CECAN Webinar:

Demystifying system thinking from within Defra – Reflections from case studies

Tuesday 12th December 2023, 09:30 – 10:30 GMT

Presenters: Dan McGonigle and Betheney Wills

Welcome to our **CECAN Webinar.**

All participants are muted. Only the Presenters & CECAN Host can speak. The webinar will start at **09:30 GMT.**

Dan and Beth will speak for around 45 minutes and will answer questions at the end.

Please submit your questions at any point during the webinar via the Q&A box in the Zoom webinar control panel.

Today's webinar will be recorded and made available on the CECAN website.

E Mail: cecan@surrey.ac.uk

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Department
for Environment
Food & Rural Affairs

Applying systems approaches in Defra

Case studies on land use, net zero and marine policy

Dan McGonigle

Head of Systems, Innovation and Futures

Central Science Division

Betheney Wills

Senior Social Researcher

Marine and Fisheries Directorate

Overview

Dan

- **Setting the scene** – why environmental policymaking is complex
- **Our journey into systems thinking** – a case study on land use

Beth

- **Systems case studies on marine policy**
- **Lessons learned**

Dan

- **Building systems capability in Government**


Air quality
Net zero
Landscape
Amenity
Pests and diseases
Bioenergy
Biodiversity
Food production
Adaptation to climate change
Balancing competing goals
Profit
Flood alleviation
Water quality
Timber
Water resources
Healthy soils
Rural jobs
House building

Sources of complexity

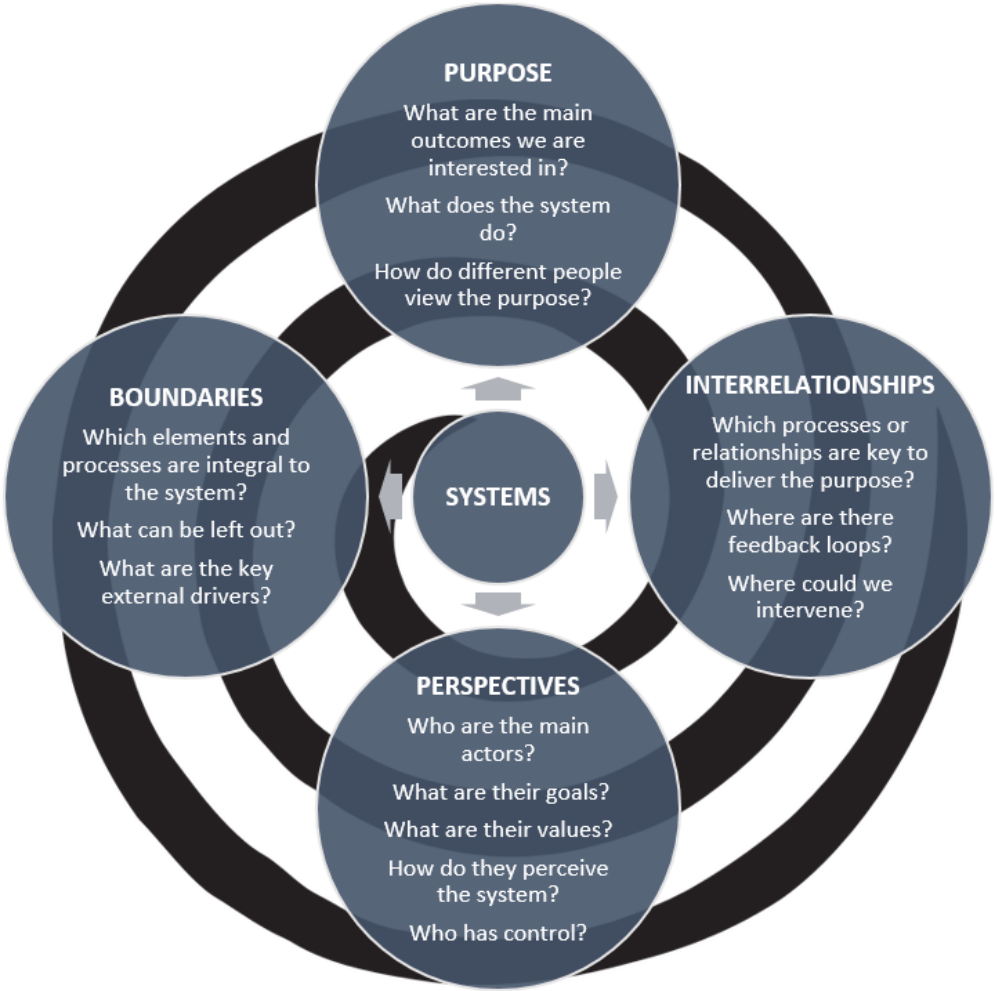
The Defra Systems Research Programme

- 2019 – post-Brexit: rapid parallel policy development across Defra and wider Govt
- Potential for unexpected interactions
- Defra science / evidence embedded in policy areas:
    + Strong policy contact
    - Cross-cutting work

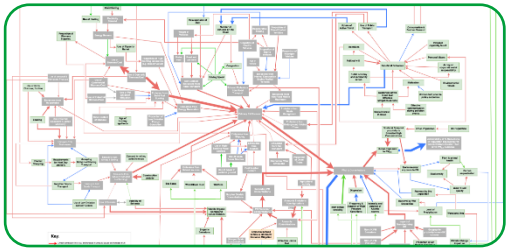
What?

