Supplementary file 1

Participatory systems mapping for population health research, policy and practice: guidance on method choice and design

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4.1 Purpose

Deciding which participatory systems mapping method to use is a balancing act. The Design Framework will enable you to break down and reflect on two key questions, specific to the needs of your project: 1) Which participatory systems mapping method(s) meet your needs? 2) What feasibility issues do you need to consider in making your choice?

Specifically, this Framework will help enhance the choice and design of a participatory systems mapping project, by enabling you to:

- 1. Consider the added value of adopting a participatory approach to systems mapping
- 2. Consider the differences between participatory systems mapping methods, including their advantages and disadvantages
- 3. Consider the feasibility of using particular methods for a given purpose

4.2 Intended users of this Framework

The Design Framework is intended for people and teams with a remit in population health research, policy and practice including, but not limited to, universities, policymaking and government, the voluntary sector, and private sector consultancies. It may be useful to those interested in using participatory systems mapping for research, monitoring and evaluation, project design or management. This Framework can be used to select a method, as well as to reflect on a method that has already been used. You do not need prior experience of participatory systems mapping to use this tool.

4.3 Using the Framework

No two projects will use participatory systems mapping in the same way, nor will they have the same objectives. How you use this Framework will depend on your background, experience in using these methods, your project aims, your context and resources, and what outputs you want to produce.

Here are a few practical tips on how to use the Framework:

- 1. Read through the Design Framework and familiarise yourself with the content and the 13 questions, which are divided between three overarching considerations
- 2. Start answering the questions that have clear responses, **using the downloadable and** editable Design Framework (Supplementary file 1)
- 3. Return to the unanswered questions and collect feedback from your team or external resources (e.g. literature or external experts)
- 4. Use the comparative table at the end of each consideration sub-section to reflect on your answers and assess which method(s) best suit(s) the project's purpose and resources
- 5. Reflect on what method best suits your project; and, how, if necessary, to further adapt the method you are planning to use or currently using

You may find some questions challenging to answer. Throughout, we provide links to sections of the guidance and other published resources that can assist. You may also wish to consult the glossary in Appendix D or discuss your considerations with topic or methods experts.

4.4 The Participatory Systems Mapping Framework

Consideration 1. What is the scope of the project?

- 1. What is the intended purpose of using systems mapping in your project?
- 2. What knowledge or information gaps do you seek to address?
- 3. What type(s) of output(s), including system map features, will be useful to your project?
- 4. What do you intend to do with the system map(s)?

Consideration 2: What is the added value of a participatory approach?

- 5. How do you intend the participatory approach to benefit your project?
- 6. Who are the stakeholders in the system, and who will you involve in the project?
- 7. What emphasis will you place on participatory approaches and involvement of stakeholders?
- 8. At what stages do you anticipate involving participants?

Consideration 3: Which factors may affect your capacity to use a participatory systems mapping method?

- 9. How much capacity building will be required to ensure meaningful involvement of participants?
- 10. What data or information is already available on the area of enquiry that can support the mapping process?
- 11. Where will the mapping process take place?
- 12. What skills, resources and expertise are required to implement the chosen method(s)?
- 13. Which data collection method(s) do you intend to use for the mapping process, and the wider project?

Figure 14. Overview of the Participatory Systems Mapping Design Framework

Consideration 1: What is the scope of the project?

The purpose of this section is to reflect on the overall aims and purpose of your project (Q1, Q2), what you want the map to provide (Q3), and how you intend to use it (Q4).

Guidelines:

- 1. Read through items for Consideration 1
- 2. Answer these as well as you can initially
- 3. Where necessary, collect feedback from your team, experts and external resources.

