Adaptive water governance and systemic thinking for future NRM

Action research to build MDBA capability

A SCOPING STUDY

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Executive Summary

Behind every high performance organisation there is a culture that informs the way individuals think and work collectively. This scoping project was designed to introduce Murray-Darling Basin Authority (MDBA) staff to strategies of human inquiry aimed at maximising professional outcomes and minimising systemic failures.

The overriding desire of those involved in the project was to have a workplace characterised by scientific, technical and professional excellence and an openness to change. These motivational drivers served to form the essential linkages between practical skill acquisition (systemic thinking and practice) and the perceived demands for cultural and organisational enhancement leading to the desired high performance outcomes.

Each and every one of the perceived interventions was directed to the delivery of a greater capacity (through new information and practice) to embrace change: change that required challenging pre-existing ways of thinking, decision-making, and working together productively. The reflection that best represented the experience at the conclusion of the first workshop was that the twenty-one participants had, collectively, taken "one small step in the right direction towards a high performance organisation." Having first identified the systemic issues that had engaged the participants' enthusiasms for moving forward, it was clear that concrete action planning could result from a limited investment of time (namely, a 4-hour workshop). The highly focused learning experience had led to the desired capacity building.

Progressive monitoring and evaluation of the outcomes of the scoping project testify to the high level of staff commitment to achieving excellence and the appropriateness of the action research methods and cultural/organisational change principles employed. The project was judged as very successful in meeting its set purpose, namely, to explore a manner of working that emphasised a critical and systemic approach to performance; one that was evidence-based and outcome oriented.

Across an eight-week period thirty-one staff engaged in one or more of the structured experiences that made up the project. In addition to the MDBA personnel, three members of the Australian Public Service Commission (APSC) participated in one or other of the workshops. This latter involvement was deemed important as it underscored the work that the APSC had recently completed on 'wicked problem' situations and the need to develop systems thinking skills in order to address just such situations. The application of systems thinking skills to wicked problem situations was seen to be highly relevant to the generation of a MDBA work-place culture characterised by forward movement and pride in its achievement, especially given the inherent complexity of integrated and sustainable management of water resources across the whole Basin.

The scoping project offered its participants (as judged by both qualitative and quantitative measures) ways of moving forward through complex and often ambivalent decision-making situations. By employing systemic strategies that maximise the flow of information and that are built on collaborative values, participants learnt to shape cultural and strategic change. The application of these change strategies addressed, in an initial manner, internal and external collaboration, problem definition, and the utilisation of new and challenging ways of listening, learning and action.

It was the strong opinion of participants that the usefulness of the theory and practice of this systemic manner of working could be more widely applied across the MDBA and, as a consequence, constituted a powerful instrument capable of achieving the desired cultural shift.

The considered conclusion of the participants was that the ambition of having a coherent organisational culture, one that supported and rewarded excellence could be achieved by the progressive implementation of the sorts of capacity building exemplified in this scoping project.

The project clearly enabled staff to use and benefit from a range of tools, techniques and conceptual models (see Section 1). With careful design and facilitation of the learning system in which these

techniques and concepts were embedded it was possible to generate very effective cross-jurisdictional (between programs and divisions) and inter-disciplinary working.

A significant research outcome has been the development of two ‘meta-models’ (Sections 5.7 and 5.8). The first is a process model for internal and external engagement so as to aid the Authority in achievement of its mission. The second is a set of activities that comprise a minimum set of elements in a learning system for evolving the Authority’s culture and character.

The research has identified a range of strategic risks that face the MDBA in pursuing its mission. What is significant, however, is that the ways of working pursued in this project were seen by participants as an effective means to highlight and then address potential strategic risks.

The scoping project evidences clear demand for on-going capability building in systems thinking for better integration and performance within the MDBA. To achieve maximum impact this will, in future, require active embedding and facilitation within the organisation (see workshop reflections, Sections 5.4 and 5.5 and outcomes of the evaluation, Section 5.6).

The follow-up evaluation of the scoping project provides clear evidence that the activities enhanced the Authority’s culture of professional development and learning, as well as generating outputs that were useful to the individual participants. Participants highlighted in the evaluation, however, that a key issue for the future was how the MDBA as an organisation may take advantage of the types of learning that they had experienced.

1. Introduction

The aim of this scoping project was to map out how the Murray-Darling Basin Authority could apply action research methods and social/organisational learning principles to improve its capability to deliver its functions under the *Water Act* 2007.

The project was conceived as a professional development task, which introduced, in theory and practice, the intellectual discipline of systemic thinking and integration to better equip staff to deliver NRM outcomes.

The development of the desired capability was to be judged by the application by the participating staff of the Authority of the insights and practical skills relevant to systemic thinking, as well as judgements about potential application.

The timeline and activities of this project are described in Appendix 1.

2. Project background

The 'trigger' for the project was a workshop conducted at the University of Melbourne concerned with 'Systemic and Adaptive Water Governance' organised by Lee Godden (Professor of Environmental Law, University of Melbourne) and Ray Ison (Professor, Systems for Sustainability, Monash University).[1] It was soon recognised by staff within the newly created MDBA that the background paper circulated as part of this workshop (see Appendix 2), addressed a set of issues relevant to the on-going effectiveness of natural resource management (NRM), and thus the MDBA, within the Murray Darling Basin (MDB). This paper provided a conceptual background from which the following project objectives were distilled:

a) Exploring and developing tools, techniques and conceptual models useful to adaptive water governance;
b) Developing more effective and complementary approaches to working within and between programs and divisions;
c) Building capacity to evaluate and assess effective performance, and recognise strategic risks;
d) Motivating deeper involvement with their work through assessing and creatively addressing the key challenges of their roles;
e) Actively exploring and developing a strategy to enhance the Authority's culture of professional development and learning;
f) Monitoring and evaluating measures of performance for the inquiry process;
g) Determining if the project's process and outputs are useful; and
h) Assisting in designing a next phase of the work if this was considered justified.

It is important to emphasise that this was a scoping project conducted over a short time frame (Appendix 1). Through this project, the MDBA proposed to scope an exploratory phase of work which mapped out how to apply a social/organisational learning approach to improve capacity for both the external and internal dialogue needed for effective NRM outcomes. Thus from the outset it was recognised that systemic and adaptive governance was an internal (within MDBA) as well as external concern (in the MDB). The project set out to achieve its aims by mapping out how the MDBA could

[1] Chris Biesaga from MDBC (now MDBA) was invited to speak at this event.

apply action research methods and social/organisational learning principles to improve its capability and capacity to deliver its functions under the Water Act 2007.[2]

Following the logic described in Appendix 2, there are strong arguments as to why professional development, systemic thinking and integration are important for the successful delivery of the MDBA's NRM strategies and programs. This not only involves integration across land, surface and ground waters – but also requires an understanding of different stakeholder perspectives and interests in environmental, economic and social aspects of NRM. In the first instance, however it requires thinking and practice skills that enable realisation of these types of 'integration outcomes' and, more importantly, they need to be embedded as part of a broader process of 'organisational learning'.

Tackling the NRM challenges effectively requires staff to have a broad understanding of the different roles and responsibilities of the Authority and how it goes about achieving its outcomes. On a day to day basis, this includes the large number of projects underway within the NRM and Basin Plan Divisions. At the same time, a strategy for engagement with diverse stakeholder interests at multiple geographical levels is being developed.

A learning approach requires a shift in thinking and practice and often the development of new skills. This is because 'social learning' for concerted action depends on the perceived inter-dependencies of stakeholders. This means that continuing to operate as an individual (or individual functions) is unlikely to enable these interdependencies to be perceived, adequately understood and acted upon (see Steyaert & Jiggins, 2007; Pahl-Wostl et al 2008; Measham 2009). A more deliberate approach to learning methods and techniques for systemic thinking can help staff and stakeholders explore and make sense of their inter-dependencies and work out how their collective roles can be complimentary.

The project explored a range of ways of improving capacity for understanding and delivering NRM strategies through the purposeful design and conduct of three workshops. It provided an opportunity to develop a more active learning approach, initially focused primarily within the NRM Division, with involvement from other staff by invitation or nomination by managers. It was understood that if the scoping phase was successful the project's approaches might be extended more widely within the MDBA.

[2] Our theoretical perspective is that all learning is social and that a particular concern of this project is how learning, as a social process, might translate into organisational learning. In the context of systemic and adaptive governance, what is meant by social learning is described in Appendix 2 – a useful metaphor for social learning is that of an orchestra – an orchestra is both an entity as well as a social dynamic from which, hopefully, an effective performance emerges (e.g., an effective organisation). Thus social learning can be understood as an entity (a policy or governance mechanism) as well as a social dynamic, an 'effective performance', between diverse stakeholders in complex and uncertain situations (see Blackmore et al 2007).

3. Conceptual framework

The theoretical approach that informs this project and the methods used to implement the capacity building initiatives were derived from:

(i) the scientific literature regarding systems thinking and practice (Ison 2008a)

(ii) systemic practices associated with situation framing and issue formulation (see Schön and Rein 1994; Ison 2008a,b,c);

(iii) systemic environmental decision making (see Ison et al 2006, 2007b);

(iv) recent research on alternative forms of governance in natural resource management (NRM) situations, especially 'social learning' (e.g. Keen et al 2005; Sienbenhüner 2006; Wals 2007; Pelling et al 2008; Tabara 2009 – see also Appendix 2);

(v) systemic inquiry, a new institutional form to deal with the limitations of living and acting in a 'projectified world' (Ison et al 2007c);

(vi) strategic and systemic organisational learning when the circumstances are dominated by the complexity of variables and the uncertainty of the consequences of predetermined outcomes (e.g. Ison et al 2009).

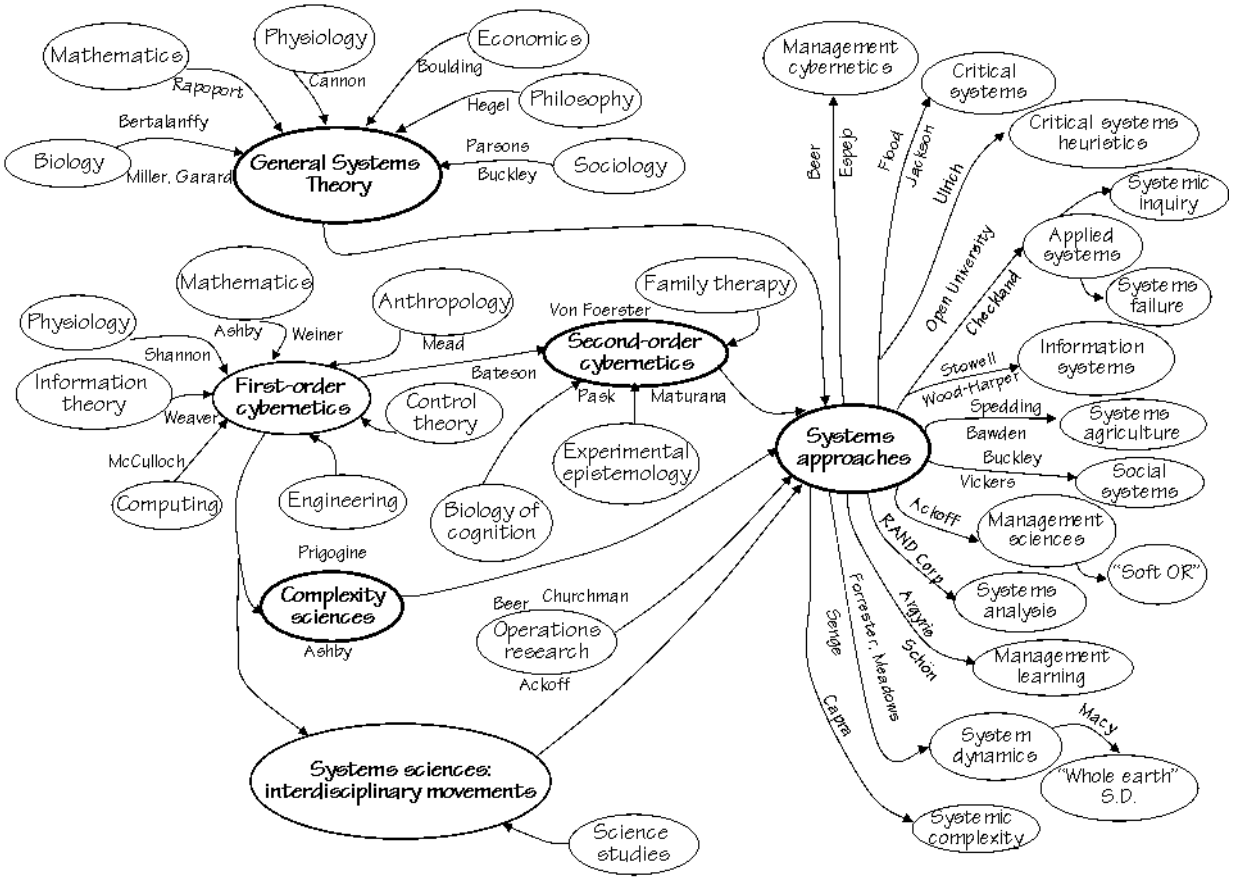


Figure 1. A model of different influences that have shaped contemporary systems and cybernetic approaches (Source Ison 2008b).[3]

[3] We do not claim that this depiction is in any way definitive – a major limitation of it is that it does not include the many valid French, German and Spanish, and possibly other, contributions to contemporary systems approaches. This in itself also highlights how the different language communities give rise to intellectual silos.

