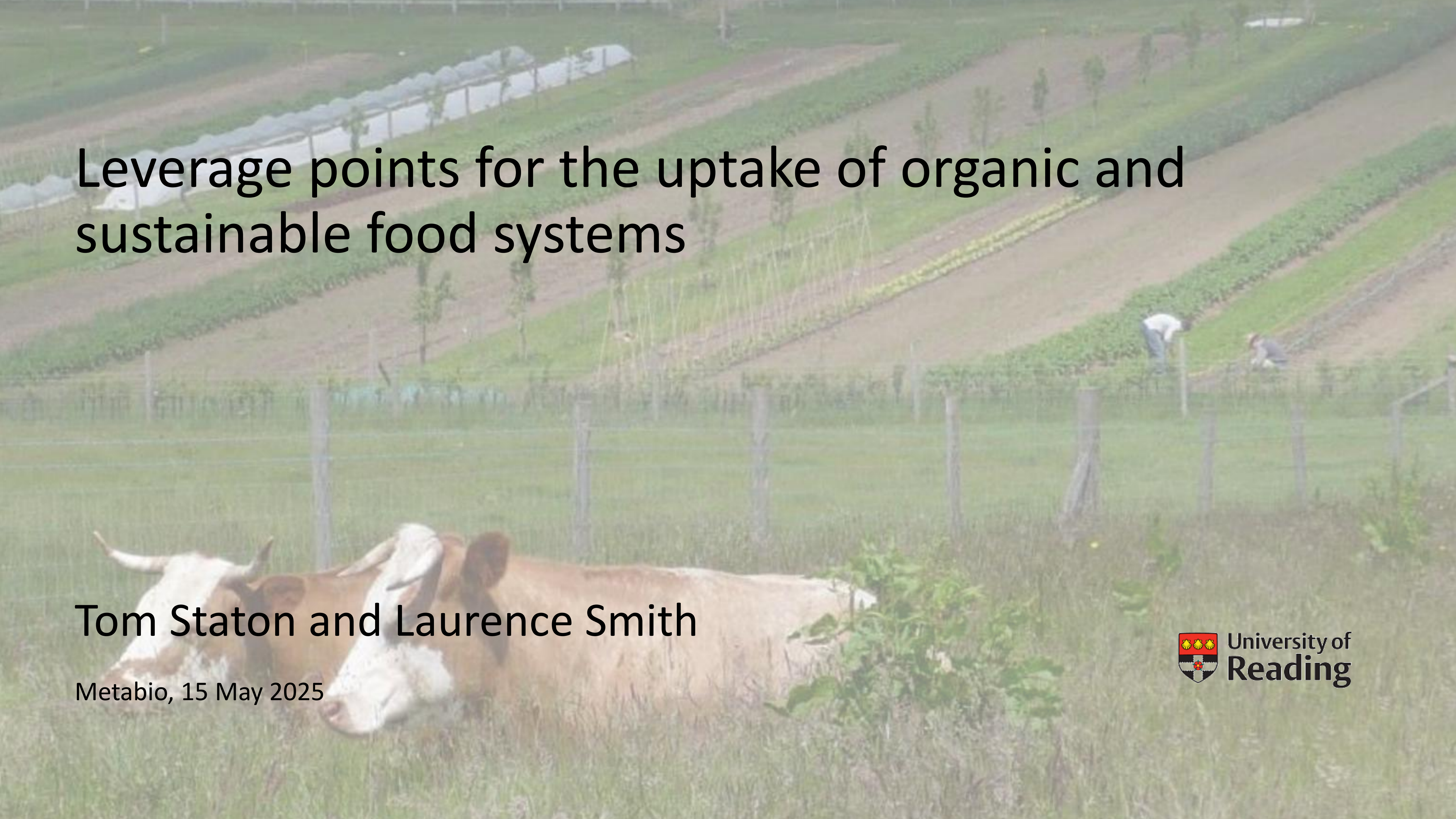


Leverage points for the uptake of organic and sustainable food systems

Tom Staton and Laurence Smith

Metabio, 15 May 2025

University of Reading

Structure

1. Introduction to organic farming in the UK and the leverage points concept

2. Identifying leverage points for the uptake of organic food production and consumption

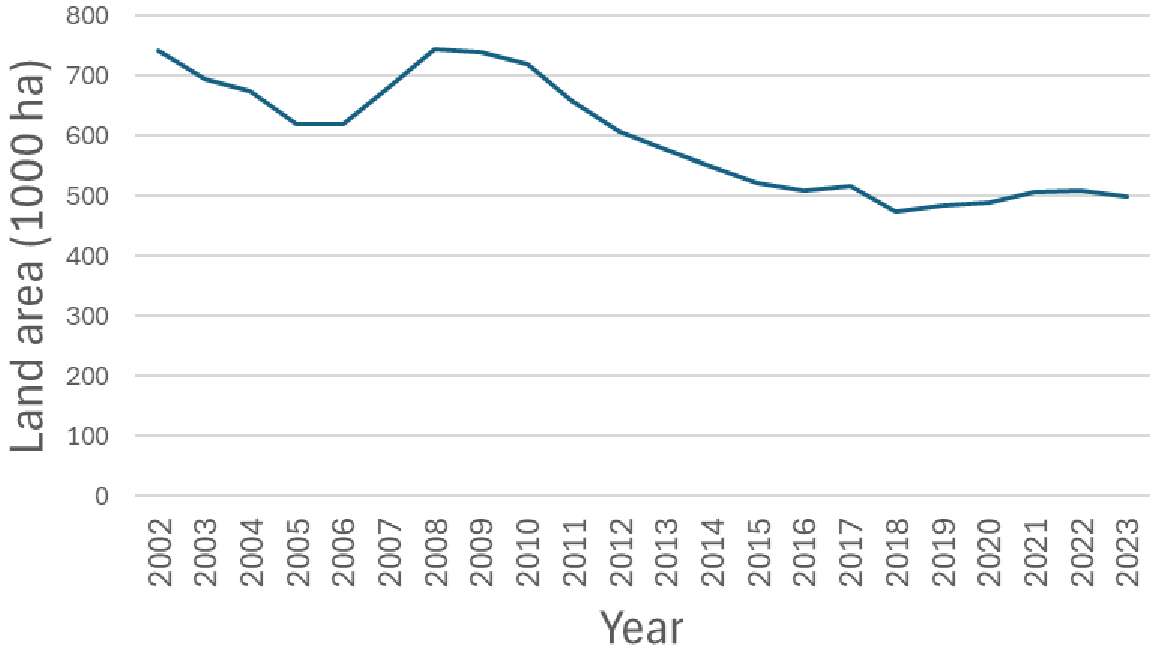
3. Impacts of future sustainability scenarios

4. Implications – transformative change

1. Introduction to organic farming in the UK and the leverage points concept

Organic agriculture in the UK

