Summary of Methodology on Integrating deliberative and systems dynamics approaches

Methodology extracted from the executive summary of the Waikato programme.

AgResearch report

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1. Background

Recent decades have seen the management of the environment become increasingly challenging because of the complexity of the issues and an increased demand from stakeholder groups for democratisation of the decision-making process (Dryzek and Scholsberg, 2005). The difficulties of adequately tackling these issues are two-fold. First, the complexity of the natural systems under discussion is mirrored by the complexity of the decision-making environment, which is often beset by stakeholder conflict regarding values, attitudes and perspectives. Second, the desire of local communities and stakeholders to be included in the decision-making process and to have a say on issues which impact on their livelihood, lifestyle and things they value.

Accommodating both the complexity of the issues under discussion and the desire for participatory processes requires a highly integrated and inclusive methodology which incorporates both traditional scientific disciplines as well as addressing social, cultural, economic and environmental well-beings. In addition, any successful method must be able to accommodate and manage multiple streams of information, including stakeholder perspectives, quantitative data from technical experts, indicators of stakeholder values, as well as potential suites of interventions and policy choices. This report documents and reflects on the authors' recent attempt to develop such an integrated method by marrying deliberation matrix and systems dynamics approaches to improve the process of defining and approaching complex problems.

2. The Process

The integrated methodology was tested using a focus on understanding the well-being of the Waikato River. The process involved a series of three full day workshops involving stakeholders from a range of professional and individual backgrounds. For the purpose of the workshops, these individuals were grouped as representing either policy, recreation, farmers, regional councillors, iwi, energy interests or researchers/water scientists. Due to participant unavailability, not all groups were represented at all of the workshops.

2.1 Workshop 1

2.1.1 Process

Workshop 1 aimed to explore and understand the issues facing the "well being of the Waikato river" through the development of a systems map that represented the relationships between the different factors that influence and are influenced by the well-being of the Waikato River. The workshop was divided into two sessions. The first sessions aimed to identify the factors that influence and are influenced by the well-being of the Waikato River. Participants were asked, in their groups, to complete three tasks:

1. Considering the questions "What does the well-being of the Waikato River influence?" and "What influences the well-being of the Waikato River", participants were asked to identify individual influences on individual post-it notes.

2. As stakeholder groups, participants were then asked to collate these individual ideas into clusters on large sheets of paper to group like influences.
   Participants were allocated five votes (in the form of stickers) to indicate which clusters of influences they believed were most important. These combined votes assisted in the identification of the major factors for further exploration. Following reporting on these results and the experience of the process in generating them, researchers collated the individual groups' responses during the lunch break to develop the key influences on the Waikato River (Appendix 1).

The afternoon session comprised a plenary session in which the group was presented with the combined list of key influences compiled during lunch. Next, the group was invited to modify (add/remove/re-word key influences) the list now that they were able to view it in a collated format. Following this discussion, the workshop facilitator initiated a discussion surrounding the relationships between the key influences and began creating a systems map on the white board as the participants discussed and debated their ideas.

2.1.2 Key lessons

- It is important to ensure the 'right' stakeholders are present and that there are an adequate number of people to represent each perspective.
- To allow for considered, in-depth and useful discussion, sufficient time (more than one might think) is needed to enable stakeholder groups to present and explain, as best they can, their perspective to the wider group.
- Creating the systems map as a group is a time intensive and potentially confusing task. The confusion may be limited by building the systems map by gradually adding major relationships. This will allow the participants to articulate the key relationships and understand how the map is developed. At this point it might be better to interrupt the process and allow the workshop facilitators (and/or researchers) to take the map away and generate a full systems map that can be presented to the group at the second workshop. The group would then have the opportunity to critique/amend the map (see Workshop 2).
- Developing a shared understanding of the terms used and their definition is time intensive, but imperative to the success of the process.