3.1 Systems thinking and practice

Systemic thinking, with its emphasis on relational variables, encourages the understanding of different stakeholder perspectives and the articulation of the diverse interests in environmental, economic, and social aspects of NRM (Ison 2008a). The intellectual foundation upon which the approach taken in this research was built relates to a particular set of understandings about:

(i) the interplay between human language (i.e. human communication), human emotions and human cognition;

(ii) the nature of *experience* and its relationship to learning;

(iii) systemic praxis – practical action that is informed by systems thinking.

A particular influence on the work comes from the sub-field of second-order cybernetics which is part of the intellectual field of Systems (see Figure 1). In the workshops that were conducted other parts of the Systems intellectual field were drawn upon (e.g. applied systems; systemic inquiry; management learning – Figure 1) but in a short scoping project of this type only a very limited exposure to the full range of systems thinking and practice was possible.

A key feature of systems thinking is that we each hold only a partial perspective on situations and as a consequence one of the key aims of systems practice is to build up a systemic understanding of a situation through multiple, partial perspectives. The evidence for this lies in appreciating that we each have unique histories (traditions of understanding, Russell and Ison 2007) and that what we have in common is our ability to live in language (i.e. human communication). The fact that we have different histories and belong to different language communities (cultural, professional etc) accounts for why a particular situation is understood or interpreted differently. It is this set of phenomena that also account for why in a given situation the nature and extent of a person or group's stakeholding is likely to be different.

As outlined in Section 1, several of the techniques introduced during the workshops (conversation mapping; rich picturing; system mapping – see below) are designed to surface different perspectives and to enable more effective engagement by diverse stakeholders in complex situations.

3.2 Situation framing and issue formulation

In recent research we have found it useful to frame situations (Shön and Rein 1994) in terms of 'resource dilemmas (Figure 2) as an expansion of earlier framings such as 'wicked problems' or messes (Ison 2008b). The Australian Public Service Commission in a seminal paper in 2007 looked at the issue of policy failure in response to long-term, intractable 'wicked problems' of which river catchment managing is an example. These authors argued for capability building in skills and understandings for engaging with, and managing, 'wicked problem situations', especially developing systems thinking skills. In a later paper (2009) the APSC observed that:

> ' *governments are facing new policy challenges, such as climate change, water scarcity, Indigenous welfare, and diseases linked strongly to lifestyle, problems which traditional techniques do not seem able to address effectively. These problems are difficult to identify and solve as they have multiple causes interacting in complex ways that are not well understood. As the Prime Minister, Hon. Kevin Rudd MP, has stated, '… a business as usual approach … is not working. Most old approaches are not working. We need a new beginning.' …….. The new modes of policy implementation are collaborative and can seem unstructured or messy. They require levels of risk taking, experimentation and engagement with communities that do not fit comfortably within current accountability and performance management arrangements* (p. 1-2).

In an address to Heads of Agencies and Members of Senior Executive Service, Great Hall, Parliament House, Canberra on the 30th April 2008, the PM also said:

'*One important feature of the priorities … is the long-term nature of many of Australia's key policy challenges. For the APS to deliver on the Government's long term reform agenda, we will need to invest in a greater strategic policy capability. By this I mean a greater capacity to see emerging challenges and opportunities – and to see them not just from the perspective of government, but also from the perspective of all parts of the community.'*

'I expect [PM&C] to work collaboratively with the entire APS so that we genuinely deliver 'joined up' government.'

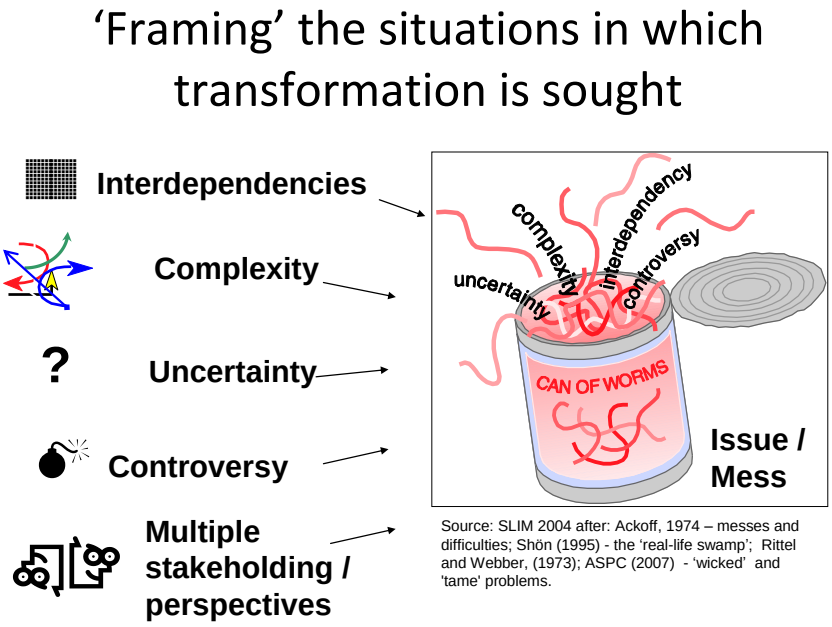


Figure 2. A way of framing a situation such as the 'managing of a river catchment' based on the literature on 'resource dilemmas', wicked problems, messes and the swamp of real life issues (Source: after SLIM 2004).

This scoping study sets out to address the challenges identified by the APSC and the Prime Minister. This is timely as the MDBA establishes itself fully within the Australian Public Service (unlike the former MDBC). The project can also be understood as research that explores ways of developing 'joined-up government' by testing and developing systemic and adaptive practices to support innovative water governance and to examine alternative and complementary governance frameworks and inquiry practices.

3.3 Systemic environmental decision making

Systemic environmental decision making is built on the understanding that humans and the biophysical environment are best understood as a coupled, or co-evolutionary system. To understand how a co-evolutionary system functions demands an appreciation of relational phenomena as exemplified by understanding the practice of walking as a relational dynamic between a person (a biological organism) and a medium such as the floor or a path. For walking to happen requires two separate entities in functional relationship, i.e. a person or a medium, such as a floor; when the relationship breaks down, walking ceases to happen. A co-evolutionary understanding questions the utility of the dominant paradigm of linear causality that drives many current policies.

Systemic environmental decision making also focuses attention on the connectivity of systems as for example in the water and carbon cycles, draws attention to the potential unintended consequences

that can arise when this connectivity is either not appreciated or neglected and attempts to create the circumstances to avoid systemic failure (e.g. Chapman 2002 – see also Ison et al 2006).

3.4 Systemic and adaptive governance

Governance is a much broader idea than management, it encompasses the totality of mechanisms and instruments available for influencing social and organisational change, especially adaptation, in certain directions (see Appendix 2). While governance moves beyond management, it is important that the praxis (theory informed practical action) elements associated with enacting governance are not lost; for example, Collins and Ison (2009) argue for 'integrated catchment managing' rather than 'integrated catchment management' as the missing key from praxis in the water domain.

The organisational learning we are concerned with so as to embed systemic and adaptive governance is the process of learning through which stakeholders, with different histories and thus perspectives, co-construct what is at issue in a given situation (Figure 3). The transformation of complex, interdependent, uncertain situations into something that is agreed is an improvement rests on the interaction of changes in understanding, changes in practices and change in social relations of those involved. This heuristic can be seen as a decision-support tool designed to maximise the quality of the intellectual input in identifying the complexity (richness) of diverse conceptual positions across professional staff and the emotional drivers that underscore positive action. Our understanding of this form of learning is built on an appreciation that nearly all theories of learning, even if they are centred on an individual, have a social dimension. The term social/organisational learning has arisen in response to a growing recognition that our understanding of learning has moved away from an educational emphasis, with its focus on individual learning, to one where learning occurs through some kind of situated and collective engagement with others. Even so, learning can have many meanings depending on which different theoretical traditions and interpretations are used in defining it (Ison et al 2000; Blackmore 2007).

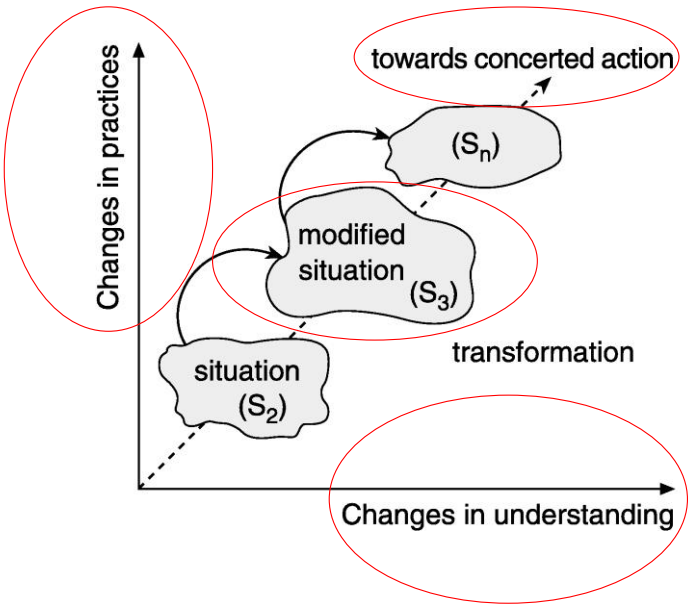


Figure 3. Factors affecting the transformation of complex, multiple stakeholder situations such as effecting sustainable water managing in the Murray Darling Basin or fostering systemic, interdisciplinary practices in complex organisations (Source: SLIM 2004). The red ellipses identify the key areas for evidence.

3.5 Systemic inquiry

Systemic inquiry is a particular means of facilitating movement towards concerted action by multiple stakeholders in situations of complexity and uncertainty. It can be seen as a meta-platform or process for 'project or programme managing' in that it has a focus on (i) understanding situations in context and especially the history of the situation (S1 – not shown – in Figure 3); (ii) addressing questions of purpose; (iii) clarifying and distinguishing 'what' from 'how' as well as addressing 'why'; (iv) facilitating action that is purposeful and which is systemically desirable and culturally feasible and (v) developing a means to orchestrate practices across space and time which continue to address a phenomenon or phenomena of social concern when it is unclear at the start as to what would constitute an improvement (this last point seems particularly apposite to the MDBA which is embarking on a long term planning process in a complex, uncertain situation in which history suggests there will be high staff turnover and loss of organisational memory unless this is purposefully managed in an adaptive manner).

Systemic inquiry builds on, and extends Churchman's (1971) epistemological assumptions; it is concerned with the design of inquiring (or learning) systems and is grounded in various traditions of systems scholarship as depicted in Figure 1, including second-order cybernetics (Maturana & Varela 1987; von Foerster & Poerkson 2002; Maturana & Poerkson, 2004) and applied systems studies (Checkland 1999).[4]

Through empirical and design research members of the SLIM project (see http://slim.open.ac.uk; also Blackmore et al 2007) have found certain 'variables' to enhance or constrain the transformation processes that lead to social/organisational learning (Figure 3). Thus institutional arrangements, including policies may be conducive, or not. How stakeholding, an active process, is built is important, as is whether adequate facilitation occurs (by people called facilitators as well as through mediating technical objects), or not; epistemological constraints are also common and need to be addressed.