- Central team focused on cross-cutting issues:
    - Trade-offs and synergies between policies
    - Unintended consequences
    - Emerging risks and opportunities
    - Embedding new ways of working

Bringing teams together to explore systems



Three applications for systems thinking in Government…



Framing policy discussions:

- Unpacking complex situations
- Managing conflicting policy goals
- Identifying areas for policy intervention

Working at the science-policy interface:

- Structuring transdisciplinary research
- Identifying knowledge gaps and prioritising research
- Contextualising fragmented evidence into a coherent narrative

Supporting dialogue with stakeholders:

- Understanding what matters to different people
- Considering multiple perspectives
- Dealing with conflicts and negotiations

Systems steps for policy exploration

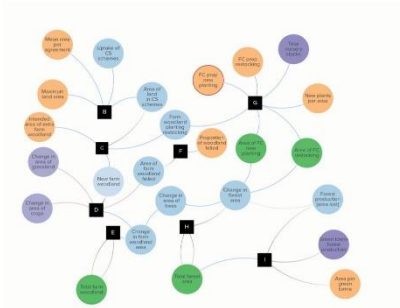
Deliberative workshops and interviews
- Explore system boundaries and key outcomes

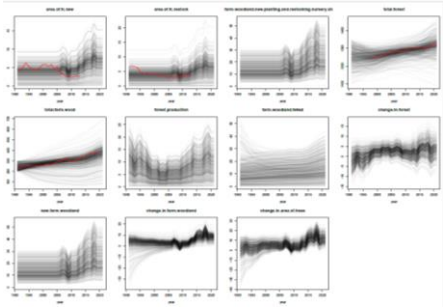
Causal loop mapping
- Identify key relationships driving the outcomes

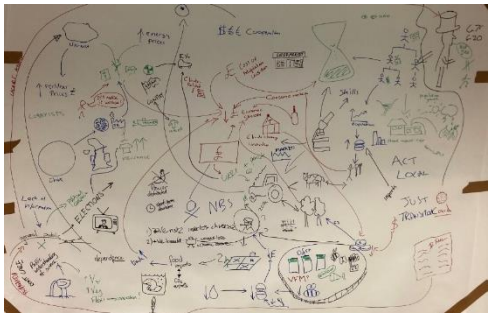
Evidence reviews and surveys
- Data on key variables
- Evidence on processes in key relationships

System dynamics modelling
1. Identify variables that have the strongest influence on outcomes
2. Eliminate redundant relationships
3. Explore policy scenarios

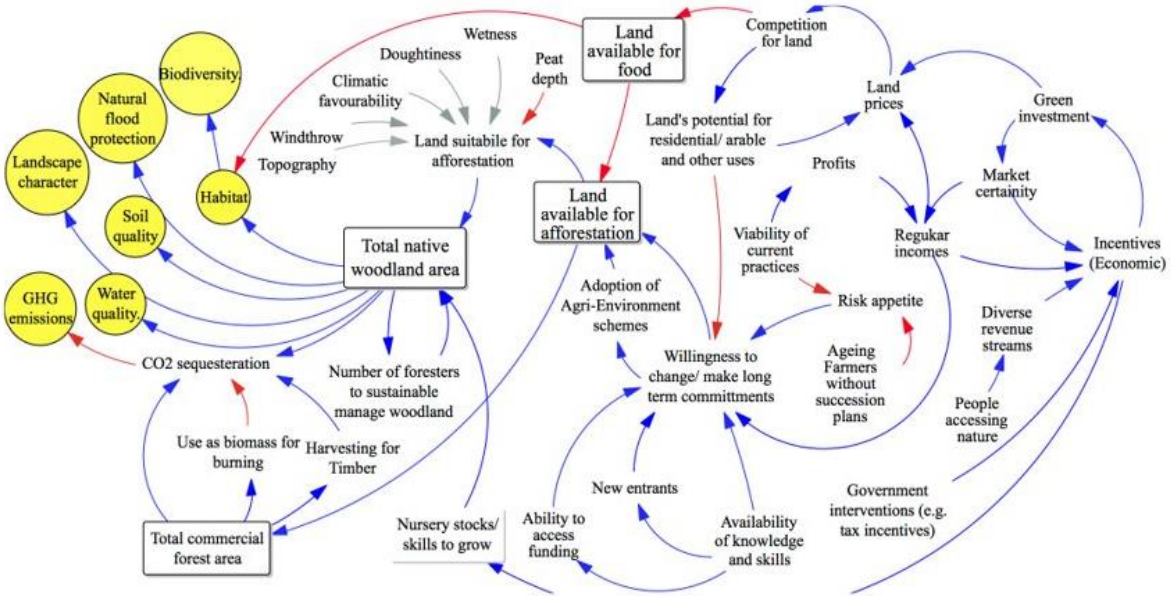
Soft Systems workshops
- Explore system transformation
- Develop conceptual models for policy intervention