- Organic land area has decreased by 33% in UK since 2002
- One of the highest decreases of European countries[1]
- But strong regenerative agriculture movement based on organic principles[2]



Organic land area (in conversion and fully organic) in the UK.
Source: Defra, organic farming statistics 2023

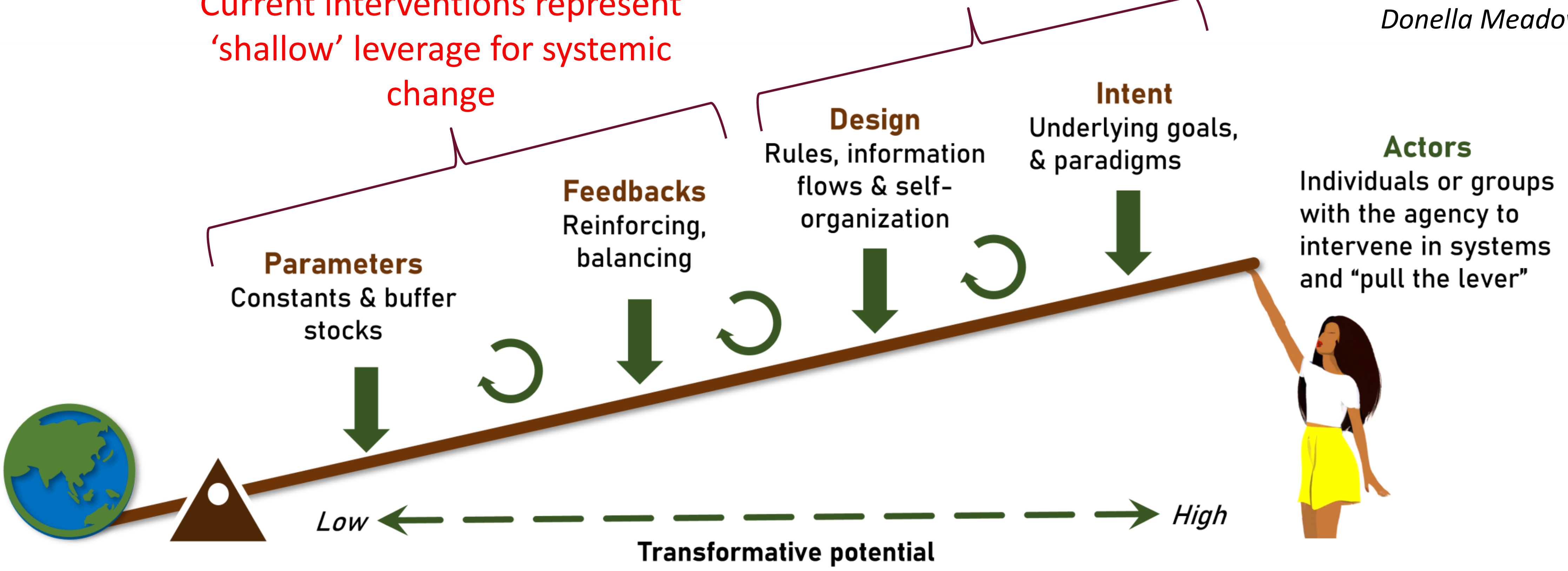
[1] Schlatter *et al* 2022. *The World of Organic Agriculture: Statistics and Emerging Trends 2022.*
[2] Cusworth *et al* 2021. Agroecological break out: Legumes, crop diversification and the regenerative futures of UK agriculture. *J. Rural Studies.*