Question 1. What is the intended purpose of using systems mapping in your project?

a) Please provide a brief description of the topic of enquiry (e.g. understanding the drivers of childhood obesity in the school setting). If feasible at this stage, define your aim(s) as precisely as possible:

b) Reflecting on the purpose of using a systems mapping approach is a key step in choosing a method. Below is a list of different reasons as to why you may want to adopt a systems mapping approach. Select all that apply to your activity/project purpose(s):

To identify systems problems or failures (i.e. those that are interconnected, dynamic or emergent)

To understand a problem at a holistic level, with an emphasis on examining the interdependent nature of causal factors (rather than factors in isolation)

To construct a high-level, broad view of a system

To deepen existing understanding of systems, including their structures and boundaries

To extend analyses of existing system maps

To understand how specific activities and changes in one part of a system may affect other parts of the system, and vice versa, sometimes in unexpected ways

To identify potential areas for intervention (e.g. leverage points)

To inform intervention development

To understand the context in which interventions are situated

To monitor existing interventions (e.g. tracking implementation)

To inform the evaluation of interventions or policies

To simulate and model possible future state of the system

Other (please specify): ____

None of the above apply

Additional information:

- Sections 2.2-2.4 (an overview of systems thinking and complexity), Section 3 (introduction to participatory systems mapping), Section 5 (key findings from a systematic mapping review on key purposes of using these methods in population health)
- Case study 1 (formative research), case study 2 (broad system view), case study 7 (implementation tracking)
- Guidance on defining public health problem statements

Question 2. What knowledge or information gaps do you seek to address?

Please describe the gaps in information/knowledge and consider how the systems mapping process will seek to address these gaps:

Additional information:

- Case study 1 (formative research)
- Consult or conduct literature reviews to identify evidence gaps [1]
- If the gaps are unclear, informal discussions with stakeholders may be useful

Question 3. What type(s) of output(s), including system map features, will be useful to your project?

Below is a list of features that systems mapping can potentially provide. Think about which ones may be most useful for your research aims, and potential availability of data (see Q10).

Select all that apply:

View of the system

Whole-system view (a system map that represents a high-level and broad view of an entire system)

Sub-system view (a system map that represents a sub-section of a whole system. This is usually done with a boundary setting process)

Data represented in system map (output)

Numbers and plots (graphical representation of causal relations using quantitative data)

Qualitative data (visual representation of causal relations without numbers and plots)

System map form (presentation of factors)

Acyclic (simple causal connections (no feedback loops*)

Cyclic (connections between factors can form feedback loops)

Simulation capabilities (exploring how systems may change over time)

Yes, this is important

No, this is not necessary

Additional components

Stocks and flows (size/quantity of system components at a given point in time, and how these sizes/quantities change over a period of time)†

Time delays in the influence of one system factor on another

None of the above apply

* Feedback loops describe when a change in one factor in the system influences a chain of changes through other factors, which return to reinforce or dampen the effect of the initial change. See Section 3.4.1.2.

† Stocks and flows, and time delays are features typically associated with systems dynamics models and are used in the process of converting a causal loop diagram into a quantitative model. See glossary for further information (Appendix D).

Additional information:

- Section 3 of the guidance document
- Case study 5 (which demonstrates an interesting use of different map features)
- Case studies 4 and 6 (boundary setting)

Question 4. What do you intend to do with the map?

Whether you intend to publish the map in a peer-reviewed journal, online as grey literature, or not at all, it is important to identify the target audience for your map. Is the map you intend to produce likely to be useful and understood by this intended audience – whether among the participating stakeholders, or an external audience?

If the system map is intended to be subsequently used by system stakeholders, it is important to think about how the system map can be integrated into existing processes and identify who will be using and updating the system map. This will likely require capacity building, and early and sustained involvement of those individuals/organisations.