In short, issues that are considered to be systemic by nature require some kind of appropriate inquiry to progress them. Systemic inquiry is an approach to managing complexity which is adaptive to changing circumstances and which draws explicitly on understandings of systems thinking, action research, cooperative inquiry and adaptive management. It is a key element of doing systemic development through which particular transformations – personal, social, situational – are realised (Figure 4; Ison et al 2007a; Collins et al 2005).

[4] Churchman (1971) addressed the design of inquiring systems. He reflected that the tendency, then prevalent, was to bolster science and its research as the paradigmatic exemplar of an inquiring system. He rejected this and observed that '….reflective learning in the literal sense…. is the thinking about thinking, doubting about doubting, learning about learning, and (hopefully) knowing about knowing' (p. 17). He defined 'inquiry' as an activity which produces knowledge (p. 8); put another way, inquiry facilitates a particular way of knowing which, when enacted, makes a difference. As Churchman (1971) observed, when exploring the metaphor of a 'library of science', the common definition of science as a systematic collection of knowledge is 'almost entirely useless for the purposes of designing inquiring systems……in other words knowledge resides in the user not in the collection… it is how the user reacts to the collection…that matters' (p.10).

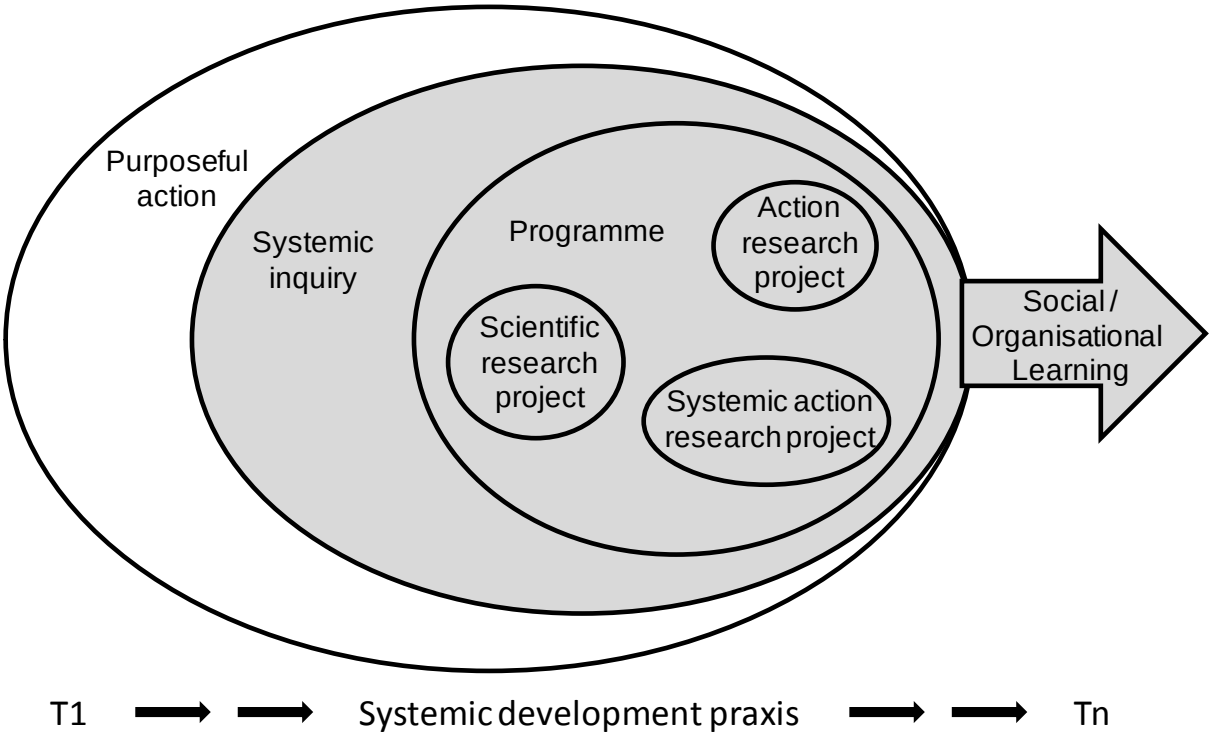


Figure 4. How different forms of purposeful action can be organised to support systemic and adaptive governance though processes of social learning and systemic development

In order to facilitate the 'take up' of new learning and the requisite personal empowerment for its implementation, an action research approach to 'issue determination' was judged to best fit the desired coherence of systems thinking and systems practice. Action research avoids the assumption that the issues, and the implementation strategies, are already clearly defined and substantially agreed upon (Bawden and Packham 1993; Ison and Russell 2007; 2009).

3.6 Strategic and systemic organisational learning

Systems thinking has been an important element in much of the literature that attempts to foster organisational learning and systemic and strategic managing; e.g., the learning organisation as envisaged by Senge 1990; Senge et al 1994 or through systemic intervention (Midgely 2000) or designing new organisational architectures (e.g. Gharajedaghi 1999) or through systems approaches to management (Jackson 2000). In our work we argue that in both NRM fields as well as organisational domains, the concept relevant to the achievement of sustainability has moved from 'management' to 'governance.' Furthermore, systemic and adaptive governance offers a framing and set of practices to build organisational resilience in the face of 'surprise', thus equipping organisations and their staff to be better able to manage strategic risk and to avoid systemic failure (Chapman 2002). Important elements of our recent research, which are extended through this project because of their relevance in an organisational setting, are the (i) design of learning systems (e.g. Figure 5) and (ii) systemic evaluation embedded within an overall systemic inquiry approach as described in Figure 4.

Figure 5 exemplifies a learning system design for practical action in a national series of workshops concerned with fostering transition to water sensitive cities (an aim of the National Water Initiative). As outlined by Ison et al (2009), these workshops, although only two days in duration, facilitated significant changes in understandings and practices of those involved (as per Figure 3). The events were judged by a majority of those who participated as successful (*ibid*).

Figure 5. The 'creating water sensitive cities learning system' design (centre) with illustration from the Adelaide workshop of some of the key processes (Source: Ison et al 2009).

As mentioned, Figure 5 exemplifies, through an activity model, a design of a learning system. Importantly it is adaptive as evidenced by the two levels, in this case, of monitoring and control. The systemic features include: (i) comprises elements or activities; (ii) exhibits connectivity; (iii) results in transformation of a situation; (iv) has emergent properties and (v) is bounded in some way. It also has design/designer features: (i) It is purposeful to those who participate; (ii) It is not deterministic or a blueprint and (iii) designers hold an awareness that what is valid knowledge is contested.

Given that the aim of this project was specified as professional development with the objectives of fostering greater staff dialogue and responsible action across diverse sections and skill sets, the consultants consciously *re-framed,* for inclusion in this Final Report, any input couched in language as a 'block to action' to language expressing an 'enthusiasm for action'. The theoretical rational for this reframing is to be found in the scientific literature linking decision making with action taking (Hubert et al 2000; Ison & Russell 2000; Russell & Ison 2007). As we discuss in a later section of the report, the first workshop was successful in fostering four working groups around common enthusiasms for situation improving action (see Ison and Russell 2000) within the MDBA. However in a typical human resources (HR) intervention, which became one of the ways this project was framed, it is important to understand just what capability and capacity development are and how these need to be evaluated.

Public service reform in Australia and elsewhere is dependent on strengthening the strategic and delivery capacity of staff within their organisational settings and ensuring the workforce have the leadership, change management and innovation skills to deliver.[5] Measures to strengthen the capability and capacity of all levels of government include incentives, performance management systems and leadership development. Whilst these may be necessary, in and of themselves, they are not sufficient. Staff may have the capacity but not the capability to act because of systemic factors associated with the organisation and other staff – not with individuals. For this reason any HR program or intervention if it is to be effective (beyond numbers participating in a training event) has to be embedded within the daily practices of an organisation. Figure 6 provides a model to guide thinking about the dynamic involved, and thus how evaluation needs to be framed.

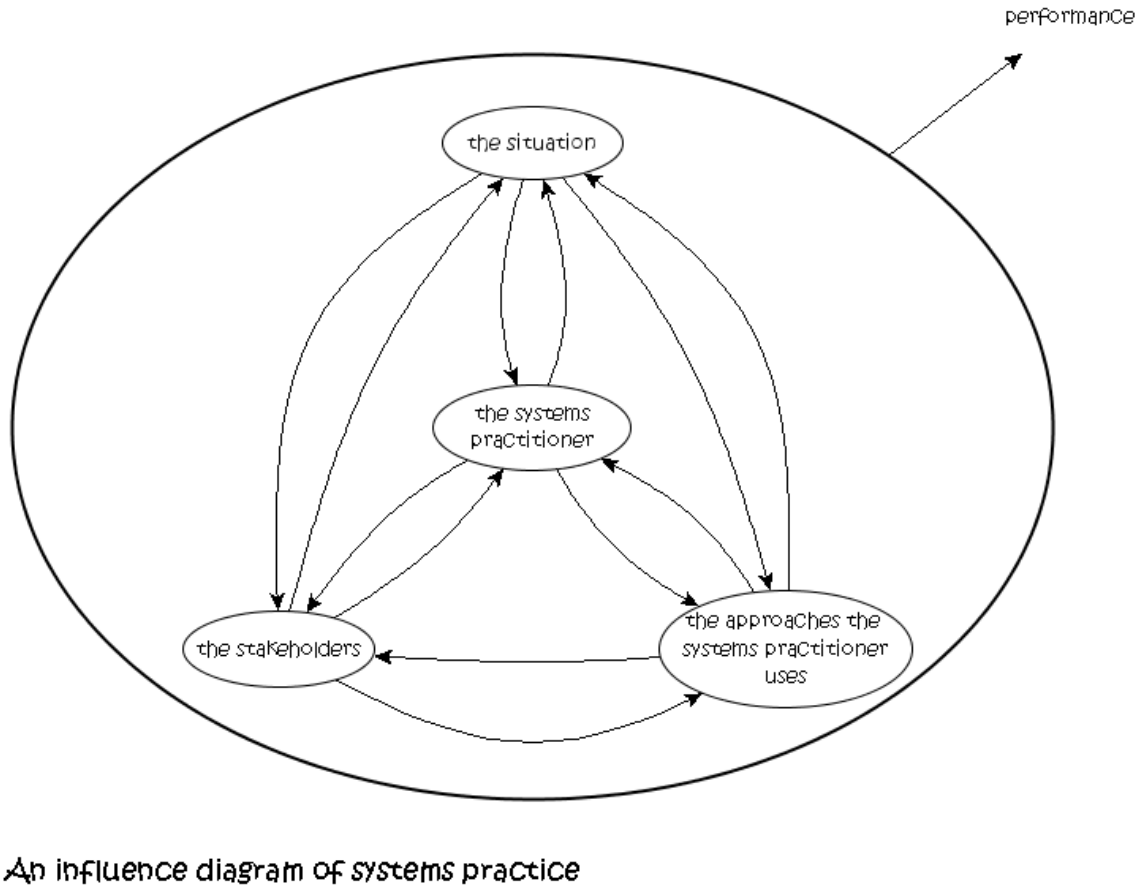


Figure 6. An influence model of the different elements necessary for systems practice. It is also a model for what has to be evaluated if an HR intervention to develop systems practice capability is to be judged as effective (source: Armson 2007).