2.2 Workshop 2

2.2.1 Process

Workshop 2 aimed to integrate the systems map into the deliberation matrix. Between workshops one and two the systems map was tidied by the research team. At the beginning of the workshop the system map developed by the research team in the intervening period of time (Appendix 2) was presented to the whole group and participants were asked for their comments. Through this consultation, participants made a number of changes to the system map (Appendix 3). These changes involved the alteration of the systems maps in three key ways:

1. New variables
2. Changes to the names of key variables
3. Development of new links between key variables

As the discussion around the systems map progressed it became evident that a clear commonly held concept of what "the well-being of the Waikato River" included was absent. At this point, it became prudent to break out into stakeholder groups and gain some clarity. Each stakeholder group was asked to describe what the "well-being of the Waikato River" meant for them and report back to the main group to explain their perspective. This exercise allowed for the exposure of each groups thinking and assumptions. Overall, the stakeholder definitions of well-being contained more commonalities than difference and these were collated into a shared set of definitions (Appendix 4).

Once the system map was complete the participants (as a whole group) were encouraged to think about the key places where interventions could occur to improve the well-being of the Waikato River. Interventions were defined as "a policy or strategy or an action that could be taken to influence system performance". At this point the group was uncertain on how to progress and individual participants appeared reluctant to take the lead and propose the first intervention. Eventually, four policy interventions were identified

1. Riparian and wetland vegetation management throughout the Waikato River Catchment
2. Maintain a stable flow in the Waikato River,
3. Removal of all the hydro dams in the Waikato river, and
4. Nitrogen and Phosphorus caps for all agriculture.

2.2.2 Key Lessons

- The debate over interventions is very time consuming. Time for debate and discussion needs to be factored into the program, and in some cases minimised
- An added step around evaluation of the status quo needs to be inserted between the completion of the map and the process of selecting interventions.
- Some pre-run analysis on current system performance would be useful to feed into the process at this point. Discussion of interventions needs to be managed differently, perhaps using small groups instead of entering into discussions as a whole group. Each group would then need to receive identical instructions from the facilitators.
- The nature of interventions needs to be clear, what where, how much detail.
- It may pay to begin with some ideas as to what interventions are possible – i.e, suggest some to begin with.
- A means of injecting science and the knowledge necessary to evaluate alternative intervention into the discussion as requested needs to be considered.
- Capturing the conversations which occur throughout the process, specifically in relation to identifying, debating and selecting interventions, is crucial to ensuring both researchers and participants can re-visit them if necessary. A combination of both digital recordings and facilitator taken notes is suggested.

2.3 Workshop 3

2.3.1 Process

Between Workshops 2 and 3 the research team prepared a template (Appendix 5) that specified 2 axes (i.e. value domains and interventions) of the Deliberation Matrix that

enabled each stakeholder group to evaluate the impact of interventions identified in workshop 2. The deliberation proceeded by requesting workshop participants to work in their stakeholder groups. A member of the research team was allocated to each group to facilitate the process. In addition, the sub systems (economy, social, cultural, environmental, governance) embedded in the systems were made transparent and were used to define the Value Domains which would form the basis of the deliberative process (see Appendix 6).

Within their groups, participants were asked to complete a number of tasks:

1. Each stakeholder group, allocated a weighting (%) across the 4 Value Domains (taken from the systems diagram), and noted across the top of the template (Environment, Social, Cultural/Tangata whenua, Governance, Economy/economic activity), to a sum of 100% (Appendix 7).
2. Individual stakeholder groups collectively identified a set of values, chosen for their importance in representing the Value Domains, using the affinity diagrams developed in workshop 1
3. A maximum of five indicators representing each value were chosen from their own experience.
4. For each Value Domain column a weighting was given to each of the values so that the sum of the weights in the column was the same as the weight given to that Value Domain.
5. The stakeholder group's judgement about the current situation for each of the indicators was declared through the use of a colour code by sticking coloured spots onto the corresponding cells of the template. The coloured code and related judgment were green (good); red (not acceptable); blue (don't know); yellow (neutral). Stakeholders could choose to proportion the colours e.g. half a red sticker, half green etc.
6. After the performance of each indicator was judged an aggregate judgement was made for each value. It was this aggregate judgment that was used to present in the full Deliberation Matrix.

Tasks four to six were then repeated to evaluate the impact of the interventions on the current situation. The colour coding in this instance was as follows: green (good/better); red (bad/worse); blue (don't know); yellow (moderate/no big deal)(Appendix 8).