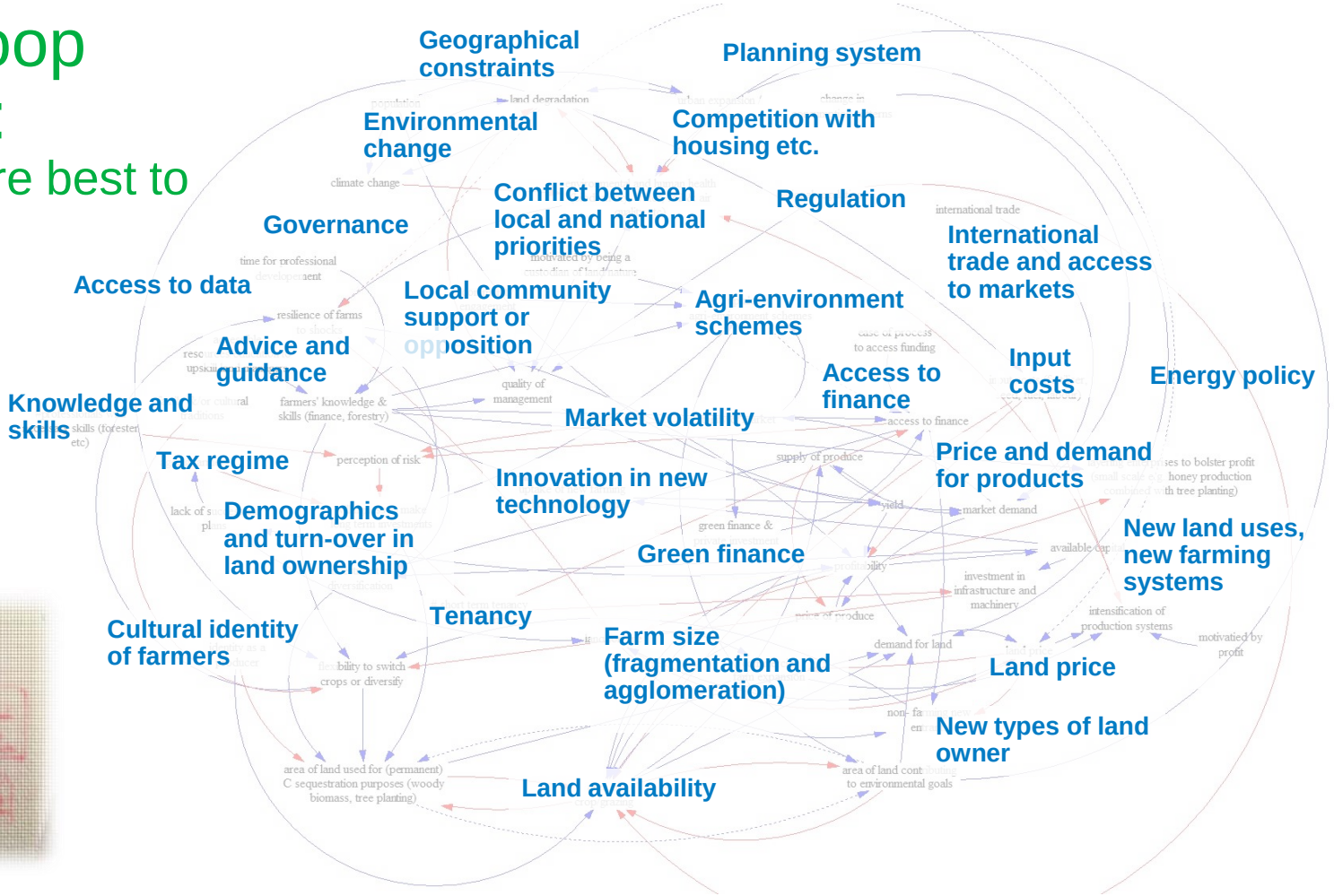
Developing a systemic understanding of land use



1. **Initial causal loop mapping**
2. **System Dynamics modelling**
    1. Which variables have historically most affected outcomes of interest
    2. Exploring possible future policy interventions
3. **Soft Systems Methodology with policy teams**
    1. Exploring system transformation
    2. Identifying new potential policy intervention points
4. **Place-based workshops with landowners**
    1. Understanding local factors affecting change
    2. Exploring local possible land use transitions