Leverage points concept: an overview

Donella Meadows

Deeper leverage points have great potential, but are under-researched

Current interventions represent ‘shallow’ leverage for systemic change

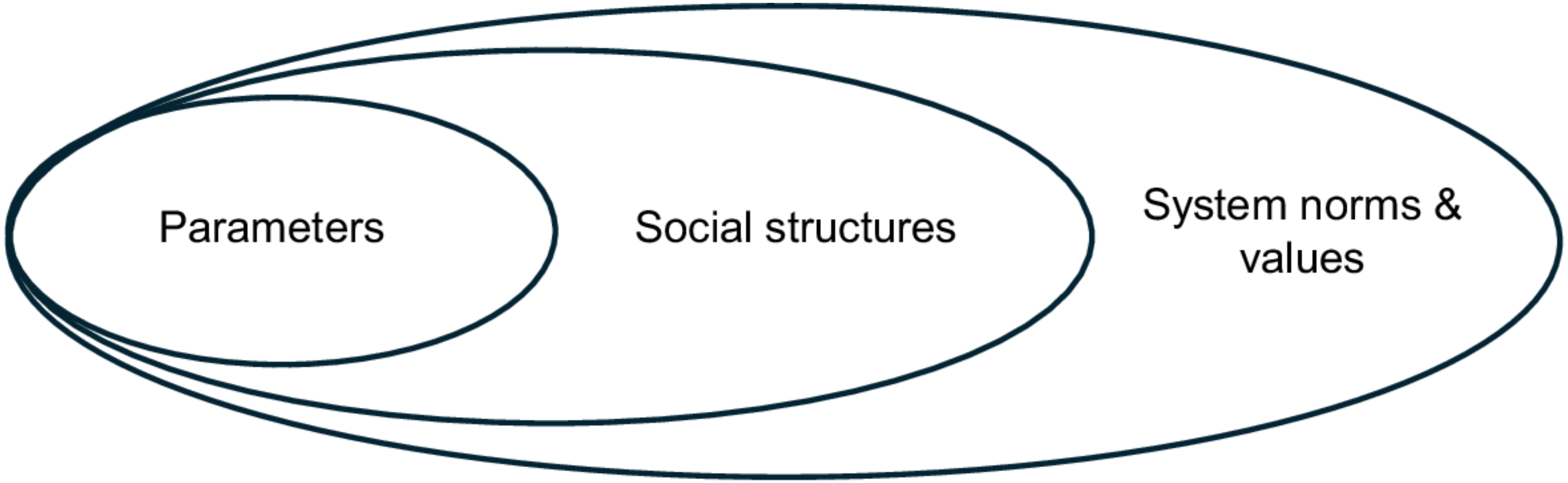


Meadows 1999. *Leverage Points: Places to Intervene in a System*

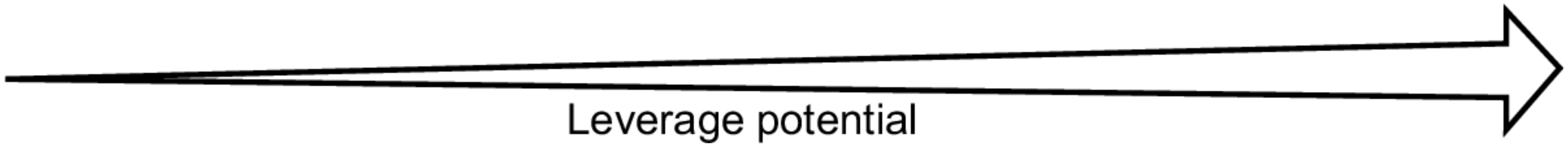
Abson *et al* 2017. Leverage points for sustainability transformation. *Ambio.*

Image from https://leverage-points.com/

Adaptation of leverage points for food systems



	Parameters	Social structures	System norms & values
Description	Quantitative mechanistic characteristics including financial and physical factors	Institutional structures and targets, information flows	Values and worldviews of actors that shape interactions within the system
Examples for sustainable food systems	Taxes, subsidies, food supply, land use, carbon stocks	Gov't targets to improve agricultural sustainability, public education of environmental impacts of food production	Consumer views on the importance of sustainable food; ecocentric farmer outlooks



Staton *et al* 2024. Leverage points for the uptake of organic food production and consumption in the United Kingdom. *Communications Earth & Environment*

Study aims

Aim: Identify deep leverage points for the development of organic and sustainable farming systems

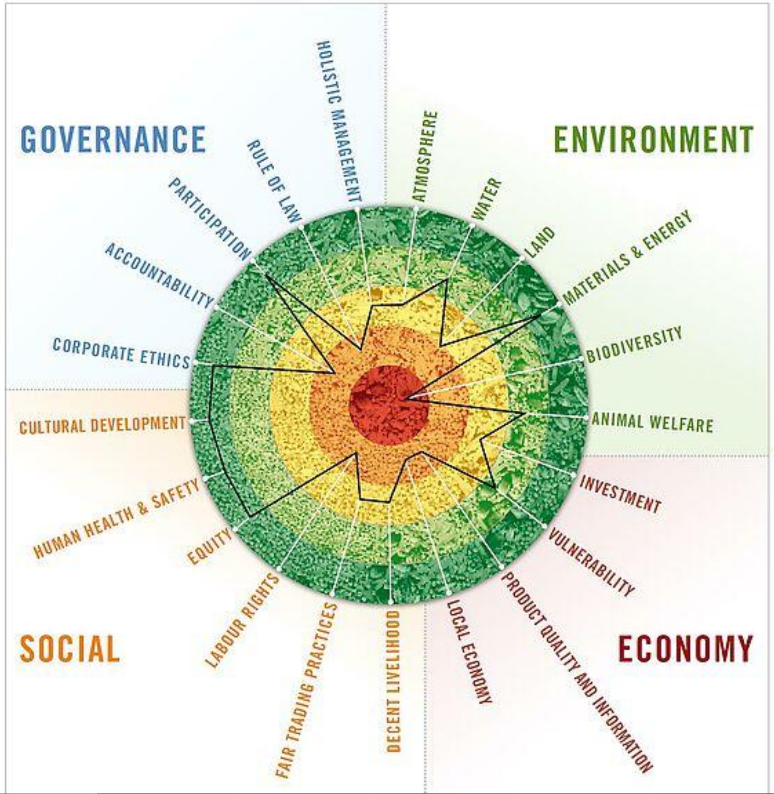
Research questions:

1. What are the main factors that could affect the uptake of organic food production and consumption in the UK by 2050?
2. How might these factors change under different future sustainability scenarios?

2. Identifying leverage points for the uptake of organic food production and consumption

Workshop 1: aims and methods

- Workshop aim: identify the main factors that could affect the uptake of organic food production and consumption in 2050 within the UK
- How do these factors influence each other?
- 18 participants (government, academic institutions, certification bodies & charities, organic farming groups)
- Fuzzy Cognitive Mapping used to visualise factors and interactions



	A	B	C	D	E	F	G
1–2	WHEN THE VERTICAL COMPONENT INCREASES WHAT HAPPENS TO THE HORIZONTAL COMPONENT? DOES IT INCREASE A LITTLE (+), MODERATELY (++), A LOT (+++), DECREASE A LITTLE (-), MODERATELY (--), A LOT (---), OR STAY THE SAME (0)?		HORIZONTAL COMPONENTS Carbon and biodiversity credits	Carbon and biodiversity taxes	Price of organic food	Fossil fuel prices	Consumer willingness to pay for organic
3	VERTICAL COMPONENTS	Carbon and biodiversity credits	0		-		
4		Carbon and biodiversity taxes		0	-		
5		Price of organic food			0		--
6		Fossil fuel prices			++	0	
7		Consumer willingness to pay for organic	+		---	--	0
8		Cost of living					
9		Subsidies / payments under AES			0		
10		Processing capacity					
11		Amount of direct marketing					+
12		Access to green spaces					
		Training and education of new farmers			+		

UK Centre for Ecology & Hydrology

Soil Association Organic

Royal Agricultural University

organic arable

Department for Environment Food & Rural Affairs

University of Reading

Sustainable Food Trust

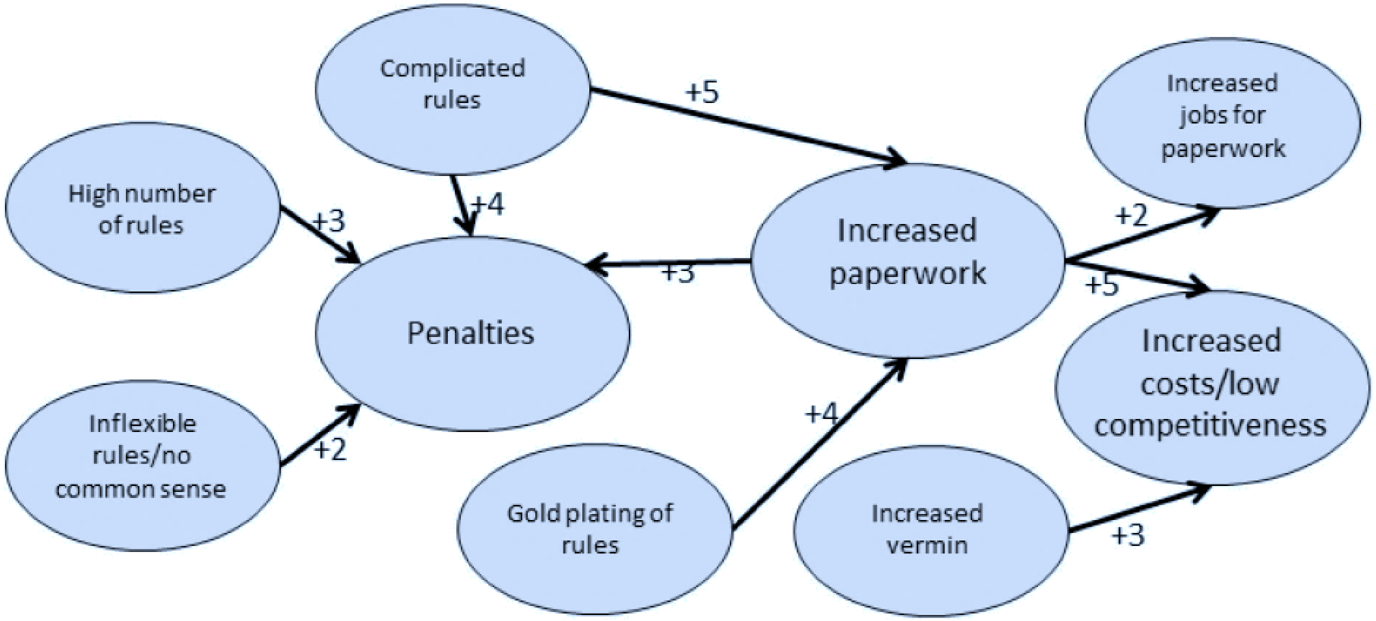
OF&G Organic

biodynamic uk association

Methods: Fuzzy Cognitive Mapping (FCM)

- Knowledge of a system is made up of concepts, interdependencies and causes
- These can be uncertain, imprecise and 'fuzzy'

How do environmental regulations affect farmers and farming practice?