Select all that apply:

Analysis and future map developments

Explore the effects of interventions on, or contribution of causal factors, to population healthrelated outcomes

Use the map(s) to analyse the long-term behaviour of the causal system

Create sub-maps to guide analysis and communication relating to parts of the system or particular questions

Conduct network analyses

Develop a quantitative model from a qualitative map

Other (please specify) _____

Dissemination, communication and application

Publish the system map for access by a wider audience

Transfer ownership of the map and its ongoing development to key stakeholders (e.g. for project monitoring purposes)

Use in community engagement and/or advocacy

Adapt the system map to other media (e.g. presentation, animation, briefing paper)

Restrict use of system map to stakeholders who were directly involved in the process

Inform intervention(s) development (e.g. including to inform a ToC or programme theory)

Develop an approach to evaluating actions identified through system mapping activities

Support project implementation and/or monitoring

Other (please specify) _____

Additional information:

- Case study 1 (developing a quantitative model)
- Case studies 2 and 7 (contrasting participatory system map uses, including mapping under constraints of certain stakeholder environments and project implementation)
- Case study 10 (use of network analysis)

Consideration 1: What is the scope of the project?

Based on your responses to the questions above, please reflect on these whilst reviewing the comparative table below. <u>Only questions that have method-specific</u> considerations have been included in the table.

Note, if you selected very few or no items for questions 1 or 3, then systems mapping may be less suitable for your project.

Select all methods that could be of interest, after reviewing consideration 1 items:

Systems-based theory of change maps

Causal loop diagrams

CECAN PSM

Fuzzy cognitive maps

Systems dynamics models (including S&F)

Bayesian belief networks

Unsure

The remainder of the tool will help you refine your choice of participatory systems mapping method(s), by enabling you to consider the participatory approach and feasibility of implementing the identified method(s).

Table 3. Method comparison for consideration 1

Please note, the table only includes questions that have method-specific considerations (i.e. question 2 has been omitted).

Methods and points of reflection	Systems based Theory of Change	Causal loop diagrams	CECAN PSM	Fuzzy cognitive maps	Systems dynamics models	Bayesian belief networks
Q1. What is the intended purpose of using systems mapping in your project?	 Mapping the connections and pathways between an intervention and its outcomes Describing what and how impacts might be created by an intervention 	 Understanding the dynamic behaviour of systems 	 Constructing large inclusive maps while also pulling out easy to use analyses and narratives of sub-sections 	 Constructing a high-level, broad picture of a complex system 	 Understanding and anticipating the future dynamic behaviour of systems, with quantification To simulate and model possible future state of the system 	 Constructing a high-level view of a system (but not as broad as other methods), with an intervention focus Examining uncertainty among interdependent factors in the system To simulate and model possible future state of the system

Methods and points of reflection	Systems based Theory of Change	Causal loop diagrams	CECAN PSM	Fuzzy cognitive maps	Systems dynamics models	Bayesian belief networks
Q3. What kind of output(s), including system map features, will be useful to your project? <i>Important note:</i> <i>These points are</i> <i>indicative only and</i> <i>will vary depending</i> <i>on the use of</i> <i>each method. The</i> <i>boundary setting</i> <i>approach will dictate</i> <i>the extent to which</i> <i>a system is mapped</i> <i>(see case studies 4</i> <i>and 6).</i>	 Sub-system view Qualitative Typically acyclic, but it can be useful to think about feedback Not designed for simulation Key assumptions about how outcomes will be realised are typically included in the diagram 	 Whole or sub- system view Qualitative Cyclic (can present feedback loops) Precursor for simulation in SD models Time delays 	 Whole or sub- system view (developing submaps that may focus on questions or topics) Qualitative Cyclic (can present feedback loops) Not designed for simulation 	 Whole system view Semi-quantitative (non-predictive, numbers) Cyclic (can present feedback loops) Not designed for simulation A theory of change, with a summary of quantifiable causal relations Time delays 	 Sub-system view Numbers and plots Cyclic (can present feedback loops) Simulates changes in outcomes over time Stocks and flows Time delays 	 Sub-system view Numbers and plots (probabilistic statistics) Typically acyclic, although feedback loops possible Limited simulation capabilities Risk models (calculating the impact of changes)
Q4. What do you intend to do with the map? <i>Important note:</i> <i>The uses given</i> <i>in this row are in</i> <i>addition to describing</i> <i>the system with</i> <i>stakeholders, which</i> <i>is the general</i> <i>intention of all</i> <i>methods.</i>	 Explain the 'logic' or 'theory' of the intervention Basis for design and/or evaluation of an intervention 	 Qualitatively explore how the systems' dynamics may look, and how these affect population health-related outcomes Network analysis 	 Create sub- maps using network analysis, causal flow, and stakeholder information 	 Compute relative impact of causal factors to determine points for interventions Network analysis 	 Analyse long-term behaviour of causal system to support strategic planning and decision- making 	 Estimate probable effects of interventions, or contribution of causal factors to outcomes