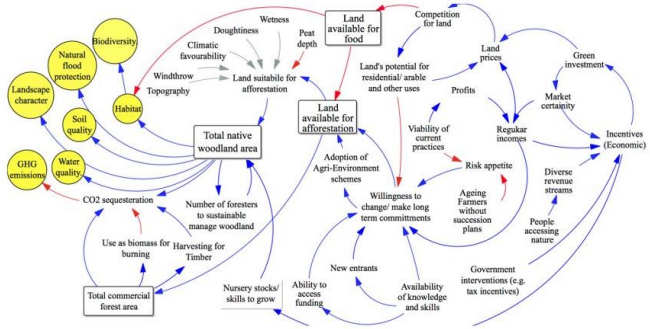
Causal loop mapping:

Finding where best to intervene

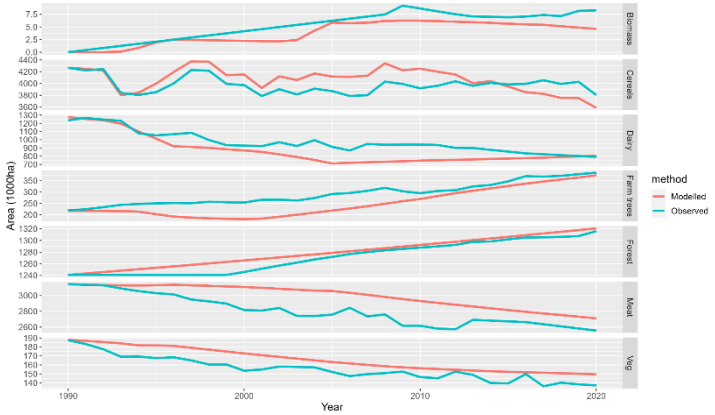


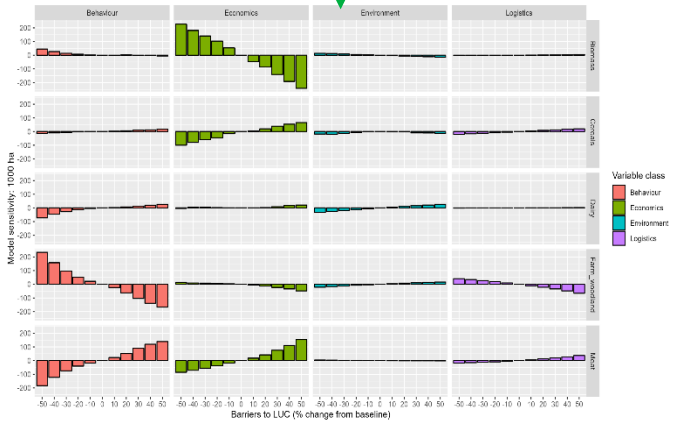
System dynamics modelling

- Interactive tool
- Exploring the knock-on consequences of policy interventions



Model building including data landscape assessment and parameterisation





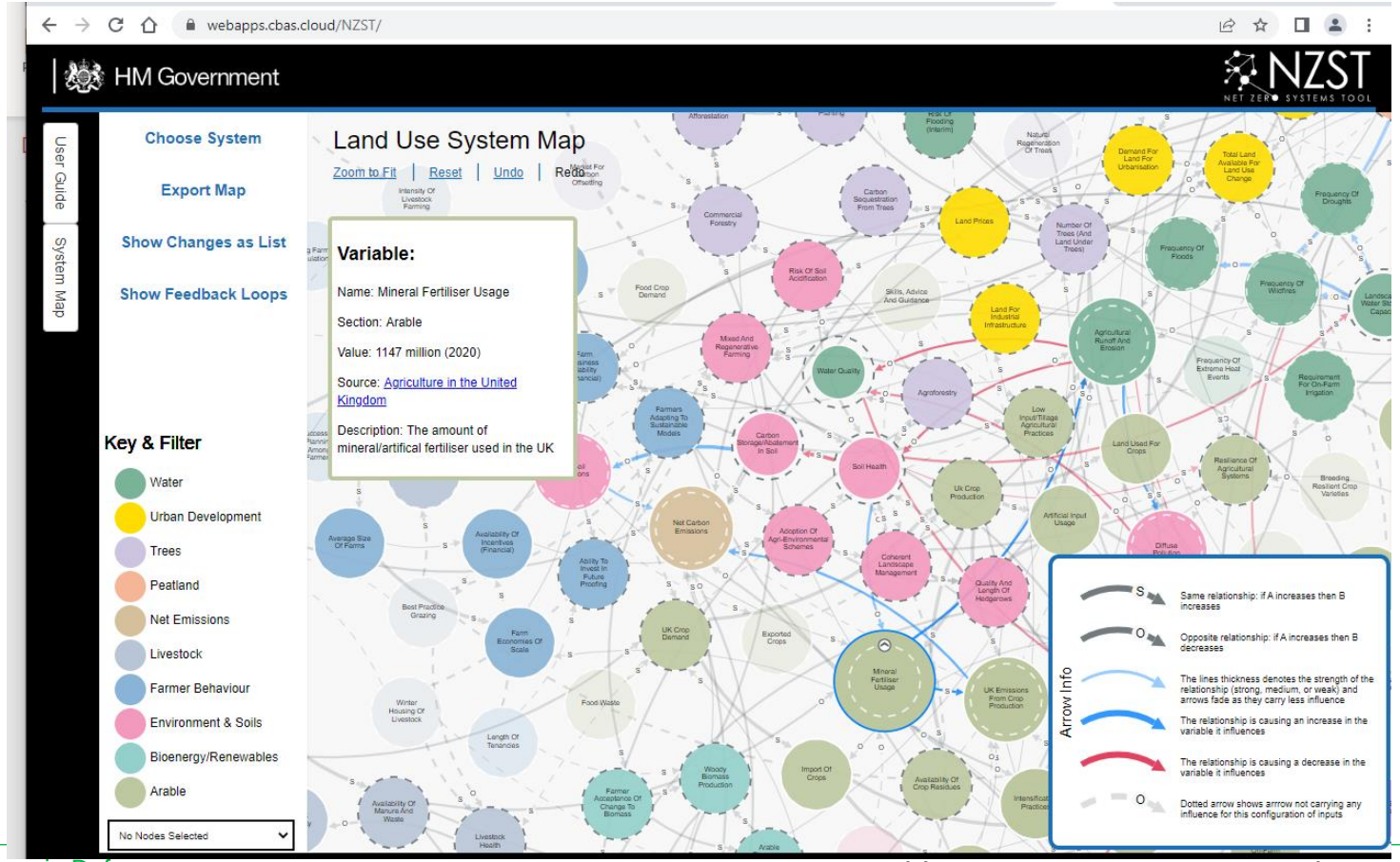
Evaluation – how good is our system?