After completing the tasks, a spokesperson from each group reported back in a plenary session the reasoning for their choices and judgements. Each stakeholder group template was attached to the wall to present a visual representation of all stakeholder deliberations.

2.3.2 Key Lessons

- Time should be spent exploring the systems map, both to reinforce the relationships it represents and as the source of the interventions.
- Prepare sheets of values and indicators that are generated through the systems thinking part of the exercise and complimented by a literature based values framework developed from all the literature.
- Ensure that all the stakeholders can attend the workshop and do not hold if key stakeholder groups are not represented.
- Explain the use of the weightings to prioritise values and indicators.

- Allocate a minimum of five hours for the process.
- Provide clarity around the spatial and temporal scale at which the system is being analysed.
- Ensure that the interventions that are to be evaluated are identified well in the systems workshop and where possible ensure that there is a portfolio of interventions that will have an impact across a range of stakeholder interests. Ensure that the stakeholders are happy with the interventions. This will avoid the tension identified in this workshop.
- Have a colour code specifically for require more information.
- Widen the science stakeholder group to include those with an agricultural and forestry systems background.
- Have to have time to demonstrate the move away from perceptions to the provision of real data. There may therefore be benefits in a step in between intervention and value/indicator identification and the deliberation that would allow for analysis to be run and brought to the workshop. From a research perspective it is important to understand how perceptions are informed and changed by this process. However people are keen to move quickly to deliberating and to do this they need informing.
- Need highly skilled facilitators to guide the process

3. Key Outcomes and Lessons

The specific lessons drawn from the three workshops and documented above provide a number of themes which should be addressed in ensuring an effective integration of the deliberation matrix and systems dynamics approaches.

- Stakeholder participation
    - Defining the stakeholders
    - Ensure stakeholder groups are able to attend
- Integration of approaches
    - Clearly define the purpose of each exercise
    - Clearly define how the different approaches fit together
- Ensuring effective process
    - Ensure adequate time for exercises and feedback
    - Define key terms used in the approach
    - Set limits on what each activity aims to achieve
    - Recognising the spatial and temporal scale of the assessment
- Facilitation
    - Experience of the process is essential for facilitators leading the process and is an asset for those facilitating groups
- Availability of data
    - At points in the process requests are made for factual data to inform perceptions. Means of anticipating this are required to keep the process flowing.

4. Guidelines

The purpose of this series of workshops was to trial the use of a unique combination of methods – systems thinking and deliberation matrices – for generating conversations

about environmental issues between different stakeholder groups. By way of conclusion, we have used our reflections from the three workshops, to compile the following set of guidelines regarding how this process might be better implemented in the future. Our suggested four-stage process is outlined below. Throughout these four stages, there are several key decisions that need to be made regarding how the process will proceed. Typically, there is a trade-off between the time required to complete some tasks and maintaining a high level of stakeholder participation.

4.1 Pre-workshop considerations

Prior to conducting a similar series of workshops, it is important to consider four key aspects: 1) relevant stakeholders, 2) size of the group, and 3) other operational aspects.

4.1.1 Relevant stakeholders

Ensure all relevant stakeholders are present. This may involve undertaking a stakeholder analysis or conversations with key stakeholder groups to identify who they believe should participate in the discussion. In addition, try to ensure that all stakeholders are present at the beginning, and for the duration of the process. Introducing new individuals (or stakeholder groups) at later parts of the process is possible, but also presents several problems such as a lack of shared understanding between current and new participants.

4.1.2 Size of the group

The group needs to be a manageable size – there are tradeoffs here between involving everybody and managing the group effectively using the set of small group technique which best promote system dynamics map construction.

4.1.3 Other operational aspects

- If possible use the same or similar coloured post-it notes for each stakeholder group
- Present all material back to the participants
- Group memory is important – as people will forget what they discussed and decided between times

4.2 Stage One

There are four parts to the first stage of the process:

4.2.1 Defining the issue

Allowing stakeholder/participants to define the issue can be time intensive but is vital to ensure the question is relevant and as specific as possible. Equally, defining key words needs to occur at the beginning of the process as they are used to ensure an ongoing understanding by all of frequently used phrases. All variables must be clearly defined and understood by the participants.

