Methodological Innovations to Meet 21st Century Societal Challenges 10 June 2019, Manchester



# Participatory Systems Mapping for understanding complex societal issues

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# **Overview (20-25 mins)**

What is participatory systems mapping?

- Origins participatory complexity
- The method building and analysing maps
- Related approaches too many to mention!

### Examples

- · The energy trilemma
- Decarbonising heat
- Future Farming

Using it yourself



# **Origins: complexity**

- Study of complex adaptive system
  - Many examples: the economy, energy sector, agriculture, etc etc – all social systems?
  - Understanding components alone won't help us understand the system
  - Many and diverse component interact in adaptive and nonlinear ways
  - Result: tipping points, emergent new properties, and unpredictability





# **Complexity has a long history**



Not much participatory stuff?



# Participatory complexity

- Complexity does NOT need to mean ever 'fancier' methods
- Research needs richer and ongoing participation with the people 'in' the system
- If we are modelling complex social systems we MUST engage at every step with stakeholders
  - ownership
  - ongoing interaction





# What is participatory systems mapping?

- Basics a causal map built with stakeholders
  - Nodes -> Factors (variables)
  - Links -> Casual connections (+ve, -ve)
- Built together: discussion and thinking tool; integrates knowledge of diverse stakeholders
- Whole system overview: interactions, context, complexity
- Multiple interdependencies & intersecting issues
- "Our" complex system (Intersubjective object)
- Meaningful analysis & insights
  - network analysis + stakeholder views



























# Analysis: Combining stakeholder perspectives with network analysis



Analysis will be different each time depending on needs and aims of the process, and the nature of the map

- Aim of analysis is to deepen the conversation not find 'correct' solutions
- Network analysis of model structure: Highly central/influential factors
  - Upstream and downstream of factors
  - Stakeholder perspectives on factors: Important, controllable, variable

#### Combined:

- Upstream/downstream of important inputs or outcomes
- System & stakeholder "levers", vulnerabilities or "canaries", hubs...
- Explore change scenarios
- % Generating narratives and questions

#### DRAFT Choose your own adventure: analysing 🔆 CE **Participatory Systems Maps**





### **Related methods**

Туре	Whose Knowledge?	Specificity / Rigidity	Analysis type	Use
Participatory system mapping	Diverse stakeholders'	Medium	Network and Node characteristics	Generate broader system understanding
Policy maps / logic maps / Theory of Change	Policy makers' / evaluators'	Low	No formal	Discipline policy thinking and evaluation focus
Dependency modelling / Bayesian Networks	Anyone's and data	High ('X impacted by')	Simulate/ Probabilistic	Assess contribution
Fuzzy Cognitive Mapping	Anyone's	High ('impact of X')	Simulate – update values of factors	Find most influential factors
Systems Dynamics	Anyone's	Very high	Simulation / Nonlinear dynamic model	Forecasting, explore nonlinear dynamics and feedbacks



#### DRAFT Timeline of different systems mapping approaches

This timeline attempts to map out the history of a broad but connected set of methods which utilise diagrammatic representations of causal relationships in systems. Comments are welcome, please contact p.barbrook-johnson@surrey.ac.uk or @bapeterj



by Pete Barbrook-Johnson and Alex Penn

Centre for the Evaluation of Complexity Across the Nexus

Widely used in many

of variation in practice.

#### A participatory systems map of the energy trilemma

How to use this map:

1. Print it out and put it up in your team area

2. Take a look at it before and during your policy mapping exercises 3. Get hold of the editable online version, update, edit, and share it

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This systems map was built by analysis and policy teams at BEIS, in collaboration with researchers at CECAN. It shows the causal relationships between a range of key energy trilemma outcomes, BEIS policies, and other factors. The map is an intersubjective object reflecting the views and knowledge of the BEIS staft who created it.