Overall strong alignment between modelled and observed timeseries data ($r^2 = 0.765$); though interannual variance is underestimated

Sensitivity – What moves the dial?

Behaviour change, incentives and logistics including knowledge/ skills are most impactful intervention points. Their impact depends on type and scale of LUC needed.

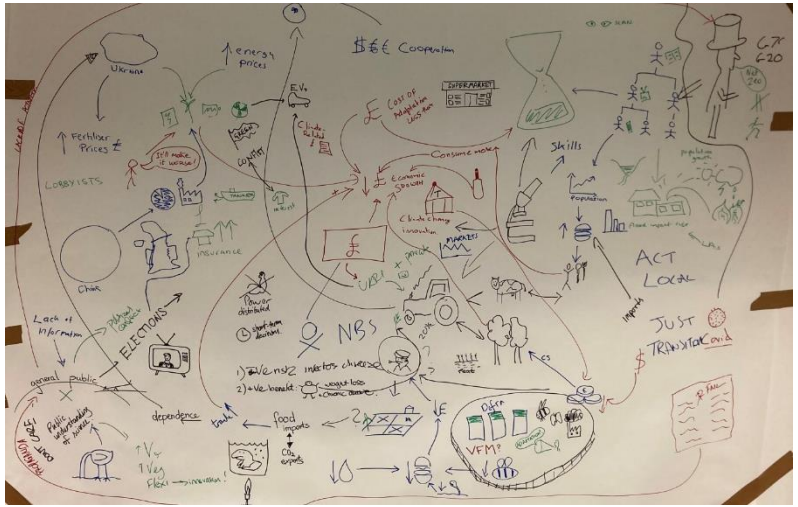
Engaging with systems maps - tools and resources



https://webapps.cbas.cloud/NZST/

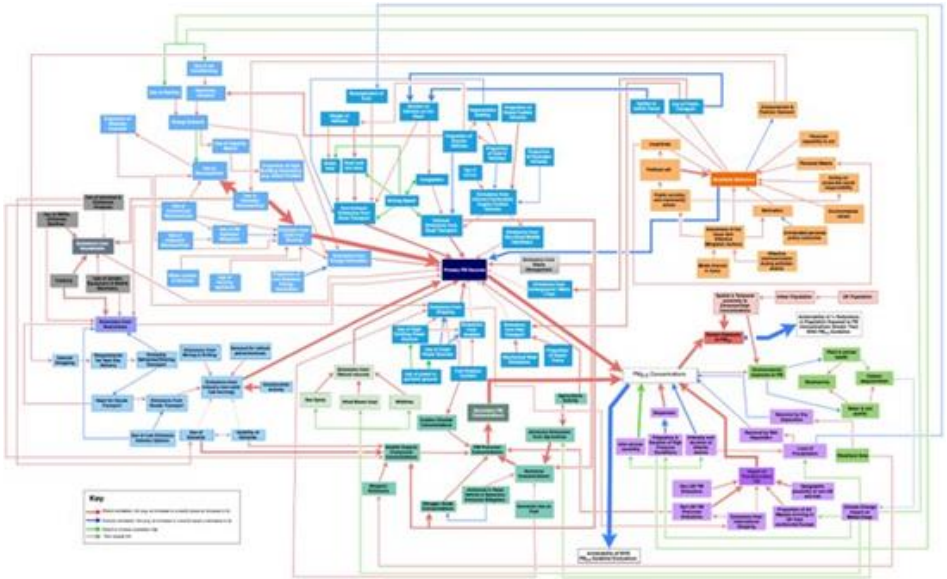
Exploring transformations - Soft Systems Methodology

- **Rich pictures** – getting policy teams with different goals together to form a collective view
- **BATWOVE / CATWOE** – mapping actors and transformations – where might we intervene? Where are the opportunities and blockers?
- **Conceptual modelling** – developing hypothetical policy interventions



Why draw systems maps in a policy setting?