Christen *et al*. 2015. Can fuzzy cognitive mapping help in agricultural policy design and communication? *Land Use Policy*

Results: Simplified FCM

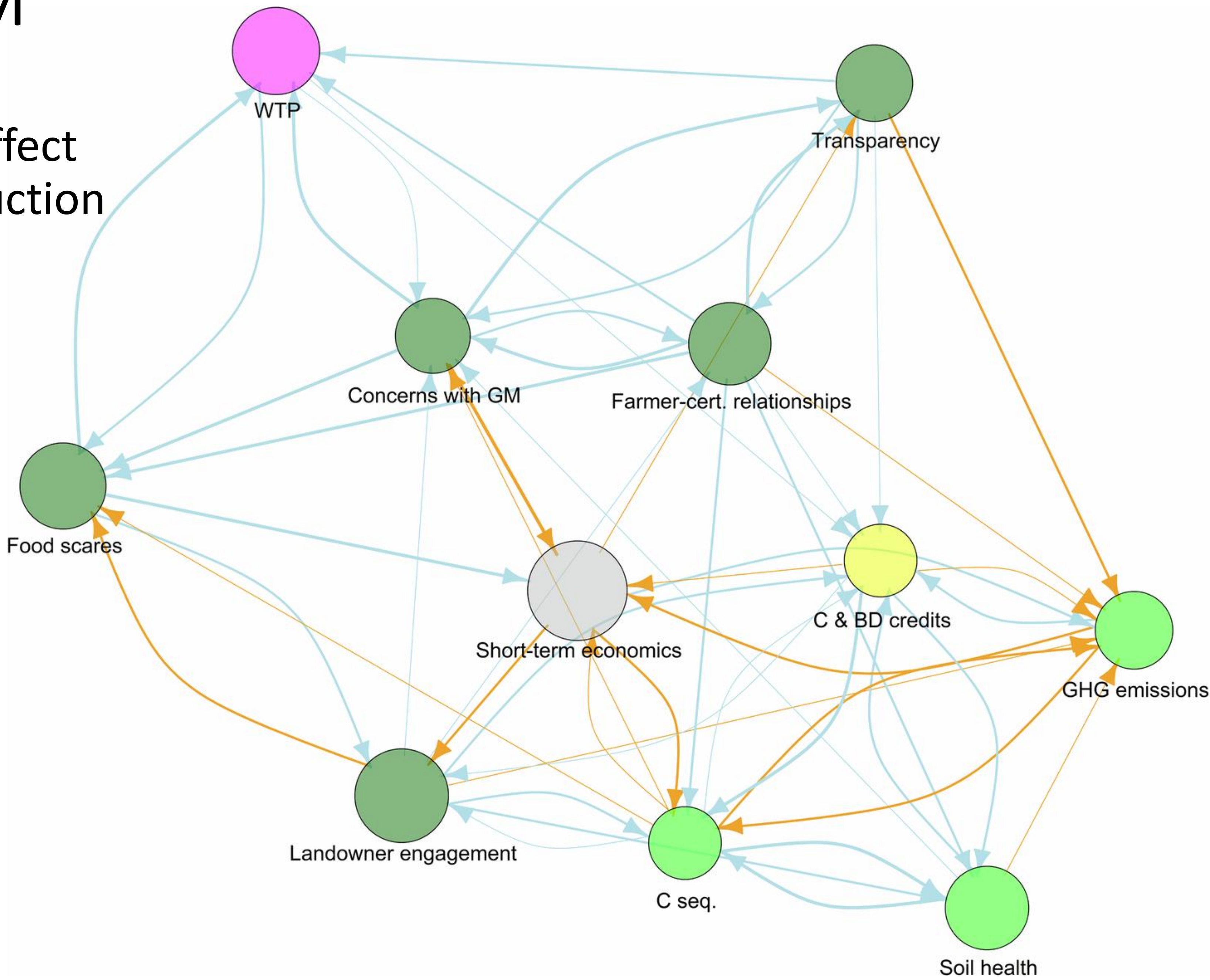
Top 11 of 55 factors that could affect the uptake of organic food production and consumption

- Governance
- Economic
- Environmental
- Social
- Other

positive interaction

negative interaction

Line width = strength of interaction



Results: Which factors are most important?