4.2.2 Establish relevant variables

The purpose of this part of the process is to establish the relevant variables that will be used to develop the systems map. Generation of the suite of variables that might be

included on the systems map is easily performed by stakeholders. We suggest that this is done in stakeholder groups who then report back to the wider group. However, constraining the number variables that will be used in the systems map to a manageable number is more problematic. Rather than voting, which can be unacceptable for a number of reasons, we suggest that participants are repeatedly challenged to define the most critical of the variables cited. Inevitably, this requires patience and good facilitation.

4.2.3 Creating a systems map

The variables selected for inclusion on the systems map need to be descriptive and clearly understood by all participants. For example, some stakeholder groups might have a narrower understanding than other groups of what is meant by a particular term. These differences need to be exposed to avoid misunderstandings.

Once the key variables have been established, the systems map can be constructed. This can be done by the participants via a facilitated discussion or the research team can construct it separate from the group. Constructing the systems map as a group can be time intensive, but having the researchers construct the map reduces the level of participation from the group which could potentially reduce their acceptance of the map produced and their level of commitment to the process. One approach is to build the map in parts, beginning with two variables and slowly developing as complete a map as possible. This has the benefit of getting participants to think about the relationships between variables giving them greater appreciation of the system's complexity.

The map must be presented back to the group and time allowed for participants to make comments and/or changes. This discussion will need to be facilitated well because some of the changes may only be weakly linked. It is important to remember that the purpose of the systems map is to represent the main drivers and the relationships between them. At this stage of the method, there is no allowance for weighting the drivers.

Systems map can be constructed at a number of different levels. For example, it might be detailed and specific, or it might be more general representing a higher level of the system. That is, there are often many other smaller systems within one larger system. The most appropriate level at which a map should be constructed is determined by the questions/issue under investigation. Often participants will want greater detail around their specific area of interest, or they may want to explore sub-systems.

4.2.4 Identifying key clusters on the map

To prepare for the second stage of the process, key clusters or domains need to be identified on the map (see Appendix 1). These form the organisation of the deliberation and frame the deliberation matrix and are used to assess the present situation and the impact of the interventions. During the workshops outlined here, the research team identified the key clusters between workshops 2 & 3. To ensure standardisation in the way in which information is gathered, assessment tables need to be developed with appropriate headings/titles depending upon the key clusters that were identified.

4.3 Stage Two

There are three parts to the second stage of the process: 1) Selection of value objects using the key clusters on the map, 2) Creation of stakeholder specific indicators for value objects, and 3) Evaluation of the status quo (present situation).

4.3.1 Selection of value objects using the key clusters on the map

Using the key clusters from the systems map, stakeholder groups need to discuss and select value objects for each. It is particularly, time consuming and difficult for groups to decide on their own value objects. Thus, we suggest that the researchers provide an extensive, pre-determined list of values from which stakeholders can choose. For example, value objects for the value domain *Environment* might be water quality, or biodiversity.

4.3.2 Creation of stakeholder specific indicators for value objects

In individual stakeholder groups, participants need to discuss and decide on specific indicators that they will use to evaluate the present situation (and also the interventions introduced during Stage Three). It is particularly, time consuming and difficult for groups to decide on their own indicators. Thus, we suggest that the researchers provide an extensive, pre-determined list of indicators from which stakeholders can choose. For example, some indicators for the value object *water quality* might be clarity, e-coli count and nutrient levels.

4.3.3 Evaluation of the status quo (present situation)

Stakeholder groups evaluate the present situation using their selected values and indicators. This information can be presented on the prepared assessment table – present situation. Coloured dots are used to indicate the stakeholder groups' perception of the given value/indicator set. In this case, we used green (good/better); red (bad/worse); blue (don't know); yellow (moderate/no big deal).
Once completed, each group can report their perspective to the wider group. The facilitator can then lead a group discussion to help the group make transparent the differences and/or similarities in their perspective.