The same model can be applied to evaluating more effective policy development; of note is the recent APSC paper in the Contemporary Government Challenges series entitled 'Smarter policy: choosing policy instruments and working with others to influence behaviour' which advocates designing policy that effectively achieves the Government's goals in an environment of increasing complexity and interconnectedness.[6]

[5] e.g. See Australian Public Service Commission State of the Service Reports and also the Integrated Leadership System (see http://www.apsc.gov.au/ils/); in the UK for example see http://www.esrcsocietytoday.ac.uk/ESRCInfoCentre/PSZ/Research/CapabilityCapacity.aspx

[6] http://www.apsc.gov.au/publications09/smarterpolicy.htm

4. Project Design

The sequence of activities with embedded learning events is shown in Appendix 1. It was agreed that the following tasks/activities would be undertaken:

1. Review of capability and needs based on overall outcomes of the project
2. Design and conduct a workshop with Steering Group and additional MDBA staff (three workshops were held)
3. MDBA staff surveys held
4. Train at least 18 MDBA staff
5. Prepare draft report
6. Present final report addressing comments by Steering Group

The following project deliverables (contract material) were agreed:

1. Steering Group meeting, introductory workshop and interviews with MDBA staff (8 May 2009)
2. Workshop 1 with MDBA staff (15 May 2009)
3. Workshop 2 with MDBA staff (12 June 2009)
4. Draft Report and completion of interviews (22 June 2009)
5. Final Report and Steering Group meeting (26 June 2009)

In preparing the project design it was expected that the situation we were entering would be characterised by all of the features described in Figure 2 (the can of worms). As we have considerable research and praxis experience of operating in such situations, it was not surprising to us to find particular metaphor clusters being expressed in relation to the situation within the MDBA. In our work metaphors provide a means to convey how a situation is understood (McClintock et al 2003; 2004). Giving expression to, and 'mirroring back', metaphors in use, is a device (method) to trigger new understandings (as expressed through new metaphors) and thus a means to open up possibilities for learning and change.

In a pre-project meeting a range of metaphors were surfaced by those present. They could be summarised under four cluster headings (i) metaphors of personal anxiety; (ii) metaphors of strategic risk; (iii) metaphors in relation to the MDBA and the complexity of its task and (iv) metaphors of purpose.

It is important to understand that the metaphors are not descriptors of the MDBA (past or present) but descriptors of how individuals understand or experience their situation. Systemic practices are concerned with creating the circumstances for transformation of understandings and practices (Figure 3). In systemic terms these metaphors also reveal aspects of the environment in which the scoping project was being established (Figure 7).

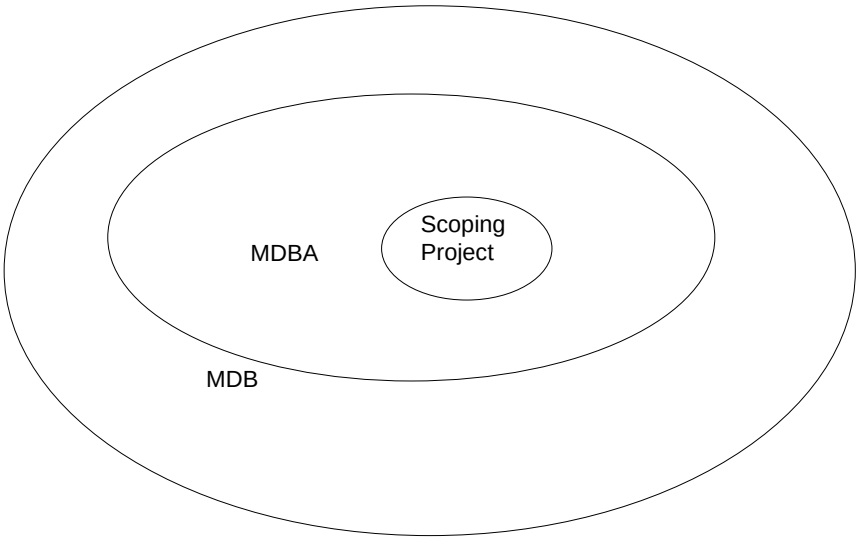


Figure 7. This project understood as a set of nested (systemic) relationships.

With this limited appreciation of the initial starting conditions a basic learning system design was created based of the following set of activities (with minor variations in some instances):

- Understand the nature of the situation from a range of perspectives by conducting a series of semi-structured interviews (this can be seen as characterising the environment of the scoping project as depicted in Figure 8, which is also a shorthand for talking about the scoping project-MDBA relationship);
- Plan and develop a set of activities and associated logistics, invitations and governance (i.e., steering group)
- Conduct workshops which start by exploring, from the perspectives of those present, a topic which captures a description of the situation to be transformed;
- Introduce and use techniques that enable the experience of those present to be acknowledged and valued;
- Experience new ways of working and techniques that could be adapted to other contexts;
- Identify key issues and opportunities, in the current situation;
- Identify possible issues worthy of ongoing systemic inquiry;
- Identify and prioritise some future actions for which enthusiasm exists;
- Monitor and adjust the overall learning system by maintaining a strong connection to the steering group (i.e. through a series of informal one-to-one conversations);
- Reflect on the learning that has or has not occurred (on-line evaluation).

The other design consideration was that of contracting for each of the group sessions. Research into group functioning and effectiveness has shown that contracting prior to starting enhances performance and sets a more positive emotional dynamic. The following (informal) contract was proposed and accepted for each of the three group sessions:

- Provide others with the experience of being listened to?
- Check out your own understandings?

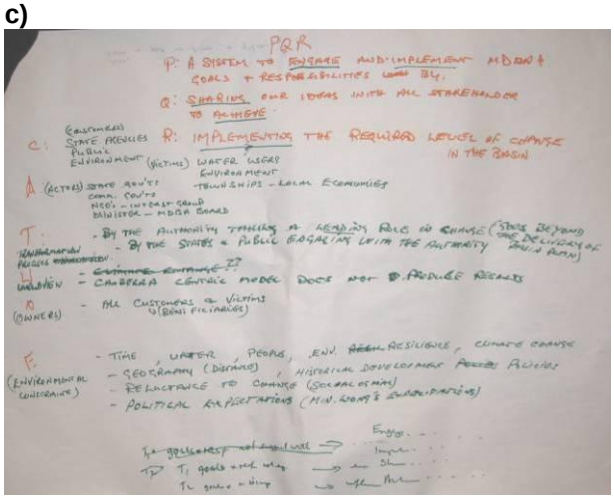
- Appreciate diversity of experiences and perspectives in the room?
- It's ok to ask questions / say you don't know?
- Who says what stays here?
- No movement between groups unless negotiated?
- No email, no phones in the room?
- Permission to take photographs and record?
    - ethics clearance – see distributed sheet
- Finishing on time?
- We all take responsibility for monitoring this contract?

Figure 8 shows a set of images depicting the dynamics, techniques and outputs arising from the implementation of the designed learning system. The main results are described in the next section.

a)

b)

c)



d)

Figure 8. Images depicting the dynamics, techniques and some of the outputs of the various activities undertaken in this scoping project: a) Conversation mapping; b) Rich picturing; c) Root definitions (PQR – a system to do P, by means of Q, to do R, and CATWOE – customers, actors, transformative process, world view, owners, environment); d) System mapping.

5. Results

This project involved a process of co-design with the project steering group. Seven cycles of action learning were then put in place (Table 1). We first present the outcomes of our deliberations with the steering group (Section 5.1). Then two composite narratives, the first composed from the outcomes of 18 semi-structured interviews (Section 5.2) and the second from a series of conversations with members of the project steering group (Section 5.3) are presented. The two workshops are then described and the main outcomes summarised (Section 5.4 and 5.5). In section 5.6 the outcomes of the evaluation questionnaire are presented. In Sections 5.7 and 5.8 two process models which arise from our research are presented. We conclude (Section 6) with suggestions for future action arising from the research.

Table 1. Summary table of learning events conducted in the scoping project

1. **Steering group workshop**	**2.** **Initial interviews**	**3.** **Workshop 1**	**4.** **Conversations with members of scoping group**	**5.** **Workshop 2**	**6.** **Evaluation questionnaire**	**7.** **Report preparation and judgement about a second phase**
6 participants (75% of steering group) Staff came from 3 divisions of the Authority	18 interviews conducted of approximately 30 minutes duration; Analysis template is shown in Appendix 3 Staff came from 4 divisions of the Authority	21 participants From all 5 divisions of the Authority NB. Two participants were from the APSC	In-depth conversations with 7 out of 8 members of the steering group	11 participants Staff came from 4 divisions of the Authority NB. One participant was from the APSC	Distributed to all MDBA staff (and APSC staff) who participated in the workshops (i.e., 29 people) 48% response rate to the on-line evaluation (see Appendix 6)	Draft report submitted on 22nd June; final workshop held with steering group on 25th June Final report submitted encompassing feedback on 26th June
Techniques introduced: *Conversation mapping*		Techniques introduced: *Conversation mapping* *PQR (root definitions)* *CATWOE analysis*		Techniques introduced: *System mapping* *Rich picturing* *PQR (root definitions)* *CATWOE* *Activity modelling*		

5.1 Project framing with steering group

The initial meeting of the members of the scoping project agreed that the evaluation process was to be informed by the broad-based goal of maximising *adaptability* and *diversity* across the staff group in their daily actions. It was in the spirit of action research to articulate and promulgate the process goals prior to the commencement of the researching project. These goals were sufficiently broad based that there was no need to review them as the various cycles of learning occurred; rather, they remained as consistent guiding principles throughout the project.

At the same meeting it was determined that the context for the evaluation of the project consisted of two key relationships; namely, the relationship of the members of the scoping project with the MDBA and the relationship of the MDBA with its stakeholder communities (see Figure 8). As this was a project with systemic thinking and practice as its core competency to be learned, these two relationships constituted the parameters for the subsequent mapping of how the scoping group arrived at the themes for both the initial interviews and the first workshop. The following 'hard-edge' themes, each expressed as a question: *What was the experience of* (1) the cross-disciplinary sharing of knowledge, (2) the communication culture of the authority, (3) the culture change demanded by the *Water Act, 2007* and (4) the engagement and lack of engagement with relevant external bodies, were derived from consideration of the two primary relationships. In addition, three 'soft-edge' themes, again expressed as questions, offered a more qualitative perspective: (1) what metaphors were in use to describe daily professional experience? (2) What emotional drivers were shaping these metaphors? And, (3) how robust was each person's capacity to critically appraise their mental model of how their intellectual knowledge was generated?

The members of the scoping group met again at the conclusion of the first workshop and agreed that the principal material outcome, beside the skills acquired, would be a model of a new conceptual framework which would convey a *process of engagement* (internal and external) and be indicative of a *desired change in organisational character*. We conclude this section by presenting conceptual models of (i) a *process of engagement* (internal and external) (Section 5.7) and (ii) a possible design for embarking on a systemic inquiry to achieve a *desired change in organisational character* (Section 5.8).

5.2 Composite narrative number 1 - interviews

A useful means of summarising and integrating the data from the 18 one-to-one interviews was to construct a single composite narrative. This interpretative task aimed to integrate the diverse expressions and organise the principle intended meaning across the interviewees. The narrative represents the cycle showing how each person (as expressed in the composite) moved from (1) inspiration to (2) experience, which was shaped by (3) emotional drivers (ambivalent by nature, but not especially so), which was (4) reflected upon and thus formed the beginning of the subsequent cycle.

The overriding desire of those interviewed was to have an inspiring vision for the Authority which acknowledged the inherent uncertainty and complexity of the situation and which sought to achieve control but, at the same time, recognised that if such control was achieved then failure would result (this can be likened to managing a paradox). The predominant experience (early May, 2009) was of being at the initial stage of development of the network of key professional relationships that would characterise their future working lives and the deeply-felt need for the existence of such a network. The overriding drivers shaping the experience were the desire to get good results, to learn from the experience, and to have a way of documenting the learning/results so that knowledge was maximally shared across all sections of the Authority. A transparent model of adaptive management which included pathways-to-action was judged to be a productive way of achieving these desired outcomes. The experience of the Authority being successful, for the environment and for relevant stakeholder communities, was of critical concern. Having dedicated time within the MDBA and the existence of a structured process for reflection on ongoing achievements (or lack of particular achievements) was considered to be a vital link in the chain of future organisational learning events.

In moving forward this composite narrative needs to be understood against a backdrop in which, at the time of the interviews, the metaphorical analysis reflected a mismatch between the metaphors of lived experience of those interviewed and their hopes and aspirations for the success of the MDBA and thus the effective managing of the MDB (Figure 9 and Figure 10).

As mentioned previously, it is important to understand that the metaphors are not descriptors of the MDBA (past or present) but descriptors of how individuals understand or experience their situation.