- Build a shared understanding of a problem across policy teams with different goals
- Rapidly bring together fragmented knowledge
- Identify evidence gaps - asking the right questions
- Spot policy interdependencies (in Defra and beyond)
- Propose potential new policy interventions and exploring transformations
- Basis for developing simulation modelling



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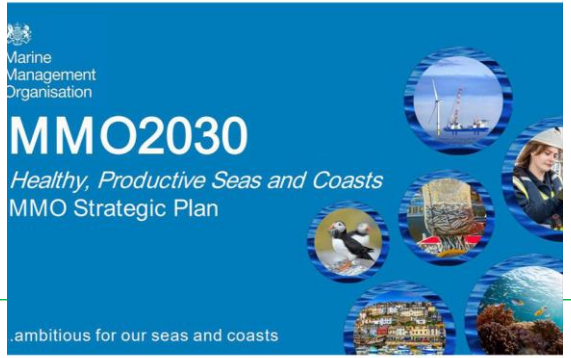
System thinking in the Marine & Fisheries Directorate

Betheney Wills

Senior Social Researcher

Application of system thinking in Marine & Fisheries

- Policy - Offshore Wind Shared Outcome Fund programme (Defra and DESNZ)
- Evidence - MMO fisheries evidence to deliver on strategic objectives and goals
- Evidence – Dependency mapping of Marine & Fisheries evidence projects and programmes