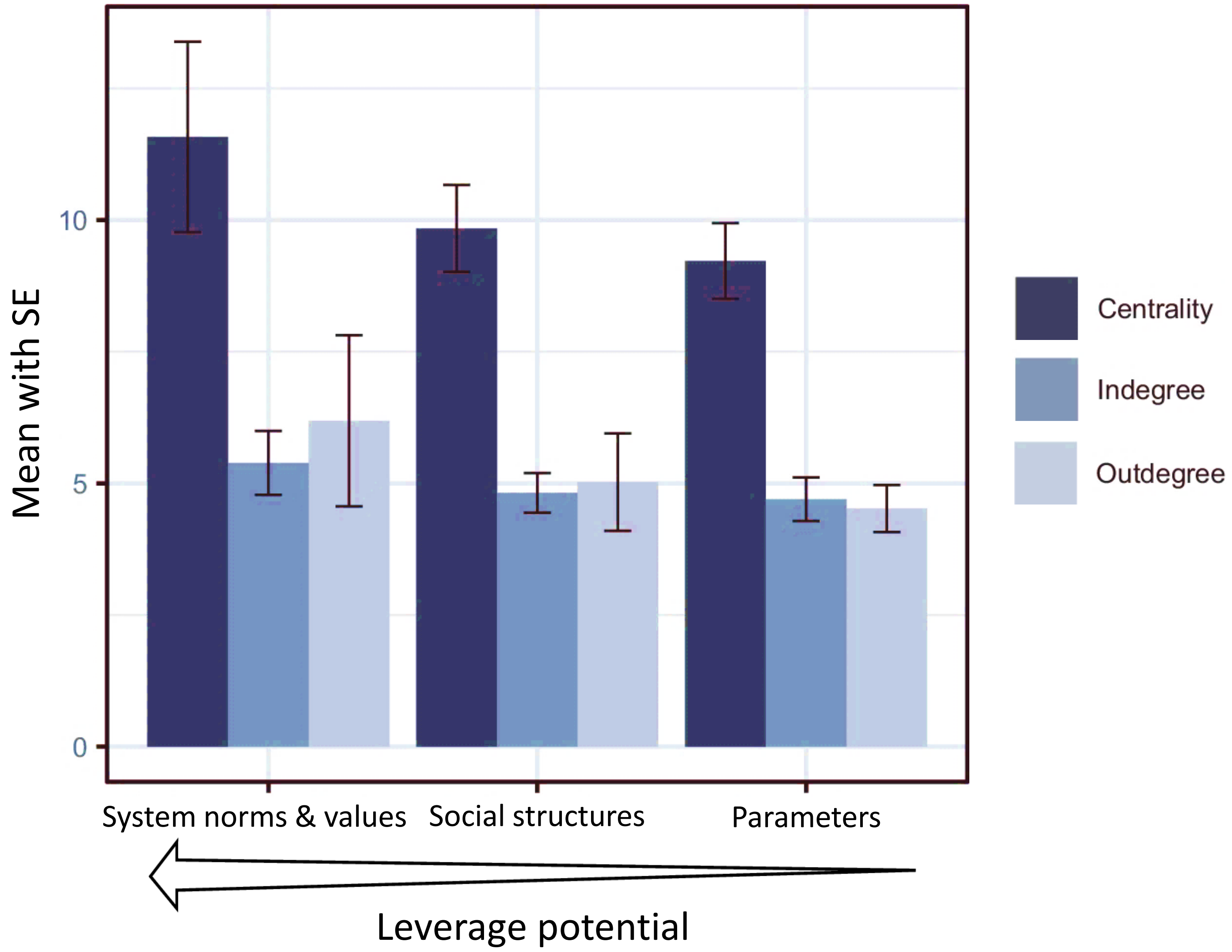
Influenced by the system

Influence on the system

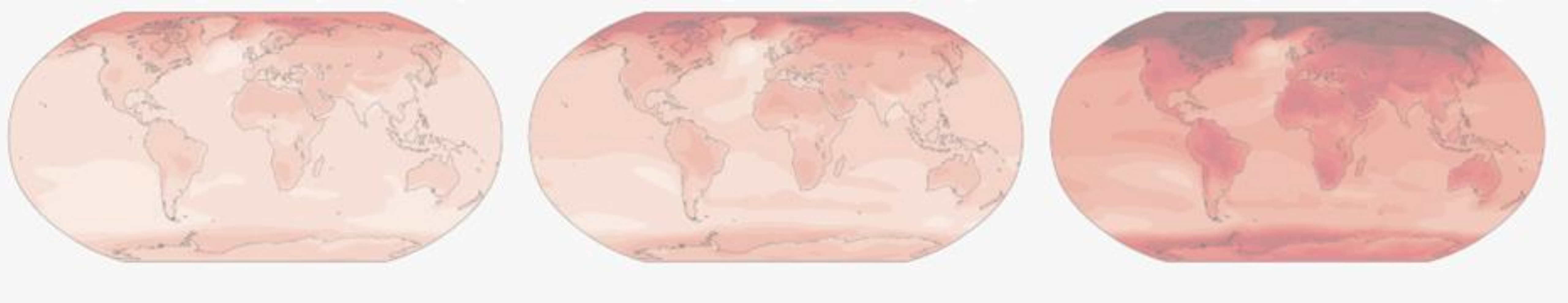
Outdegree + indegree

Factor	SAFA Dimension	Outdegree	Indegree	Centrality
Short term thinking in economics	Other	11.9	6.7	18.6
Landowner engagement with organic farming	Social	13.1	4.4	17.5
Consumer willingness to pay for organic	Economic	8.1	8.2	16.3
Food scares	Social	9.0	7.1	16.1
Soil health	Environmental	7.8	7.8	15.6
Farmer-certification body relationships	Social	12.8	2.6	15.4
GHG emissions	Environmental	5.3	9.2	14.5

What about leverage points?