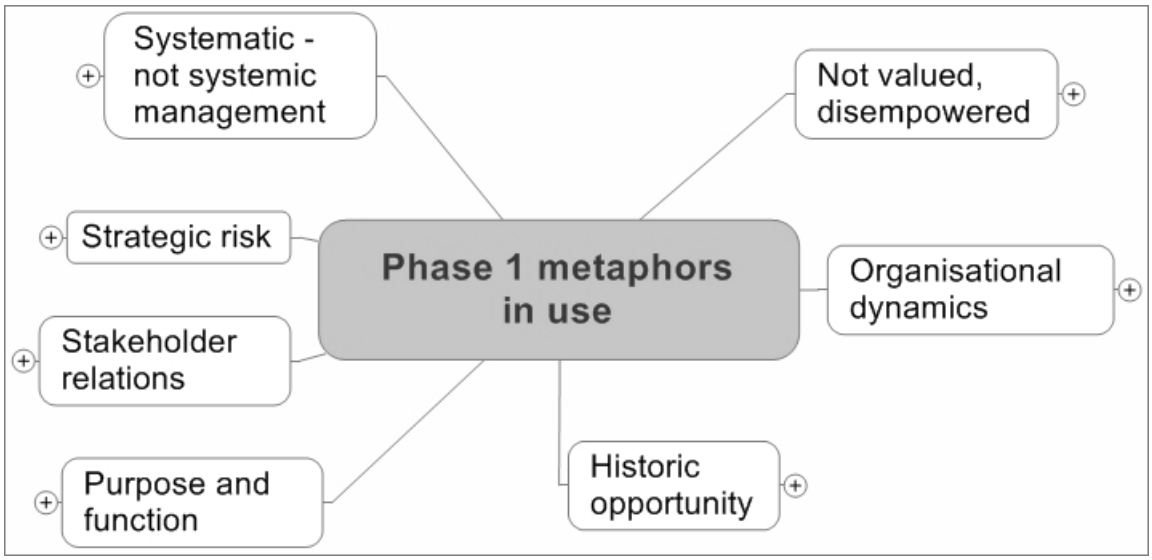


Figure 9. Metaphor cluster headings arising from phase 1 of the project (semi-structured interviews). The individual metaphors reflected tensions between lived experience and aspiration.

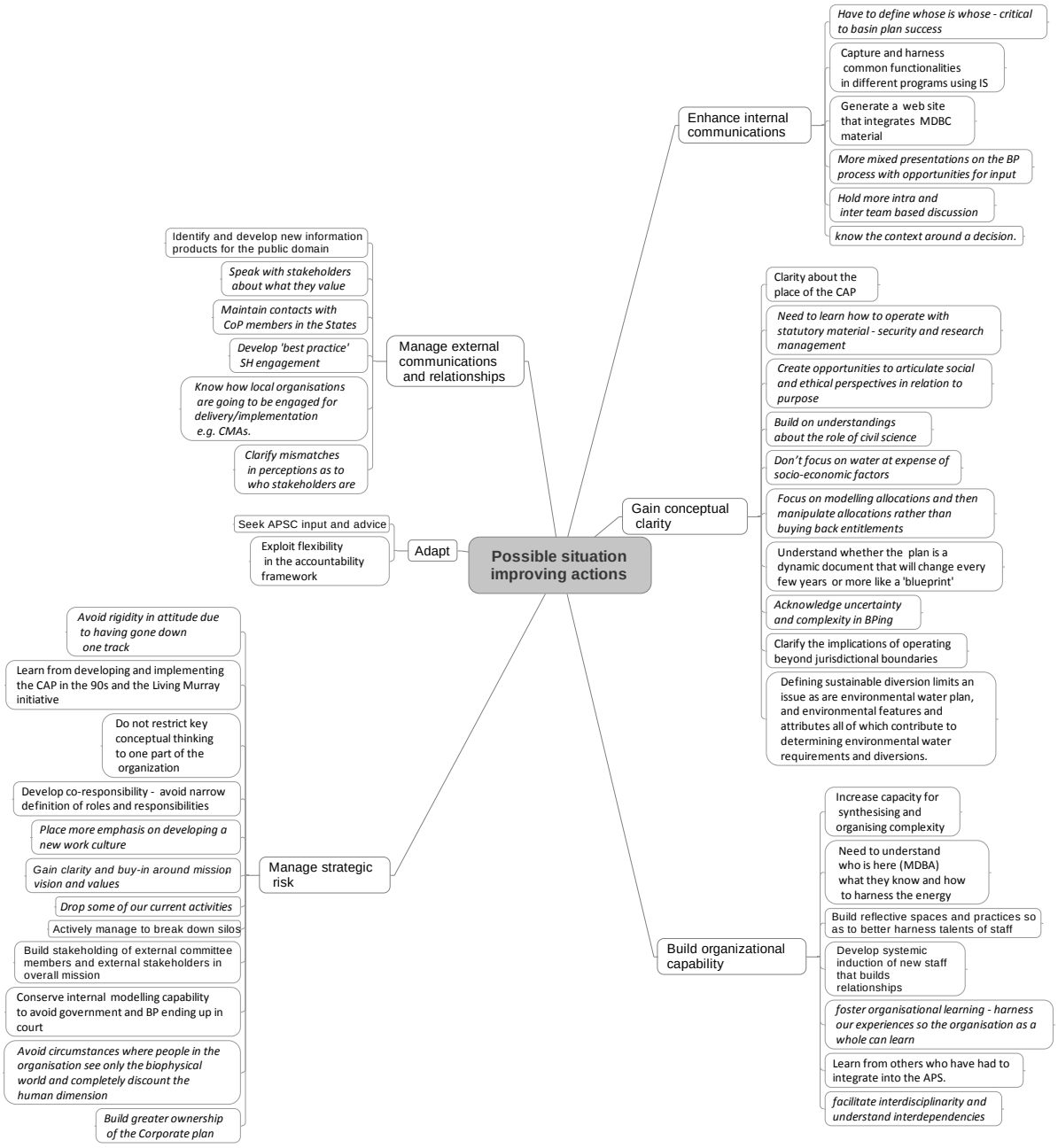


Figure 10. Some possible situation improving actions arising from suggestions of staff involved in this research.

5.3 Composite narrative number 2 - conversations with the steering group

Members of the Steering group (2 women and 5 men) each agreed to engage in an informal conversation with a member of the consulting team (Robyn Holder) which had as its focus the relevance of systemic thinking and social learning to their professional experience. The main outcomes of these one-to-one semi-structured conversations are presented under the headings used to group the participants' reflections.

5.3.1 Interest in systemic thinking and social learning

The potential of using these two techniques (and the underlying philosophies) to produce more effective outcomes in situations of inherent complexity was judged as being paramount. The

techniques offered a greater degree of confidence in working with complex and divergent multi-stakeholder perspectives both within the Authority and by members of the Authority with external organisations. The sense of confidence was expressed as 'capacity building' and 'value-based planning.' In particular, the use of social learning processes was seen as assisting the fruitful evolution of the MDBA as a dynamic organisation which maximises the intellect, experience and capability of its staff. The building of a workplace culture that had systemic understanding and social learning as its values was seen to be highly desirable.

5.3.2 Goals for the project

This section discusses conversations held with seven (of eight) members of the Project Steering Group. A descriptive account of how the members of the scoping group were working with and implementing the skills/values/attitudes espoused by the scoping project is provided. Interview methodologies are described in Appendix 3.

The conversations aimed to provide an informal opportunity to tap into the enthusiasm of participants, and to explore their interest in and experience of systemic thinking and social learning and their application. Past research (e.g. Ison and Russell 2000) had shown that interventions of this type provided a more supportive learning environment and helped to open up space in complex organisational settings for new thinking and practices to gain traction.[7]

5.3.3 Conversation structure

A semi-structured interview schedule was prepared for the sessions. However, the conversations primarily emerged from and followed the interest and perspective of each participant.

Seed Bed: An early focus of each conversation was exploration of peoples' past experience and areas of interest. While one purpose was to put the individual at ease and to establish rapport, these early reflections came to constitute a "seed bed". The reflections enabled people to reveal a little of where they had come from, a little of who they were and an orientation to their thinking. These comprised aspects of work history, academic discipline and 'lessons learned'. The seed bed of early experience was then returned to at later points in the conversation in order to draw forward key learning and insights to the current workplace and its issues.

Motivation: A series of questions explored people's motivation to be involved in the project. In part, these aspects were about issue identification and situation analysis. In part, they were also about providing space to enable articulation of values (in relation to self, colleagues, stakeholders, the Australian community and to the MDB), perspective (on the past, present and future), and aspiration (for the self, colleagues, the organisation, the MDB, stakeholders and the wider Australian community).

Grounding**:** A final part of the conversation became 'grounding' these earlier components - with the individual's understanding of systemic thinking and its tools – in some of the 'real time' challenges of the MDBA job at hand. Ideas and interactions were discussed for these challenges. People were invited to see 'the world' from the perspective of key decision-makers and internal and external stakeholders, and the extent to which their current opportunities for learning and reflection could be positioned to help what needed to be done. They were also invited to consider what relevant others (e.g., executives, peers, stakeholders, MDB communities) might observe or hear about the ideas or interactions, and what – with systemic thinking approaches and tools – might be different than previously. This invited consideration of what people may do or say differently.

[7] This part of the research was conducted by Robyn Holder (ANU) following a brief jointly formulated with the PI.

5.3.4 Participant reflections

The reflections of participants are grouped into the following areas:

- Interest in systems thinking and organisational learning
- Goals for the project
- Current realities
- Ideas for and experiences of applied systemic thinking & social learning
- Outcome focus

Interest: The overriding source of interest for participants was in the power and potential of systemic thinking and organisational learning to produce more effective practices and outcomes in complex and uncertain situations. Said one participant, it "*opens up conversations that people can learn from… It's a way forward through difficult issues"*.

A common perspective was a sense of the enormity of the challenges facing the MDB and the Authority. Some participants viewed systemic thinking and organisational learning as processes that could add depth and credibility to the MDBA's statutory mandate to act in 'the national interest'. People gave different terms to these processes such as capacity building, participative planning, community development, values-based planning, conversational communication, consultation, engagement. The different terms emphasised different aspects of facilitative processes but, in the main, they occupied a common domain.

Some participants considered that ambiguities about the role of the MDBA – 'authoritative decision-maker' or 'honest broker', for example – were embedded within the establishing legislation. While these may ultimately be tested in the political and perhaps the legal arena, some hoped that systemic thinking & social learning could assist the Authority in achieving clarity of purpose and clarity of identity.

A second area of interest related to how systemic thinking organisational learning tools could assist the evolution of the MDBA as an organisation which utilised the intellect, experience and capabilities of its staff, and which engaged productively with internal and external stakeholders. Participants commonly expressed views that "the whole is greater than the sum of its parts".

Participants articulated their hopes for inclusive processes, respectful practices and transparent decision-making within the MDBA and, from there, to the hard task ahead. This perspective is consistent with the view that systemic and adaptive governance begins within organisations and moves out, through stakeholder processes, into situations of concern – such as the MDB.

Participants also viewed systemic thinking and its tools as providing potential for their own intellectual and professional development. Nurturing peoples' higher-order conceptual capabilities was valued in itself and as a resource for the Authority. A number of people identified ways in which the MDBA Professional Development activities could be utilised to expand the technical capabilities of personnel with systemic thinking. Still others viewed the project as a way of accessing the knowledge and wisdom of the "walking encyclopaedias" within the Authority.

In keeping with this line of thinking was recognition that the marketplace for committed and motivated people was highly competitive. It was a staff retention and attraction strategy to build a workplace culture that was highly participative.

Goals: A central goal for the project held by all participants was for the approach, methods and tools of systemic thinking to be harnessed so as to enhance the effectiveness of the MDBA's actions to improve the MDB and NRM more generally. It was recognised that this would involve contributing to preparation, delivery and implementation of a Basin Plan that satisfied diverse interests and could meaningfully deliver the Objects contained in the *Water Act* 2007.

All participants viewed this capability as a possible means of applying a “learning logic” to a realisable vision for the MDB. A number of people applied the adaptive and sustainability components inherent in a vision for the ecologies of the MDB as a metaphor for the Authority itself.

For some the timeline for the publication of the interim Basin Plan was experienced as a “pressure cooker” or “freight train”, but participants understood that systemic thinking methodologies could add intellectual, conceptual and scientific depth that could – potentially – come more to the fore in 2010 to both manage and mould the internal and external feedback and dialogue.

In differing ways, participants articulated perspectives on the capacity of the project to add depth and strategic momentum to the MDBA’s task, whilst recognising that it had the limitations of a scoping project.