Consideration 2: What is the added value of a participatory approach?

The purpose of this section is to reflect on participatory approaches to systems mapping. The following four questions will help you reflect on how involvement of system stakeholders could add value to your work (Q5-Q8). You may wish to read information provided in Sections 1.1, and 3.3 of the guidance, as well as case studies 1, 8 and 9 for examples of highly participatory and well-reported participatory processes in population health research.

Guidelines:

- 1. Read through items for Consideration 2
- 2. Answer these as well as you can initially
- 3. Where necessary, collect feedback from your team, experts and external resources

Question 5. How do you intend the participatory approach to benefit your project?

Select all that apply:

To capture stakeholders' 'mental models' of a system

To capture as many different perspectives as possible

To identify convergent and divergent views among stakeholders

To reach consensus among stakeholders

To harness participants' domain-specific expertise in developing the system map

To encourage systems thinking among stakeholders, enabling them to adopt a more holistic perspective on key challenges

To encourage social learning between participants and throughout the mapping process

To promote trust and acceptance among mapping stakeholders

To identify, prioritise or fill evidence/information gaps

To foster joint problem framing to ensure the map is focused on priority questions

To produce context-specific solutions that meet the needs of stakeholders

To facilitate the communication, dissemination and use of the map

Other (please specify): _____

None of the above apply

Question 6. Who are the stakeholders in the system, and who will you involve in the project?

Stakeholders can be people or organisations whose actions may influence, who hold knowledge about, or who are affected by, the system of interest. Stakeholders may include:

- Those with 'lived experience' of the main area of enquiry (e.g. people living with diabetes)
- Community members
- Experts and researchers
- Representatives of public or private organisations and institutions

Much of the value of participatory systems mapping is in the discussions held during the mapping process. Therefore, it is important to consider who to involve. As it is rarely, if ever, possible to include all stakeholders in the mapping process, it is important to reflect on which stakeholders are most important to involve based on the purpose of your systems mapping. Whose perspectives are critical to ensuring diversity of views on the system? Who has knowledge or understanding about different parts of the system? For example, you may want to include decision-makers, end-users, and those whose specific knowledge or actions can significantly influence the understanding or behaviour of the system.

In some cases, you may consider adopting a formal approach to stakeholder identification and stakeholder analyses, for which numerous resources exist 2, 3].

a) First, list all the key stakeholders in the system of interest:

b) Second, consider who are the essential stakeholders you will want to invite to take part in the mapping process:

If you are unsure about who to include in either box above, revisit your project aims, purpose of systems mapping, and identify key informants in the system that could support the identification of further stakeholders.

Question 7. What emphasis will you place on participatory approaches and involvement of stakeholders?

It is necessary to consider how important the participatory element of your project is, as different participatory systems mapping methods require, or can better foster, different degrees of involvement of stakeholders. For example, in some circumstances it may be beneficial to have very specific and focused participatory activities (e.g. domain expert inputs to a quantitative model), while in others it may be beneficial to have participation as the defining feature of the

entire project (i.e. from design to dissemination). Furthermore, some methods require greater researcher input (e.g. due to requisite expertise) and therefore can be more challenging for stakeholders to engage with (see Q9). However, these factors are project specific. Use this space to reflect on these considerations:

Question 8. At what stages do you anticipate involving participants?

