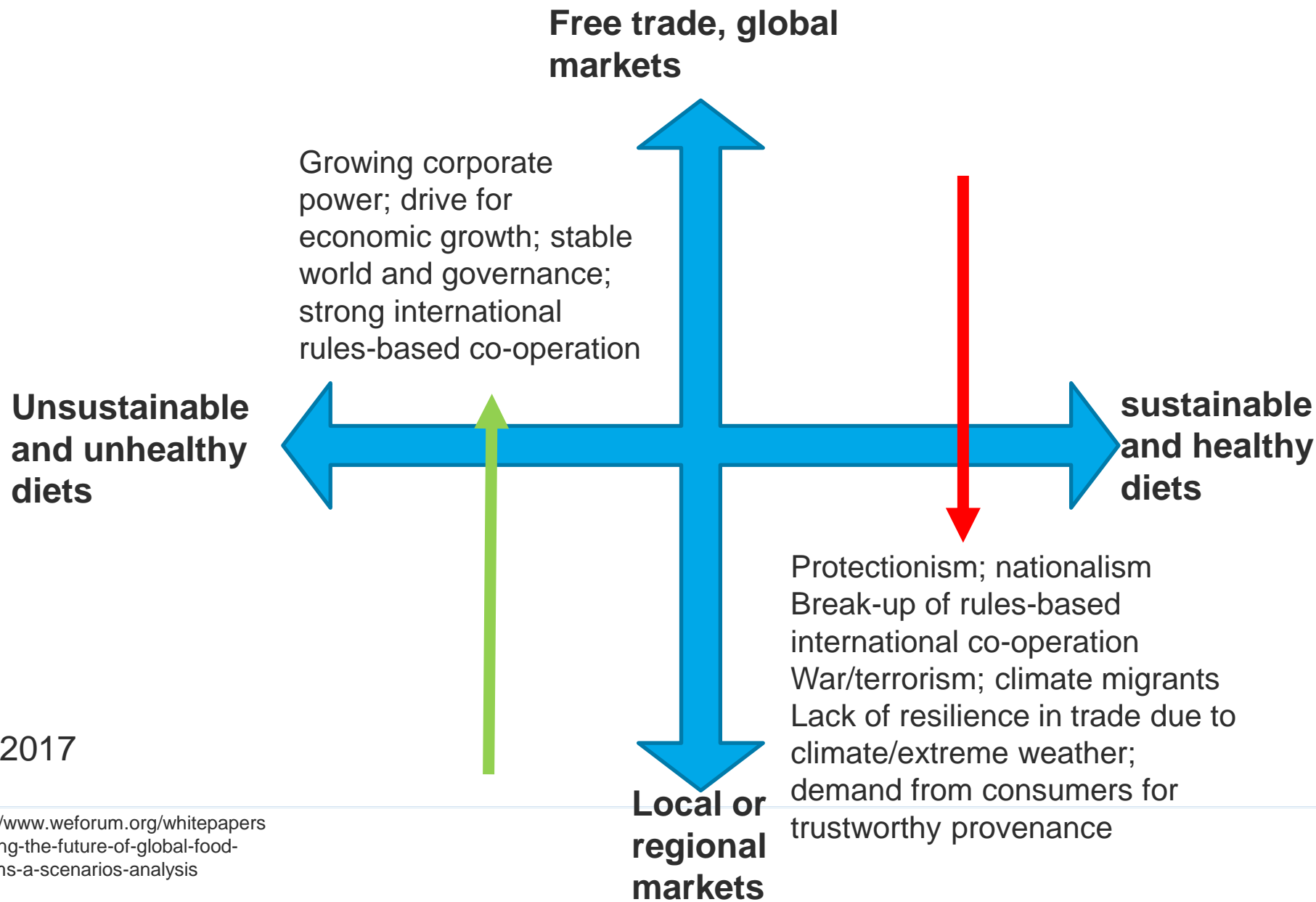


*Events happen that reshape markets, politics and attitudes*

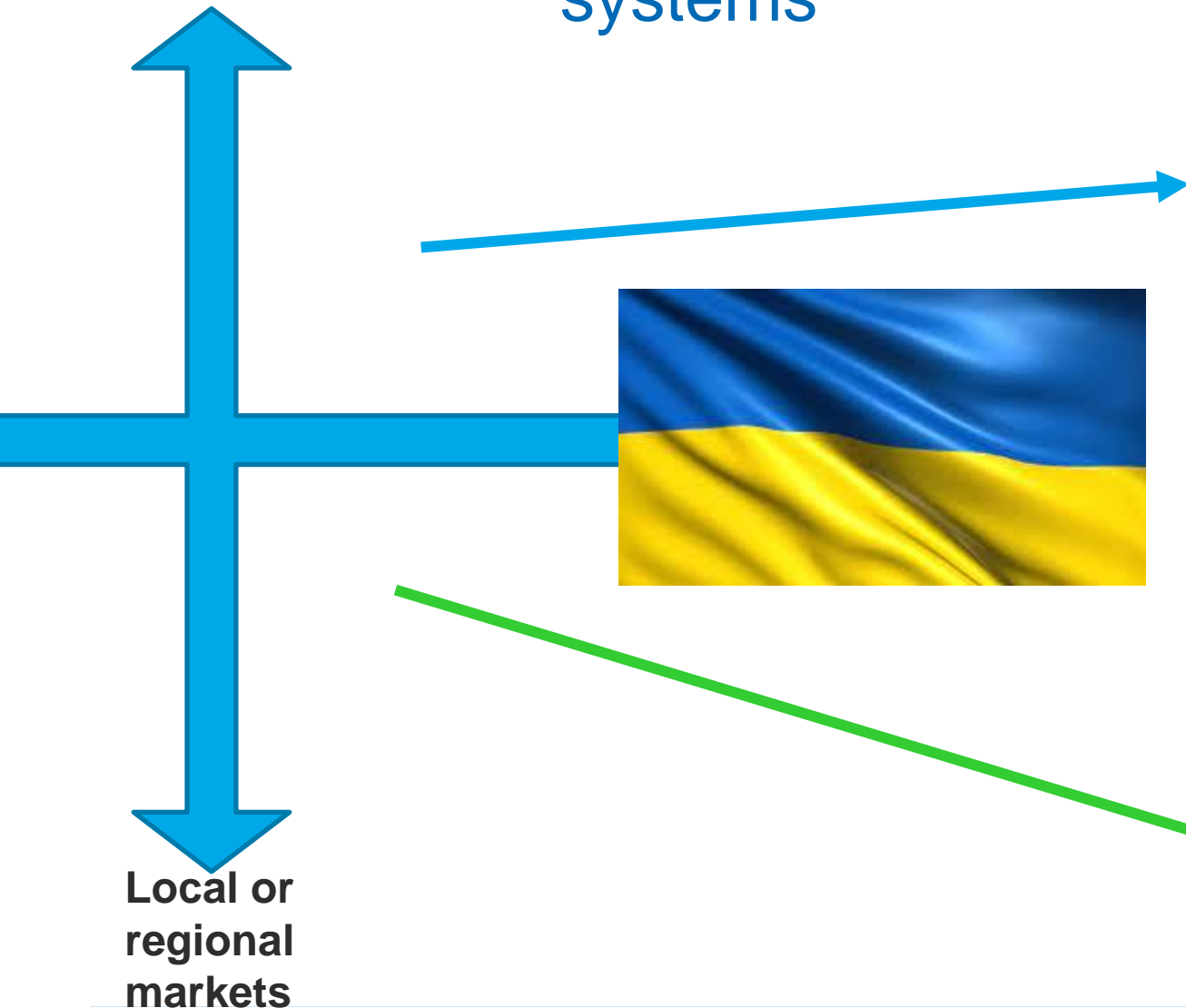




# Future of food systems



# Different futures, different food systems



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



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





# CONCLUSIONS

In the long run, change is necessary. But, unlocking change requires a “real” systemic approach to move beyond “supply chain” or “supply and demand” thinking

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# Food system transformation is needed for human health, to protect biodiversity and reduce climate change impacts

- **There is an overly strong focus on technology to “unlock change”...**
- **Systemic change is unlikely to arise unless citizens, farmers and investors enable political change that changes the “rules of the game” and unlocks the lock ins**
- **Structural market change (trade, subsidies, research, taxes, availability, incentives, public procurement, education) is needed to invert the business model of large agri-business**
- **No lever is too small to pull, but real systemic change requires concentrated pressure on a smaller number of leverage points. Such pressure is as likely to come from “events” as from within**
- **Assertions that we need to grow ever more to feed the world are based on assumptions (with ideological underpinnings) not fact**



# Thank you!

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