Language commonly used by participants in describing their perspective on goals for the project and its potential influence within the MDBA included the words: respectful, engaging, dialogue, meaningful, openness, robust, resilience, deeper, and understanding.

Current Realities: Participants were invested strongly in the future of the MDB and the Authority. Some of the current challenges were viewed as transitional and situational in respect of the transition from the MDBC to the MDBA. Participants were also aware that the changed focus and authority of the MDBA, following on from the work of the MDBC meant that the organisation (and all levels of staff) was entering unchartered and potentially very stormy waters.

While the current focus on the drafting of the interim Basin Plan was understood as an organisational and legislative imperative, participants considered that the systemic thinking approach could be drawn upon to enrich the Plan and to build internal rigour. People understood too that the Basin Plan was a means to an end and saw social and organisational learning approaches as capable of building ‘ownership’ and ‘buy in’ to carry out some hard decisions.

Participants felt that their effectiveness might be enhanced in an organisation that provided opportunities to co-build, or join, narratives about purpose. It was thought that a surer (and reassuring) understanding about direction and vision, and individual’s role within it might emerge from such processes e.g. broadening understanding about executive level thinking, about the proposed content to the Basin Plan, and about strategic objectives beyond June 2010.

People also showed curiosity about other sections within the MDBA and were keen to find ways to create a higher degree of internal cohesion and interaction.

Ideas: All participants were rich with ideas for the future from past experience, current problem analysis and their perception of opportunities within the MDBA. Many ideas focussed on building an internal culture that valued intellectual curiosity and a synergy built from staff interaction. Ideas included:

- topic based seminars to share internal areas of enquiry or explore current problems
- bringing in external experts to share current research (especially where they might contain particularly challenging problem analysis)
- incorporating systemic thinking into formal Professional Development requirements
- scenario planning as a means of exploring and responding to contentious issues and proposals

Other ideas were more focussed on strengthening the lateral foundations of the MDBA and included proposals for regular meetings for personnel at specific grades (e.g. EL1). Participants thought these need not be overtly task oriented but could be gatherings around, for example, a regular morning tea or lunch. Such gatherings would serve an additional purpose of providing opportunities for highly tasked individuals some ‘down time’.

Some participants talked of applying the learning in particular ways relevant to current challenges or specific tasks. Some examples were about structuring a presentation using the analytic approach of systemic thinking; another involved using conversation mapping as a device for diffusing contentious subject discussions within teams. Other participants referred to insights they had gained into being more attentive and open to the use and selection of words and terms. Some of these ideas reflected that the project language needed to adapt to common usage in order to maximise accessibility[8]. Some viewed the experiential learning embedded within the project as valuable in itself.

This perspective linked to ideas about the project providing individual enrichment. These less formal and more individualised ideas focussed on modelling curiosity and respectful practices in everyday interactions, and on being brave in making approaches and greetings to others. People viewed these practices as underpinning rich networks. People spoke of deliberately using language that was constructive and upbeat, and that piqued interest. Social opportunities and fun in the workplace were also recognised as important building blocks to "good teams" in a dynamic work culture.

Outcome Focus: Participants revealed a strong sense of responsibility for their work and that of the MDBA. Individuals were highly cognisant of the diversity of interests in the MDB and of the actual and potential impact of the Authority's direction and decisions.

People spoke of the "impact of the conservation agenda on local communities", and of the different values people/businesses/communities placed on water. One person voiced that the future was "terrifying" and the uncertainty of communities was not conducive to the rational decision-making necessary. Participants were acutely aware of the importance of engaging with communities and the nation as a whole about our relationship with and future in the dry continent.

Some participants identified a deeper outcome in drawing together the narrative threads of ordinary members of the MDB communities to create a new story of nation-building.

All those interviewed identified opportunities that, from their perspective, were worthy of consideration as part of organisational learning and adaptation by the MDBA. These are discussed in Section 6.

[8] However, we know from our research that adapting to common usage does little to facilitate changes in understanding on the part of the listener – new terms carry new meanings and it is the difference, rather than sameness, that is the key to learning and change.

5.4 Workshop 1

Participants in the first workshop reflected that this was a valuable and productive process that tapped into and reinvigorated staff enthusiasm. Many related that the techniques learnt at the workshop were directly applicable to their own work and provided them with a way to put their understanding into practice. Participants were invited to provide reflections on their experience of the workshop at the conclusion of the event, which are listed as follows:

- My reflection is that this workshop was one small step in the right direction towards a high performance organisation.
- A simple constructive way to proceed and make connections.
- A fantastic process – engaging methodology which allowed complexity to be explored.
- VERY VALUABLE. Very productive, generated lots of ideas, maintained/tapped into enthusiasm, great to focus on big picture instead of daily grinding minutiae. VERY VALUABLE.
- My reflection is the workshop was engaging, easy to follow and I could see ways to apply P,Q&R to my work.
- My reflection is - encouraging to see MDBA looking for opportunities to improve.
- My reflection is how effective the guided process of thinking was in coming up with concrete things to do.
- My reflection is that the PQR sentence structure is valuable to create powerful requests.
- This comes at a good time and is encouraging, both in moving forward and in identifying others to move forward with.
- Appreciation for diverse range of issues and enthusiasm to find solutions. Will be interesting to check in at the next workshop and see how groups moved forward on the activities/actions they planned.
- My reflection is that workshop inspired and empowered a diverse bunch of staff, who mobilised their intellects and enthusiasm.
- Our attempt at framing this challenge is great. The question is; how do we get people both internal to MDBA and all our external stakeholders to "see the picture"
- Internal communication has been set back recently – need to reinvigorate!
- A very good collection of staff feeling about change.
- Useful but a way to go for the MDBA. Needs greater engagement across the Authority.
- Stimulating & provides a way forward to put our shared understanding into practice.
- An excellent process to draw out systemic issues and concerns, to prioritise them and develop strategies to effectively respond to the most significant ones.
- My reflection is that the day has been productive in scoping out issues and interacting with others. Also helped explore ways around issues.

5.4.1 Issues derived from conversation maps

The conversation mapping exercise generated a list of emergent issues (marked with yellow post-its) and emergent opportunities (marked with blue post-its), which were arranged on a whiteboard in groups according to themes (a snapshot is shown in Figure 11 and detailed in Appendix 4). Participants voted on these topics, using one red dot each to represent the "issue or opportunity you have most enthusiasm to take personal action on" and one blue dot each to represent the "issue or opportunity you would like someone else to take action on".

Figure 11. Issues and opportunities generated from the conversation mapping exercise

5.4.2 Actions arising from issues

The themes or issues with most red votes (issues that participants had the most enthusiasm to take personal action on) were divided into four table groups made up of those who voted for them.

Table 1 – Internal Reform (4 red votes)

This group identified the following as issues they had the most enthusiasm to take personal action on:

- Learn from past programs that have worked well (e.g. The Living Murray 1st step) – 2 red votes
- "New" science of operating in an uncertain and dynamic system – 2 red votes

This group concluded that two of the most important actions they could take to address these issues were: 1) rebuilding the seminar series to enable knowledge capture; and 2) communication and knowledge systems.

The first action, rebuilding the seminar series, was considered to represent *"a system to capture/apply learning from seminars by facilitating/butchers papering/reporting/placing seminars on the intranet at the end because we can store this"* and *"a system to share knowledge by establishing topic forums across the MDBA because we will reduce duplication and inefficiency and foster innovation"*.

The second action, a communication and knowledge management system, was envisaged as a system for communication via the intranet, comprising online discussion forums, a place to share models and tools, and to assist in cross-discipline issue-based research.

Table 2 – Governance and Communications (2 red votes)

This group identified the following as issues they had the most enthusiasm to take personal action on:

- Change agenda is an opportunity to transform the way we do business – 1 red vote
- Engagement requirements in Act are an opportunity because we must – 1 red vote, 3 blue votes

This smaller group (2 people) looked at the change agenda of the MDBA and concluded that what was needed was *"a system to design scientific input into the basin plan through genuine engagement"*, involving internal stakeholders as well as external "input".

Table 3 – Long-term Strategy (7 red votes)

This group identified the following as issues they had the most enthusiasm to take personal action on:

- Multi-scale NRM remains critical because the MDB can't be managed from Canberra – 1 red vote
- Opportunity is to record the uncertainty for each decision and allow revisit in time (adaptive management) – 2 blue votes
- Clarification of functions and strategic intent is an opportunity – 1 red vote
- NRM paradigm is an opportunity because water is not separate – 2 red votes
- Anticipatory not reactive water policy – 3 red votes

The group divided their actions into three systems of interest: 1) implementing *adaptive management* as *"a system to learn from the past and have innovative approaches by MDBA because we can learn from mistakes and new conditions"*; 2) addressing the long-term strategic approach as *"a system to coordinate information, knowledge, action and enthusiasm by all stakeholders because we all have part of the solution"*; and 3) building up a seminar series as *"a system for looking back and learning from the past in order to help inform what we do"*.

Some of the actions that this group were enthusiastic to take action on included a seminar series on the NRM "big picture" in Australia and water policy, as well as a multi-scale analysis of strategic risk using a system model to support decision-making and a recommended reading "book-club" on texts related to systems.

Table 4 – Vision and Culture (6 red votes)

This group identified the following as issues they had the most enthusiasm to take personal action on:

- Lack of a clear MDBA vision is an issue because it is hard to know what our priorities are and how to achieve anything in the Basin – 1 blue vote
- Building new identity for the organisation is an opportunity because identity of the organisation can be recast – 1 red vote
- Opportunity to develop a shared understanding of our vision – create ownership – 1 red vote, 3 blue votes
- An opportunity for building a united collaborative organisation – 4 red votes

This group formulated a system to "*build a united collaborative organisation by creating a culture to serve the community"* in order to manage Basin resources more sustainably because the Basin community is "suffering". The group was enthusiastic about developing a fundamental philosophy of serving the community to manage Basin resources sustainably.

5.4.3 Group enthusiasm for action-taking

Overall, the workshop group as a whole exhibited strong enthusiasm for rebuilding a seminar series and developing some form of communication system, either through the intranet or face-to-face via morning teas, book clubs, etc…, in order to build a more collaborative culture within the organisation.

5.4.4 Some possible implications for MDBA arising from Workshop 1

The outcomes of this workshop reflect a highly committed group of staff concerned to do the best they can for the MDB and its communities and environments. All participated enthusiastically and, as they self-report, all gained a lot from their involvement.

This workshop provides evidence for the following:

- That worthwhile capability building can be achieved within a high quality learning system design and associated facilitation with a limited investment of time (4 hours of workshop time);
- That experiential – learning by doing – activity is a powerful means to develop systems thinking and practice skills;
- That well designed capability-building events can be grounded in real issues of strategic and organisational relevance to the MDBA and can, with appropriate on-going organisational support, harness the skills and enthusiasm of staff in inter-disiplinary and cross-jurisdictional working;
- The systems techniques, concepts and methods employed are very amenable for use in dealing with the day-to-day issues of the MDBA;

5.5 Workshop 2

The second workshop saw participants using new techniques, such as system mapping, rich picturing and defining root definitions using PQR and CATWOE analysis (see Figure 8). Participants were again invited to provide reflections on their experience of the workshop at the conclusion of the event, which are listed as follows:

- More please!
- Inspiring to learn new things – it's great to exercise the brain
- Learnt a lot about MDBA through the workshop exercise and met good people!
- Is there a dept/section strategic document based on a systems theory – i.e. PQR?
- Again, renewed invigoration, enthusiasm and connectedness! (to go back and apply and explore…)
- Revitalised, challenged, encouraged
- Useful to think through issues from a different perspective and be provided with a different way to tackle them.
- Systems thinking is more than the sum of its contents. It's about processes and translating them into tools for change.
- Opportunities to share ideas and work together
- Good stuff! Systems approach is not a blueprint for change, but a basis for negotiating an outcome in the environment.
- I can make a difference.
- Being clear about our role is the first step to becoming effective.
- Today has encouraged me to examine systems rather than just processes, goals, obstacles and results.

5.5.1 Actions arising from Workshop 1

Returning participants built on what they learnt in the first workshop. A key aspect of systems practice is *iteration*, where you learn things as you do them, iterate, and then move on to the next issue. In other words, the learning process is the key issue.