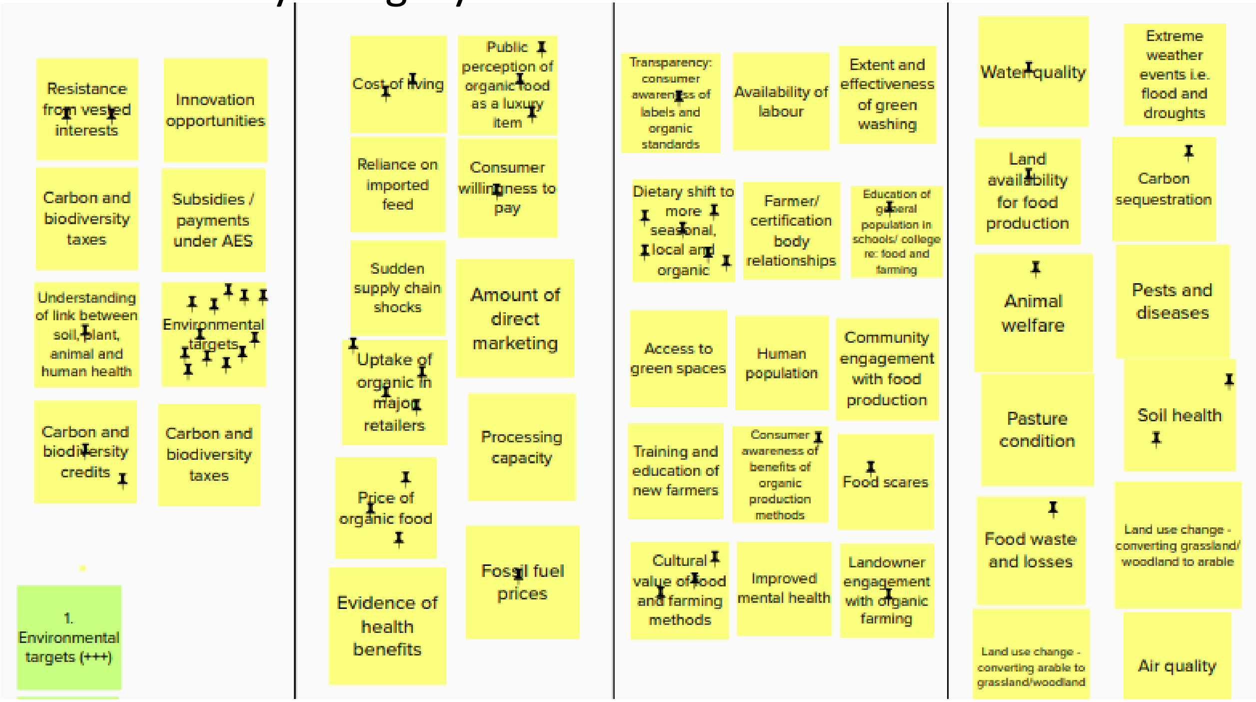
3. Impacts of Future Sustainability Scenarios