Select all that apply:

Project design stage Scoping, assessment, and boundary setting Map building Map validation Map analyses Dissemination and use of outputs

Consideration 2: What is the added value of a participatory approach?

Based on your responses to the questions above, please reflect on these whilst reviewing the comparative table below. <u>Only questions that have method-specific</u> considerations have been included in the table.

Note, if you selected very few or no items for question 5, then participatory systems mapping may be less suitable for your project.

Select all methods that could be of interest, after reviewing consideration 2 items:

Systems-based theory of change maps

Causal loop diagrams

CECAN PSM

Fuzzy cognitive maps

Systems dynamics models (including S&F)

Bayesian belief networks

Unsure

The remainder of the Framework will help you refine your choice of participatory systems mapping method(s), by enabling you to consider the feasibility of implementing the identified approach(es).

Table 4. Method comparison for consideration 2

Please note, the comparative tables only include questions that have method-specific considerations. For consideration 2, this is only question 5, reflecting that in most cases the potential to incorporate participatory processes in systems mapping methods is possible across methods.

The following are indicative examples of typical participatory contributions within specific mapping methods:

Methods and points of reflection	Systems based Theory of Change	Causal loop diagrams	CECAN PSM	Fuzzy cognitive maps	Systems dynamics models	Bayesian belief networks
Q5. How do you intend the participatory approach to benefit your project?	 Identifying key gaps and uncertainties that can be tested through evaluation 	No method- specific considerations	 Facilitating the co-design of analyses 	 Harnessing domain-specific expertise to determine or validate the relative weighting of connections in the map 	No method- specific considerations	 Harnessing domain-specific expertise to determine probability states of factors in the map

Consideration 3: Which factors may affect your capacity to use a participatory systems mapping method?

The purpose of this section is to reflect on the resources available to carry out your participatory systems mapping project and assess the feasibility of implementing one or more of the potential methods (Q9-Q13).

Guidelines:

- 1. Read through items for Consideration 3
- 2. Answer these as well as you can initially
- 3. Where necessary, collect feedback from your team, or external resources, experts, or stakeholders

Question 9. How much capacity building will be required to ensure meaningful involvement of participants?

It is important to consider the skills and expertise required for each method, and review what skills and expertise currently exist across your project team and potential stakeholders. You may need to consider bringing in additional expertise as well as plan for capacity building of the project team and stakeholders that would be involved in map building. Consider this question alongside Q6, 7 and 8.

Select one of the following responses:

- Minimal (no or minimal capacity building required, and/or adaptation of mapping processes required)
- Moderate (some capacity building and/or adaptation of mapping processes required)
- Extensive (significant capacity building and/or adaptation of mapping processes required)

Question 10. What data or information is already available on the area of enquiry that can support the mapping process?

The aim here is to reflect on the availability of data or information because some mapping methods have prerequisites, while in others, it is possible to choose to develop a participatory systems map with prior information/data in addition to stakeholder involvement.

For example, you may have already collected qualitative or quantitative data, or conducted a literature review, which may contribute information to the mapping process. Alternatively, there may be a significant body of evidence or information already in existence that you can draw upon.

a) What is currently known about the area of enquiry; would it be useful to integrate some of this knowledge in the mapping process? What types of data may be available?

b) Will you consider using a preliminary map?

If you intend to involve stakeholders in the map building stage of the project (see Q8), it is important to consider whether it could be useful for the project to start off with a preliminary map before involving stakeholders. Consider your project aims, the availability of other systems maps on your topic of enquiry, the group of stakeholders and resources. Consider as well if it may be better to start off with a blank sheet/screen and collect participants' 'mental models' without prior influence, or if it could be more useful to present a preliminary map (sometimes called a seed map) to participants, which they can then further develop and refine. For instance, a preliminary map might be helpful if there are time limitations for workshops, or if the topic is very complex.