Some participants in the first workshop reported using the PQR and CATWOE methods to try and get to some of the issues of what their division should be trying to do and how they should be working with other agencies. Participants reported that “once you understand what your limitations are and what your boundaries are in your work, you might be able to deliver that to start with”.

5.5.2 System mapping

Our initial interviews suggested some confusion and uncertainty over structure and relationships between components in the new MDBA; many experienced it as a dynamic situation where not everyone was fully up to date with changes. Several suggestions were made that some things need to be dropped (e.g. particular projects) and others experienced some missing elements in the new structure. For this reason, systems mapping was introduced as a potentially useful technique.

Participants worked in pairs to develop system maps of the MDBA as they understand it. One group’s effort, shown below (Figure 12a), highlights the organisational structure of the MDBA and how it interacts with the outside world through reporting pathways. The group pointed out that thematic links weren’t well reflected in the map and that on reflection, the MDBA could be organised according to themes. This prompted a discussion of how the MDBA has been structured, with some suggesting that it was to achieve what has been set out in the *Water Act* 2007. This structure doesn’t reflect very well that stakeholder engagement is an important part of all divisions of the MDBA.

Another group (Figure 12b) represented the MDBA as an influencing and co-operating organisation. The top section of the system map reflects the organisation as it currently is, while the bottom section reflects some of the co-operation that could be possible. In discussion, the point was raised that staff in all divisions have responsibilities for high level organisational goals, such as stakeholder engagement, which do not necessarily work best when defined by an individual division.

a)

b) c)

Figure 12. Examples of system maps of the MDBA produced during workshop 2.

5.5.3 Rich picturing

Rich picturing allowed participants to draw images of the situation without needing to connect different components. Rich picturing is a useful means for participants to engage with complex or 'wicked situations' (as per Figure 3). When done in pairs they also help surface deeply held values and understandings about a situation, thus enabling things to be talked about that generally remain hidden.

5.5.4 Root definitions using PQR and CATWOE analysis

Participants were invited to pick-up on a theme from the rich pictures they produced and express that theme as a sentence with the form: a system to do P, by means of Q, in order to R; where P is 'what needs to be done', Q is 'by means of', and R is 'why' (Figure 13). This provides a root definition of a 'conceptual' system of interest, based on a task or an issue.

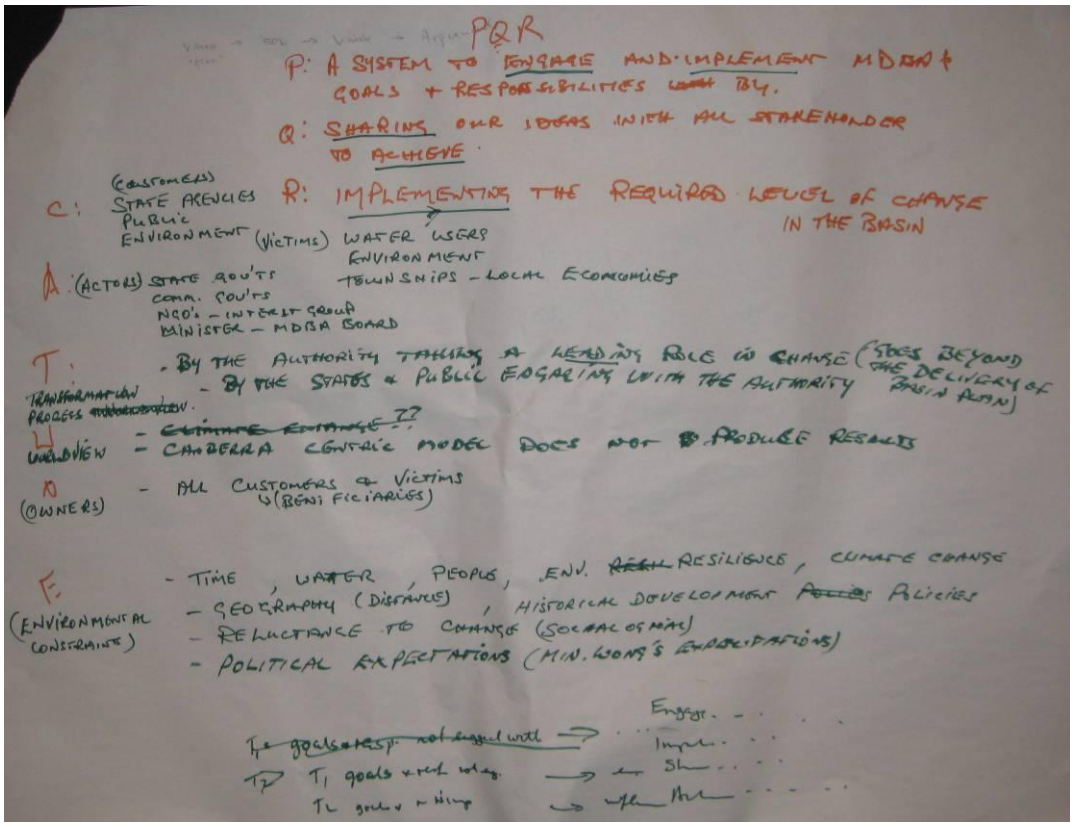


Figure 13. Root definitions using PQR and CATWOE analysis

In the CATWOE analysis, C represents the 'customers' of the system, either the victims or beneficiaries of the system; A represents the 'actors' of the system, the people who make the system operate; T represents the 'transformation process' and W the 'world view' that underpins the system; O represents the 'owners', the person(s) with enough power to make it work or stop; and E represents the 'environmental constraints' in which the system has to operate.

5.5.5 Some possible implications for MDBA arising from Workshop 2

The second workshop provided evidence for the following:

- The existence of very different perceptions of how the MDBA is structured (i.e. all participants were given a limited set of relatively simple instructions about how to develop a systems map of the MDBA – a technique designed to capture a snapshot in time of the structural elements of a system of interest – yet the groups produced markedly different outcomes);
- How successful the systems mapping was as a device to facilitate (mediate) conversations amongst the participants about how they 'saw' and thus understood the organisation and how through engaging in this process the different perspectives could be appreciated, challenged, questioned etc;
- The conceptual rigour involved in teasing out elements of the CATWOE's and PQR statements and the benefits gained from this conceptual thinking.

5.6 Follow-up evaluation

A follow-up survey was distributed to participants to collect feedback on their experience of the project, and areas of their work where they have applied the techniques learnt (survey questions and responses are shown in Appendix 6). The survey generated a 48% response rate out of 29 MDBA staff invited to respond. Overall, participants rated their ability to use systemic thinking before and after the project (on a five point scale) as having increased from little or modest ability (average 2.4 of 5) to modest or significant ability (average 3.3 of 5).

Over 70% of respondents were employed at an executive level in the Authority. Most respondents (>70%) reported that they talked with people in their group about the ideas and techniques learnt in the workshops. A large number (>60%) reported that they have changed how they see their own individual situation as a result of the project. A majority of respondents indicated that they would recommend investing in a second phase of this work in the MDBA (average 5.9 of 7).

The survey provides strong evidence for shifts in understanding and practice in terms depicted in Figure 3. This is a significant outcome given the relatively short time period devoted to this scoping study. It is also indicative of the utility of the methods, techniques and concepts introduced. For example, Collins et al (2005) found that using systems diagrams as learning devices to progress 'wicked situations' or 'messes' significantly improved participants' understanding of the task they faced and meant that ideas could progress rapidly during workshops. As happened in the MDBA workshops, the experiences of participants suggested that using more systemic methods to tackle issues perceived to be complex, uncertain and interdependent is a prerequisite for making progress in other, similar situations.

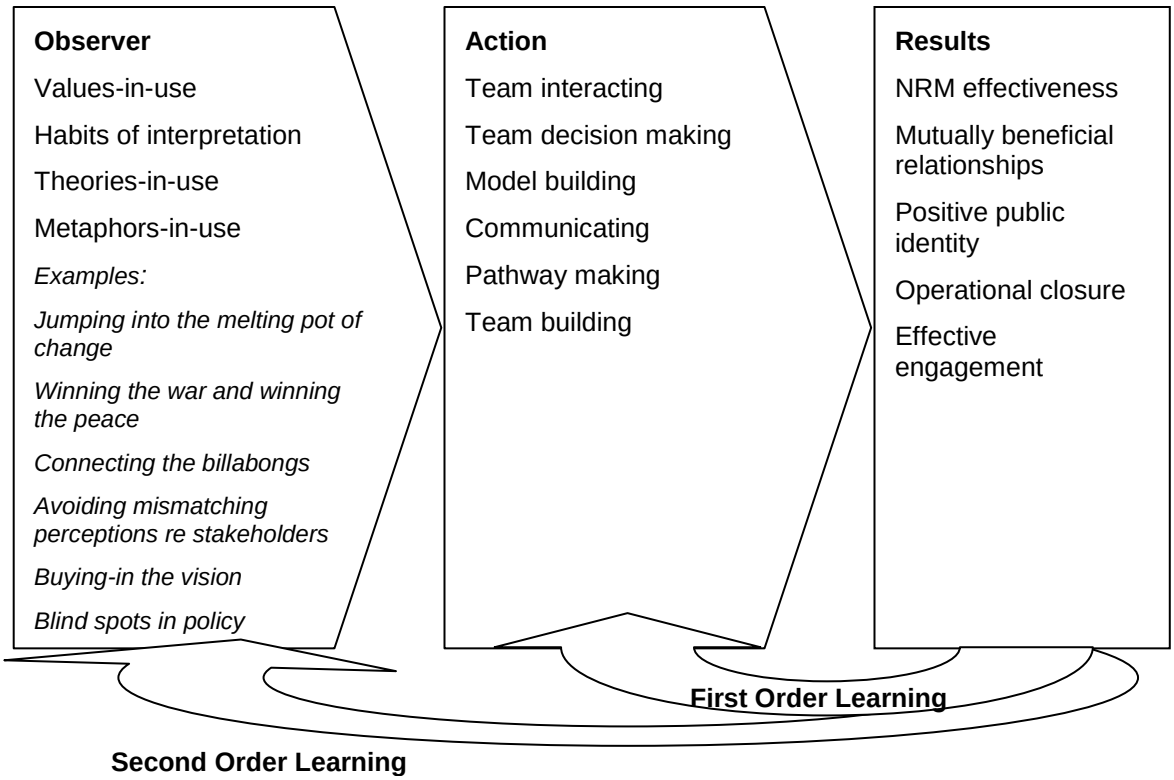
There are other similarities with outcomes from our UK research. Collins et al (2005) report that the experiences of EA staff using systems practices in the workshops were generally positive and often accompanied by more creativity, insight, clarity and enjoyment. This suggested that the skills for systems thinking and practice of key staff could be developed and enhanced so that the advantages and disadvantages of using project management tools are better understood from a systemic perspective. They also concluded that soft systems methodology (SSM), a particular form of conducting a systemic inquiry, could be introduced as a project managing platform to complement PRINCE2 so that systematic and systemic perspectives could be maintained.

In the first phase of their work Collins et al (2005) reported the following learning points emerging from their workshops which were relevant to daily working practices within the EA:

- developing and refining systems conceptual models as devices for conversation enabled reflection;
- good design and good workshops can enable these conversations and lead to learning which in turn establishes early dialogue with other projects;
- the use of these techniques slows down meeting styles so as to have meaningful discussions; clarify ownership of projects and responsibilities;
- establish greater clarity about the purpose of what has to be done;
- situate the systematic PRINCE2 methodology within a more systemic SSM-oriented project management framework and build capacity to benefit from such a shift;
- if the right people are involved from the start a co-design or co-delivery model (as opposed to a linear, imposed model of policies, projects and plans is possible;
- boundary issues can be resolved thus clarifying ownership of projects and responsibilities.

5.7 A process model of engagement

Participants expressed the desire to achieve successful implementation of the Authority's mission. An essential means of doing this was seen to be effective engagement both between sections of the authority and between the Authority and external stakeholders. It was judged by members of the steering group that some of the aims of successful implementation would result from first-order problem solving/learning (see diagram below). Other aims would need to address second-order learning which is explicitly designed to tackle obstructive blind spots which arise as consequences of past successes but are no longer matching the new circumstances (see diagram below).



First Order learning: This is essentially a problem-solving approach characterised by a seemingly objective problem "out there". The feedback arrow demonstrates that results, as much as they are known, only feedback to the next cycle of actions and have little effect on the values and understandings of the observer (i.e., individuals and collectives within the MDBA).