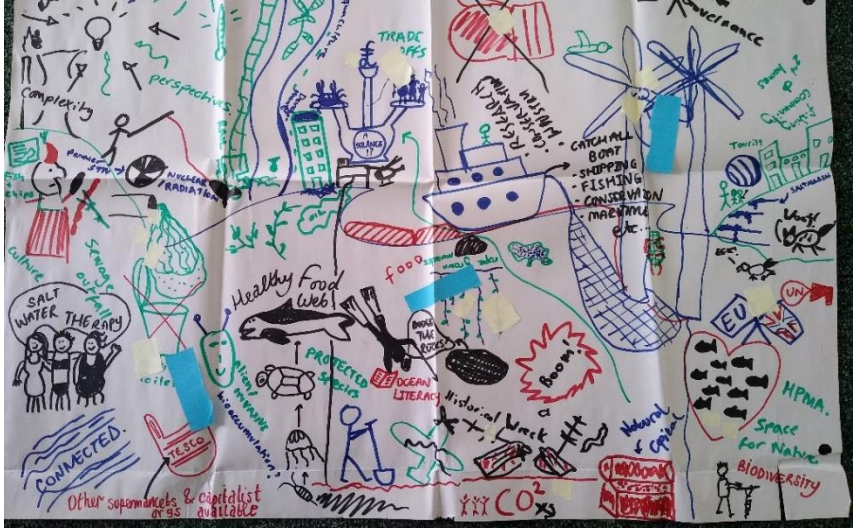


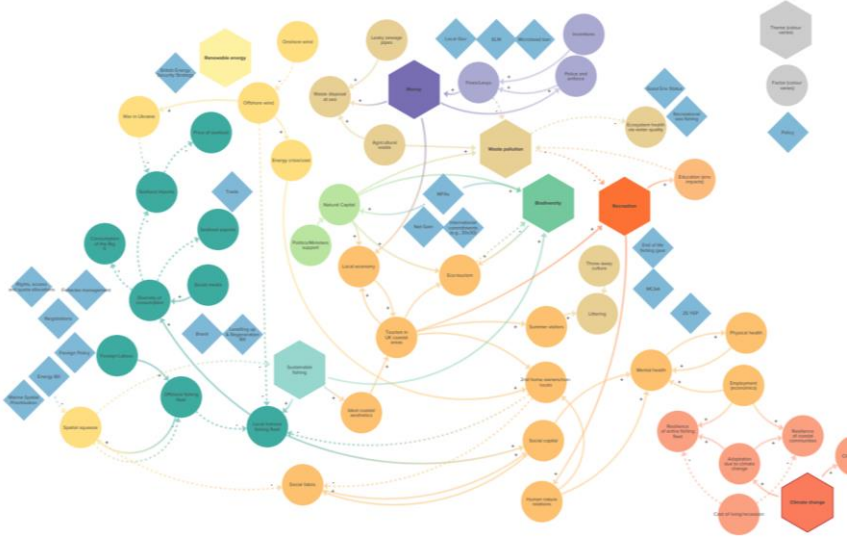
System capacity in Marine & Fisheries

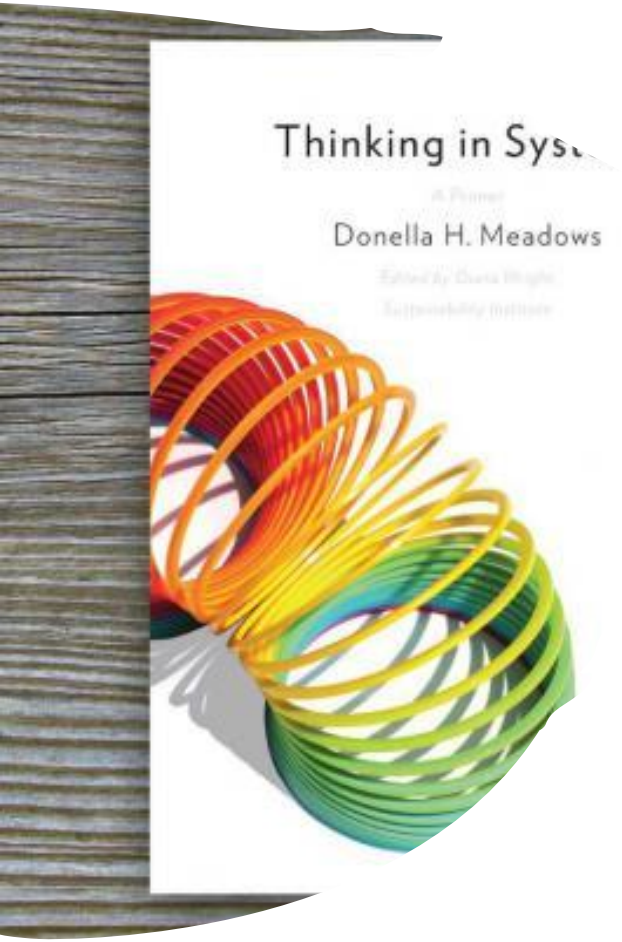
Mapping the social and cultural dimensions of Ocean Sustainability

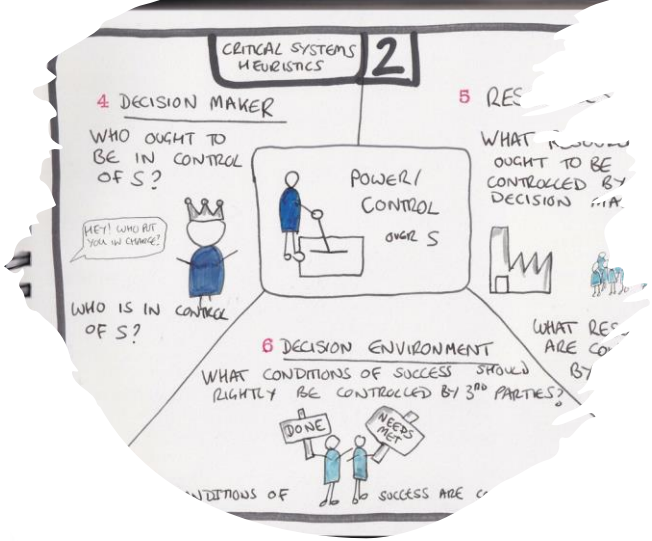
Aims 1) build or improve understanding of system mapping to enable us to confidently deliver more of these exercises in-house; and

2) produce a system map to represent the social and cultural factors within the ‘Ocean Sustainability’ system – i.e., the social dimensions of the policy areas that we work in and across