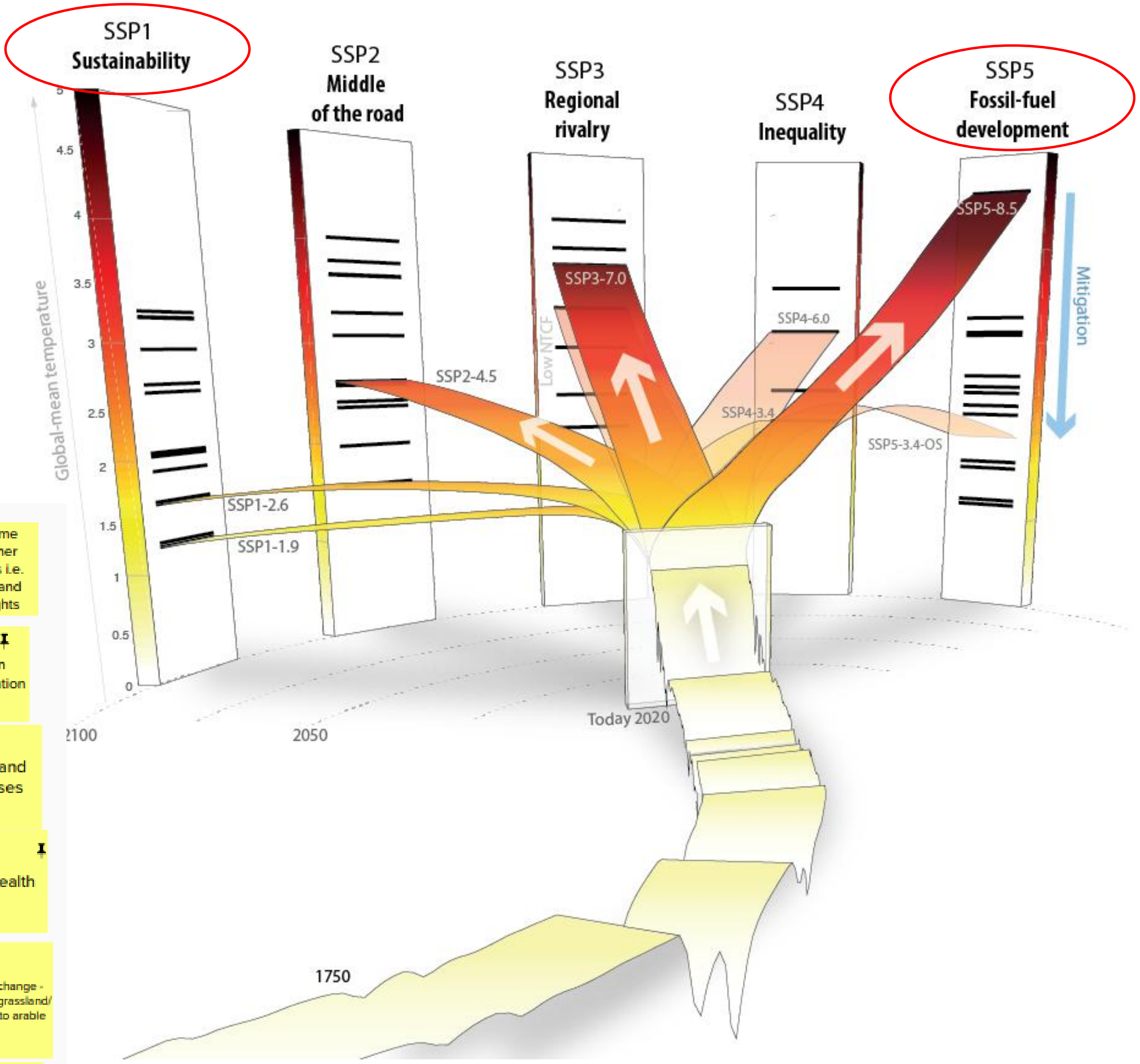


Workshop 2 Methods

Workshop aim: '*How would the factors under each pillar of sustainability (governance, environmental, economic, social) change under each SSP scenario?*'

Each participant voted for one factor in each sustainability category





O'Neill et al. 2017. The roads ahead: Narratives for shared socioeconomic pathways describing world futures in the 21st century. *Global Environmental Change*.
Mitter et al. 2020. Shared Socio-economic Pathways for European agriculture and food systems: The Eur-Agri-SSPs. *Global Environmental Change*.

Results: Scenario analysis

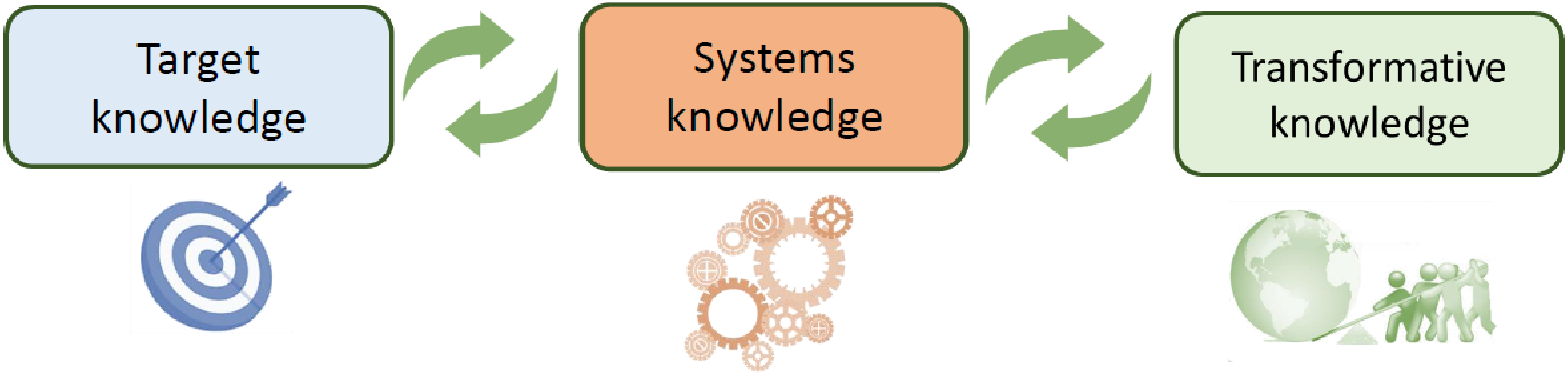
SSP1 (taking the green road)

- Greatest effects on
  - short-term economic thinking (↓)
  - green washing (↓)
  - vested interests (↓)
- BUT overall change in the system was low, indicating limited change in uptake of organic agriculture
- Factors voted for were shallower leverage points

SSP5 (fossil-fuelled development)

- Greatest effects on
  - fossil fuel prices (↓)
  - reliance on imported feed (↑)
- Stronger system change, but less consensus on effects than SSP1 – more unpredictable scenario

4. Implications – Transformative Change



ProClim - Forum for Climate and Global Change. (1997) "Research on Sustainability and Global Change — Visions in Science Policy by Swiss Researchers".

How to bring about transformative change?

- Build public goods into economic systems and policies
- Food prices should represent true cost of production
- Systems should be designed to incentivise sustainable farming
- Regulate against green washing and vested interests
- Strategies to reduce food waste
- Connectedness to nature

Methodological insights

- FCM provided unique insights into under-studied, fuzzy concepts
- Useful for identifying leverage points in a complex, transdisciplinary system
- Demonstrates value of embracing social-ecological complexity
- FCM is a model of perceptions, not necessarily reality
- Findings and language depend on the participants
- More ‘conventional’ participants could provide further insights
- Application to other countries with distinct challenges would offer additional insights

Conclusions

- Findings support leverage points perspective
- Under-studied behavioural aspects tended to have greatest influence of the system
- Under a sustainable future, experts predicted that shallower leverage points would change the most
- Demonstrates need to expand our focus towards deeper leverage points e.g. longer-term economic thinking, landowner engagement, relationships with certification bodies.

Further reading

Based on an article published in Communications Earth & Environment (August 2024)

https://doi.org/10.1038/s43247-024-01585-3

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