4.4 Stage Three

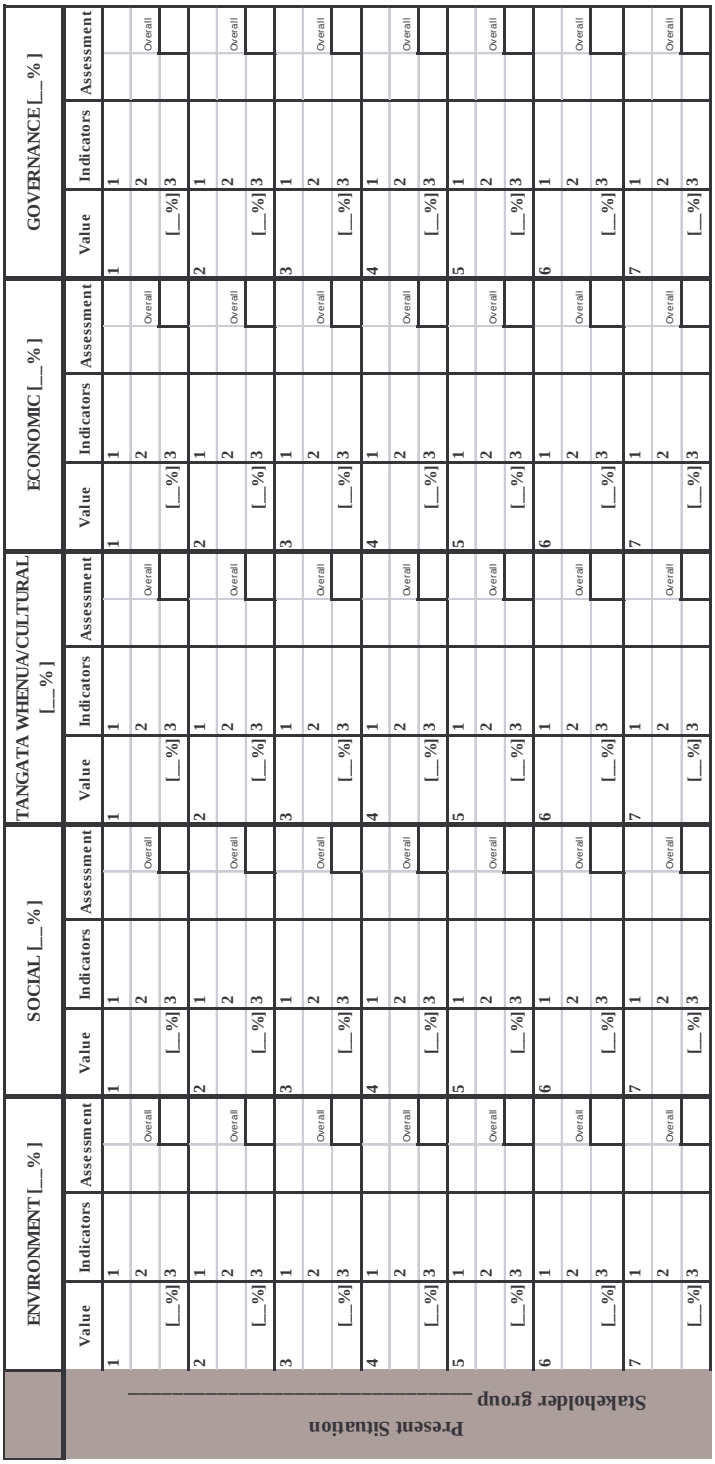
Stage Three entails consideration and selection of appropriate interventions to improve the present situation. Selecting interventions is not easy for a large group, so this part of the process needs to be facilitated well. The group may require a facilitated discussion on the ways in which the systems map can assist in identifying an appropriate intervention, or a suite of interventions. The interventions must also be described in detail to remove ambiguity and so that stakeholder groups can more fully assess the potential impact on the present situation.

4.5 Stage Four

Stage Four involves the deliberation of the chosen interventions. Each stakeholder group assesses each intervention (or suite of interventions) as to the impact it might

have on the way in which they perceive the present situation. The completed assessment tables can then be presented to the group and sufficient time should be made to allow groups to view the ways in which other groups assesses the interventions, to allow groups to report back their assessments, and to encourage dialogue between participants.

Appendix 5


Present Situation
Stakeholder group
ENVIRONMENT [__ %]
SOCIAL [__ %]
TANGATA WHENUA/CULTURAL [__ %]
ECONOMIC [__ %]
GOVERNANCE [__ %]
Value
Indicators
Assessment
Overall
[__ %]