For more info contact Tajbee Ahmed (BEIS), Marianne Law (BEIS), or Pete Barbrook-Johnson (CECAN p.barbrook-johnson@surrey.ac.uk)



Key outcome for BEIS

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BEIS policy

- Energy Trilemma (prices vs carbon vs security)
- Crowded policy landscape
- Map the trilemma and BEIS policy impacts
- Inform evaluation planning
  - Evidence gaps
  - Complementary or clashing mechanisms
  - Prioritise future evaluations
- Reality of use(!)
  - Print and put up on wall
  - Look at before and after policy mapping exercises ('this map has the breadth but no depth')



### **CECAN case study – BEIS trilemma**







Energy Trilemma contd

- Pulling out narrative and new questions
  - e.g. Policy
     clash and
     complement



#### *Draft* participatory systems map of the biogas and biomethane production and consumption system



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- RHI evaluation
  - CAG consultants using realist approach
- Large biomethane and biogas plants
  - Big budget burners
  - Complex 'ecosystem' around these plants
- Map of biogas and biomethane production systems
- Inform evaluation
  - C-M-Os
  - · data collection
  - Support surviving steep learning curve
- Inform wider policy planning in decarbonising heat team
- Gather an unusual mix of stakeholders
  - BEIS, Defra, National Grid, Farmers reps, Developers, Finance, Waste, Local gov, etc



# **CECAN case study – Defra Future Farming**

- Future of farming post-Brexit and CAP
- **Reform policy, reform evaluation?**
- Linking ex ante analysis and policy planning with evaluation – pulled to the former?
- Map of each -> then combine:
  - Environmental Land Management
  - Productivity
  - Rural communities
  - Animal and Plant Health
- 🕷 Mega-map
- X Multi-use
- Online maps to share

Health and Harmony: the future for food, farming and the environment in a Green Brexit





# When to use?

- When we have complexity + demand for participation
- X When overview of system is needed
- Not when we want a simulation
- Not when desire to narrow focus
- X In practice (in CECAN):
  - Prioritising and designing evaluations
    - Evidence gaps / Key mechanisms
    - Contradictory or complementary policies
    - Capture stakeholder input
  - During evaluation
    - Inform middle range theory (ToC, CMOs)
    - Inform data collection
  - Policy planning and design





## Practicalities – workshops and beyond

- 8 Before
  - · Pick a focal problem / define system
  - Gather knowledge/stakeholders
- During workshop (min 2-3 hours)
  - · Pick a focal factor
  - Brainstorm factors
  - Consolidate factors
  - Connecting factors and checking (iterate and prompt)
  - Collect extra info (node/link characteristics)
- X After
  - · Digitise map
  - Verification (follow up workshop?)
  - Analysis (follow up workshop?)







### Resources

- Workshop process guide cecan.ac.uk/resources
- Software (use what you know!?)
  - Draw.io (google/one drive) for drawing easily and sharing
  - Gephi for network analysis and vis
  - R for visualisation and analysis
  - CCTool (coming soon) for all!
- I-day course October2019
- 3-day course Spring 2020
- CECAN advice for your systems mapping efforts



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#### y use Participatory Systems Mapping?

These types of models provide thinking tools which can be used for discussion and exploration of complex issues, as well as sense checking the implications of suggested causal links. Such "hands on" complexity science can increase stakeholder motivation and understanding of the scope of whole systems approaches.



The diagram above is an example map. We can see the factors in the system represented by the rectangles, and the connections between them by arrows denoting the strength, direction, and nature (positive or negative) of the casual influence.

The following eleven steps give a detailed breakdown of how to generate your own Participatory Systems Map (PSM). They are written so that you can use pen, paper, and post-it notes.





# Conclusions

#### ※ Participatory systems mapping

- quick and effective participatory complexity
- multi-purpose
- choose your own adventure analysis
- easy to start!
- entry point for complexity
- tricky to communicate
- horses for courses and horses cooperating

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### THANKS QUESTIONS?

Get mapping! Get in touch!

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