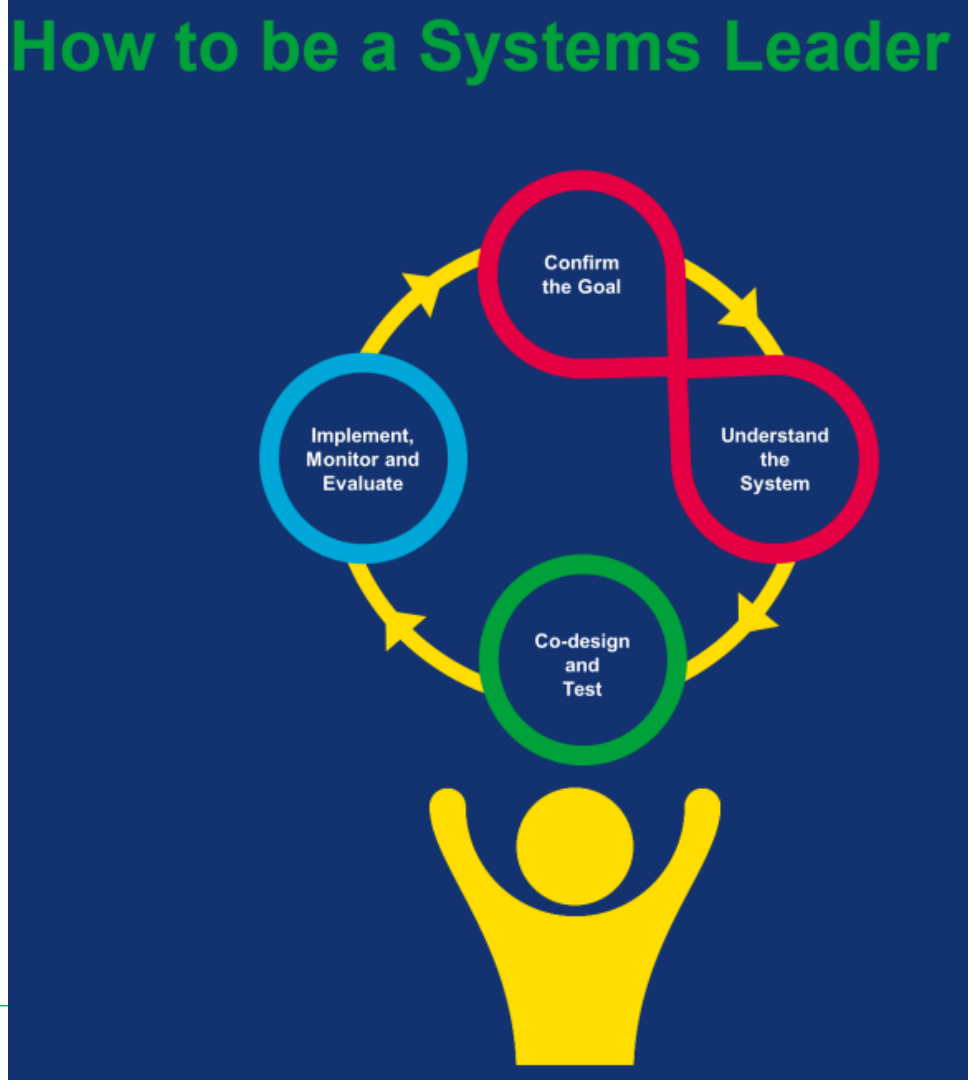




System capacity in Marine & Fisheries

The Ocean Sustainability book club

A call to arms
What for Marine & Fisheries?



Cross-cutting lessons learned

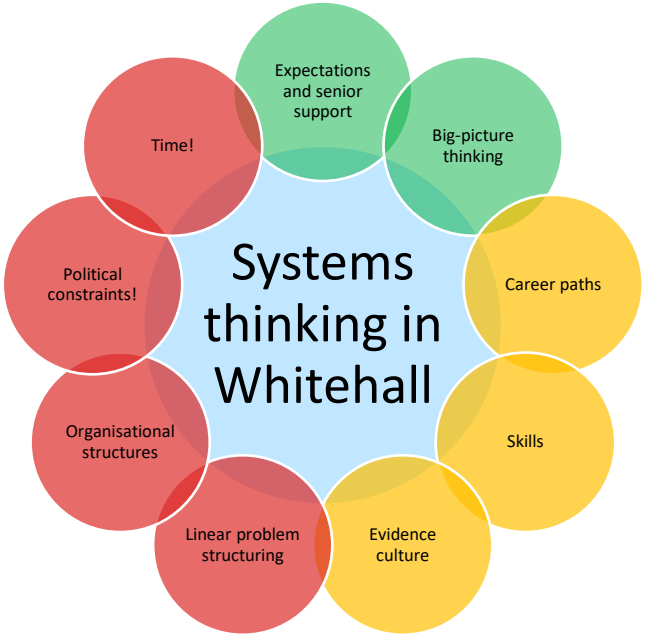
1. System approaches have been valuable in bringing people together

2. Recognise the role and practical implications of politics on civil servants

3. The audience is not the same. Evidence and policy teams and Senior Leaders want different levels of detail.

4. Mixing methods is an exciting space.

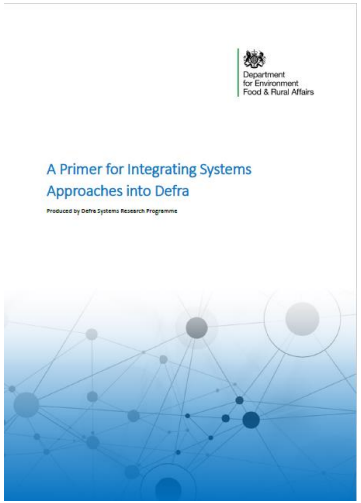
5. “This is what it is. Oh, hold on!”



Building systems capacity in Government

- **Communities of practice**
  - STIG - 600 members from < 30 organisations
  - Defra Systems Community of Practice (300 members)
- **Training**
  - Defra policy school (bespoke in-house module)
  - External providers
- **Supporting materials** (Systems toolkit and Case studies)
  - https://www.gov.uk/government/publications/systems-thinking-for-civil-servants
- **Interactive systems mapping**
  - **Net zero systems tool:** https://webapps.cbas.cloud/NZST/
  - **SEEK:** Defra interactive systems mapping
- **Secondments into Government**
  - https://defrajobs.co.uk/roles/research-and-development/

STIG
Systems Thinking Interest Group



Thanks