Select all that apply:

No – start with a blank sheet/screen (no prior input)

Yes - a preliminary map created by reviewing evidence on the topic

Yes - a preliminary map based on input from domain experts

Yes - a preliminary map based on project team knowledge, including previous research

Yes - using a complete or partial map from elsewhere

Other (please specify): _____

Additional information:

• Case study 3 (example of using a preliminary map)

Question 11. Where will the mapping process take place?

Think about how you would like participants to engage at each stage of the mapping process. Different approaches produce different participatory experiences; for instance, participants will engage differently with a map on a table compared with one viewed on a screen. Online practices can mean that it is easier for stakeholders to take part, especially when collaborating across geographical distances. However, if you seek a high level of interaction and discussion and/or if you wish participants to take a leading role, then this is much easier in person than online. It may be necessary to have more, and shorter, sessions online. Computer-aided participatory systems mapping software is increasingly available, however it can substantially affect the form of the map generated [4]. Thorough testing should always be undertaken, and methods adapted as needed (see Q13).

Select all that apply:

In-person

Online synchronous

Online asynchronous*

Hybrid session(s) - in-person and online participants taking part in the same session

Separate session(s) - either in-person or online

* Asynchronous refers here to stakeholders having the possibility to contribute to map building in their own time/pace.

Use the following box to add any further reflections on this question (e.g. stages of the process, locations, etc.).

Additional information:

• For more information on how to run online workshops, see Barbrook-Johnson and Penn (pp. 155-157) [5].

Question 12. What skills, resources and expertise are required to implement the chosen method(s)?

All methods included in this guidance require a degree of systems sensibility, as well as a basic understanding of a given subject or context, to be able to determine where there might be gaps in knowledge and facilitate mapping activities accordingly. Furthermore, more experienced facilitators/mappers will be more familiar with the methods and common pitfalls in systems mapping.

a) It is important to reflect on your project team's interest in participatory systems mapping (and that of any partners), and systems approaches more broadly. How well does it align to your existing research perspectives and practices? Do you have the means to carry out capacity building of the team? Is there suitable motivation for working with participatory systems approaches ? Use this box to reflect on these considerations:

b) What is the timescale for the participatory systems mapping process (from design to dissemination)?

Note: all methods can be used over varying timeframes. However, some methods may be more suited to less resource intensive projects (e.g. fuzzy cognitive maps), while others tend to be longer and more methodical (e.g. systems dynamics models).

c) How much time will you have with participants for map building activities (in-person/online interactions)?

Note: This includes time availability of the project team, as well as the availability of stakeholders invited to participate.

d) Which of the following skills and expertise are available to your project (i.e. in your team, through external consultants, or among participants)?

Select all that apply:

In-depth knowledge of the context

Expertise in the chosen research or project area

Facilitation skills in group map building

Mapping software expertise

Systems mapping analysis expertise (e.g. network or sensitivity analyses, statistics)

Qualitative research skills (i.e. familiarity with data collection methods and analytical techniques)

Modelling and simulation expertise

Outor (picase specify).	Other	(please	specify):
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e) What software(s) may you need to carry out the mapping process? Is this software available to your team? See Appendix F for examples of software.

Question 13. Which data collection method(s) do you intend to use for the mapping process, and the wider project?

a) What data collection method(s) do you intend to use for each stage of the mapping process? (see Q8 for an overview of typical map building stages).

Select all that apply:

Group-based workshop(s) Individual interviews Small group interviews/focus groups Survey(s) Online whiteboard(s) (no moderation; asynchronous) Other (please specify): _____

Note, in some instances due to logistical reasons, sensitivity of topics discussed, or power dynamics between participants, you may wish to consider organising several workshops or modes of involvement to ensure all sub-groups of stakeholders can take part. Integration of results from each group or mode of involvement would then need careful planning.

b) It is also important to reflect on other components of your project, which may be more or less complementary to a systems mapping approach. For instance, a stakeholder analysis or Delphi exercise. You may wish to consider these in relation to feasibility, or whether any of these methods may be useful to the mapping process itself.

What other methods have you considered, or will you be using, as part of your project?

Consideration 3: Which factors may affect your capacity to use a participatory systems mapping method?

Based on your responses to the questions above, please reflect on these whilst reviewing the comparative table below. <u>Only questions that have method-specific</u> <u>considerations have been included in the table</u>.

Considering the factors that may affect your capacity to implement the participatory systems mapping method(s), which methods seem most suitable based on available prior information, your intended project design (i.e. data collection methods), and the available resources?

Select all that may apply:

Systems-based theory of change maps

Causal loop diagrams

CECAN PSM

Fuzzy cognitive maps

Systems dynamics models (including S&F)

Bayesian belief networks

Unsure

Table 5. Method comparison for consideration 3

Methods and points of reflection	Systems based Theory of Change	Causal loop diagrams	CECAN PSM	Fuzzy cognitive maps	Systems dynamics models	Bayesian belief networks
Q9. How much capacity building will be required to ensure meaningful involvement of participants?	 Minimal to moderate capacity building of participants 	 Minimal to moderate capacity building of participants (depending on which stages stakeholders are involved in) 	 Minimal to moderate capacity building of participants 	 Moderate degree of capacity building of participants 	 Moderate to extensive degree of capacity building of participants (depending on which stages stakeholders are involved in) 	 Extensive degree of capacity building of participants
Q10. What data or information is already available on the area of enquiry; is prior mapping work relevant for the project?	 No data requirements It is possible to develop from another systems map (e.g. CECAN PSM) 	 Useful where there is limited data from which to start Can be useful to have first built behaviour over time plots, when initiating map building 	 No data requirements Useful where there is limited data from which to start 	 No data requirements 	 Empirical and quantifiable data on the system of interest, particularly for map validation 	 Useful where there is limited data from which to start No specific data requirements (although data about the system's past is typically used for map validation in population health research) Participatory approach even more useful where quantitative data is limited

Please note, the table below only includes questions that have method-specific considerations (i.e. questions 11 and 12 have been omitted).

Methods and points of reflection	Systems based Theory of Change	Causal loop diagrams	CECAN PSM	Fuzzy cognitive maps	Systems dynamics models	Bayesian belief networks
Q13. What skills, resources and expertise are required to implement the chosen method(s)? <i>Important note:</i> <i>These skills do</i> <i>not have to be</i> <i>requirements for</i> <i>using a systems</i> <i>mapping approach;</i> <i>they can be acquired</i> <i>throughout the</i> <i>project, possibly with</i> <i>the assistance of</i> <i>external experts.</i>	 An understanding of intervention development, evaluation and programme theory are useful 	 Network analysis skills are useful 	 Network analysis skills are useful 	 An awareness of model calibration and sensitivity analysis Network analysis skills are useful 	 Precise technical specification and quantification of components 	 An understanding of the maths and data involved Requires specific software for map analysis

Method choice and reflections

Having worked through the Design Framework and considered the purpose of a participatory approach to systems mapping, as well as the factors that can affect implementation of methods, you should now have a sense of which participatory systems mapping method(s) may best meet your needs.

Use the following table to record which method(s) you are considering and why. Further information to support your decision can be found in Section 3 and the Appendices that accompany this guidance.

Method option 1:	
Benefits:	
.imitations:	

Method option 2:

Benefits:

Limitations:

Method option 3:	
Benefits:	
Limitations:	

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- 3. International Rescue Committee. <u>Stakeholder analysis and social network guidance note;</u> 2019.
- 4. Penn AS, Bartington SE, Moller SJ, Hamilton I, Levine JG, Hatcher K, et al. <u>Adopting a whole</u> <u>systems approach to transport decarbonisation, air quality and health: an online participatory</u> <u>systems mapping case study in the UK</u>. Atmos. 2022; 3(3):492.
- 5. Barbrook-Johnson P, Penn AS. <u>Systems mapping: How to build and use causal models of</u> <u>systems</u>. Cham, Switzerland: Palgrave Macmillan; 2022.