Second Order Learning: Focus is on the *observer* and is important when *where you stand* matters. One's way of observing is made explicit with the benefit of detecting blind spots and thus rigid thinking. It is this feedback process that is important in addressing strategic risk, thus avoiding systemic failure.

We suggest both of these types of learning, and thus feedback processes, are at the heart of doing systemic and adaptive governance, and thus to the role the MDBA will play in effective on-going managing of the MDB.

5.8 Model of desired change in organisational character (medium to long term)

It needs to be acknowledged that this project was undertaken at a time of significant change and uncertainty in the history of water governance in Australia (e.g. MDBA 2009). The complexity of the task assigned to the new Authority, including its integration of the old MDBC should not be underestimated. It was, however, telling that the three staff who participated from the APSC reported that many of the issues that were surfacing were common in other parts of the public sector, and thus there were opportunities to learn from the experiences of others.

It is of note that the Australian Public Service Commission (APSC 2007) in a review of 'wicked problems' described them as problems that "*go beyond the capacity of any one organisation to understand and respond to, and* [where] *there is often disagreement about the causes of the problems and the best way to tackle them. …..Usually, part of the solution to wicked problems involves changing the behaviour of groups of citizens or all citizens. Other key ingredients in solving or at least managing complex policy problems include successfully working across both internal and external organisational boundaries and engaging citizens and stakeholders in policy making and implementation*."

The APSC authors go on to say that "*wicked problems require innovative, comprehensive solutions that can be modified in the light of experience and on-the-ground feedback*" and that "*all of the above can pose challenges to traditional approaches to policy making and programme implementation*". In a foreword to this paper, the Commissioner of the APS makes the very powerful point that: "*It is important, as a first step, that wicked problems be recognised as such. Successfully tackling wicked problems requires a broad recognition and understanding, including from governments and Ministers, that there are no quick fixes and simple solutions".*

These authors also highlight that: ''*critically, tackling wicked problems also calls for high levels of systems thinking…. thinking* [that] *helps policy makers to make the connections between the multiple causes and interdependencies of wicked problems that are necessary in order to avoid a narrow approach and the artificial taming of wicked problems. Agencies need to look for ways of developing or obtaining this range of skills'*.

Importantly this project is a response to the need identified by the APSC. In this regard it is ambitious and cutting edge in the Australian context because the APSC (2007) paper does not outline where and how systems skills can be developed. Thus, in the first instance, there is a need to turn to non-Australian experience – to research in similar contexts.

In systems-theoretical terms, the initial starting conditions for any activity are of critical and strategic importance, as they create (and limit) the set of possible trajectories for a system of interest. Most importantly they create particular manners of working/being together that create the culture of an organisation. From these early conditions particular manners of 'acting' begin to be conserved over time, or not. What emerges can be described as 'the culture' of an organisation.

A study of the history of developing and implementing the 'River Basin Planning' (RBPing) component of the EU Water Framework Directive by the Environment Agency of England and Wales (EA) conducted in 2006-7 (Collins 2007), six years after introduction of the WFD, has interesting parallels with this study. The main 'players' within the EA involved in developing 'River Basin Planning', when interviewed, highlighted the following issues as being significant:

- Lack of agreement on an approach
- Lack of agreement on a format for the Strategy
- Processes of decision-making generally poor
- Poor handling of risks?
- Lack of understanding and moves towards integration
- Issues of scale not fully appreciated

- PRINCE2 project management
- Project creep and unilateral project initiation
- No sense/early loss of 'bigger picture' - when pulling it together it all fell apart
- Lack of clarity about stakeholder engagement
- Technical side missing from the discussions
- EA areas (regions) do not understand River Basin Planning
- Planning system links still to be assessed

It would seem from our research that many of these issues are already present or unresolved within the MDBA. However our research also provides evidence for how the MDBA could, through incorporating systems thinking and practice and action learning/research approaches better position itself on a trajectory towards being recognised, internally and externally, as a 'high performance' 'desirable destination' (in employment terms) organisation.

As researchers we have been involved in a range of research projects involved with introducing systemic practices and action research approaches into complex organisations (among these are organisations involved with NRM and other aspects of environmental management). The following aspects of organisations usually constrain the successful introduction and embedding of systemic thinking and practice into organisations:

- *Operating with internally produced blueprints, perhaps arising from systematic (rather than systemic) project management tools and methods (e.g., PRINCE2 project management approach).*
- *Failure to open up and adequately manage reflective spaces in the daily life of an organisation – with the result that organisational learning and relationship building and maintaining are curtailed;*
- *The failure to link project management with underlying theories and practices for organisational learning (thus running the risk of producing an organisation unable to retain any 'corporate memory' and thus predisposing long-term NRM management tasks to systemic failure. For example Collins et al (2005) working with the Environment Agency of England & Wales identified the following key 'Learning point' in their research concerning implementation of the EU Water Framework Directive (2000-2027):*

  'The most important outcome was the recognition that the 'blueprint' was systematic in nature and that the WFD offered an opportunity for the Environment Agency and its stakeholders to learn their way towards its implementation. This process would be based on several learning cycles, corresponding broadly to the timetable built into the WFD'.
- *Limiting the range of perspectives involved in formulating key strategic decisions;*
- *Failure to see 'induction' as an opportunity for organisational learning and for investing in staff social and relational capital (see Armson et al 2001);*
- *In response to perceived complexity and uncertainty, too often staff and their managers are keen to 'focus down' on the detail. This is often at the expense of understanding the systemic implications of particular actions and can lead to a focus on 'how' to do something before first getting a clear picture of 'what' needs to be done and why (the modified SSM approaches introduced in the two workshops is particularly well suited to addressing this issue);.*
- *Staff KPIs and other performance and capability frameworks may not create demand pull for systemic thinking and practice understandings and skills;*

- *Inadequate architectures (e.g. meeting rooms), furniture and protocols for creative ways of working;*
- *High staff turnover in key projects and as part of strategic decision making;*
- *Outsourcing of key capabilities thus undermining longer term organisational learning and capability – creating a strategic risk in the face of long-term NRM phenomena;*

From the outcomes of this scoping project, and in the light of other research, as discussed above, we propose the following set of activities as elements in a learning system (of the form described in Figure 5). To these, relevant staff of the MDBA would need to design and add a monitoring and control system to which measures of performance, and thus criteria for evaluation had been added (i.e. these basic activities would need further elaboration and refinement through a context sensitive systemic design process).

1. Appreciate experiences and expectations of existing staff;
2. Create opportunities for staff to co-develop a vision and thus build their stakeholding in the evolving purpose of the MDBA;
3. Acknowledge and develop ethical, yet practical ways of talking about the uncertainty of the MDB governance situation;
4. Appreciate the contrasting value bases of staff in relation to purpose or perceived purpose of the MDBA;
5. Critically evaluate the viability of current framing approaches and discourses regarding the Basin Plan and planning in relation to adaptation as a co-evolutionary process;
6. Master and embed techniques (conceptual and methodological) for systemically framing situations, policies and practices;
7. Appreciate the nature and extent of within organisation connectivity that is needed for ongoing effectiveness;
8. Develop capacity to run and maintain systemic inquiries as a contribution to managing uncertainty, maintaining organisational resilience and organisational memory as enacted practices sustained by good relational capital;
9. Appreciate how the evolution of the organisation (MDBA) could be enhanced and sustained through the commissioning and enactment of a second-order learning system (i.e., one that manages activities 1-8 on an on-going basis).

6. Recommendations and Suggestions for Future Action

We propose the following actions in the short to medium term:

- Create the circumstances for the steering group and researchers to co-develop and co-present a seminar to MDBA staff at a date in the very near future;
- Ask relevant members of the Steering Group (SG), to organize and facilitate a meeting between the researchers and the PPP arm of the MDBA so as to explore some of the issues, implications and opportunities that have arisen;
- Ask relevant members of the Steering Group (SG), to organize and facilitate a meeting between the researchers and the stakeholder engagement/external communications arm of the MDBA so as to explore some of the issues, implications and opportunities that have arisen;
- Invite all participants in the project to contribute to building a discourse and associated practices within the MDBA and its stakeholders, for systemic adaptive governance – a useful starting point would be to gain confidence to creatively challenge and explore the ways in which particular situations are being 'framed' (Figure 2 is relevant);
- Invite all staff who have participated to take responsibility for identifying opportunities for leverage, including using the final report strategically;
- Identify ways and means to use systems thinking and practice to mount co-inquiries – across the MDBA - and co-research, (so as to avoid MDBA staff being reduced to a simple project management role);
- Further explore collaboration with the APSC staff who attended the workshops;
- Consider how the scoping project could be used to leverage longer term research to build capability within and without the MDBA for strategic and adaptive governance;
- Use the learning and outcomes of this project to *build organisational legitimacy* – i.e. the MDBA has statutory authority but next needs 'soft' legitimacy. This lays groundwork for 'ownership', 'buy-in' and future compliance. Legitimacy needs to be established at different levels: Ministerial, scientific, MDB community/industry levels, and with wider Australian community. Establishing and maintaining organisational legitimacy is a process.
- *Build trust* – as one of the cornerstones of organisational legitimacy. Ultimately this rests upon a realistic degree of trust in the 'reasonableness', sense of fair play and 'collectivity' of human beings (within the organisation and out in the community).
- *Build from the inside out* – the components of trust-building and organisational legitimacy are more effectively established within an organisation for it to be considered trust-worthy and legitimate from the outside.
- *Be open to opportunities for creating strategic reflective opportunities for the executive* and other staff – in a time and task pressured environment, more flexible delivery mechanisms could be scoped for the MDBA executive. Approaches could include one-to-one lunches, scenario problem analysis & problem solving, formal presentations to the executive group, and closed group sessions.
- *Find ways for members of the Board to listen and learn* – to people both inside and outside the Authority – this may also open up a strategic approach to managing contentious risk.
- *Distinguish between power and influence* – this relates to perspectives of exclusions and disempowerment. Discussion may assist and enable people to engage and deploy their influencing skills at whatever grade.
- *Engage in alliance building* – this will be a critical component of any next iteration of the project. Essentially the project leaders will need to model their preparedness to take risks with their authority and influence by deploying the new thinking and skills. Conversational coaching may provide a useful 'safety net' for these individuals.

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Appendix 1 Timeline of events

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
Week starting	Monday 27th April	Monday 4th May	Monday 11th May	Monday 18th May	Monday 25th May	Monday 1st June	Monday 8th June	Monday 15th June	Monday 22nd June	Monday 29th June
Meeting Dates Tasks	**Fri 1st May** Scoping meeting Initial steering group interviews	**Fri 8th May** Steering group interviews Interviews with broader project group	**Fri 15th May** WORKSHOP 1 Steering group meeting	Lunches with Robyn	Lunches with Robyn	Lunches with Robyn Robyn's draft report due	**Fri 12th June** WORKSHOP 2 Steering group meeting	Prepare draft report	**Mon 22nd June** Draft report due **Thu 25th June** Final steering group meeting and wrap-up Approve draft report **Fri 26th June** Submit final report	

Appendix 2 Paper

Systemic and adaptive water governance:

Reconfiguring institutions for social learning and more effective water managing?

Concept Paper for a Program of Research

prepared for a seminar to explore the role of social learning in water policy and law

Friday 5 December 2008

Anita Foerster, Ray Ison & Lee Godden,

This unpublished paper can be obtained from the authors upon request

Appendix 3 Interview methodologies

Template used to collect interview responses

Descriptions of experience	Metaphors in use	Emotional drivers	Ideas for improvement	Enablers / constraints

Steering group interviews

The conversations were conducted on a one-to-one basis over a period of two weeks. Each session was between 1.5 to 2 hours. Participants were provided with an Explanatory Statement and signed a consent form. Sessions were recorded and participants were offered a digital copy of the session for their own purpose. Participants were assured that comments and reflections would be reported on so that they were not identified.

Participants occupied different roles within the MDBA and came from four different sections. There were two women and five men. Participants came from a range of disciplines and backgrounds. Some had less than a year of experience within the MDBA (or its predecessor the MDBC), and others had a number of years within it. All have had extensive employment histories in diverse industries and professions.

Appendix 4 List of issues and opportunities from the conversation mapping exercise

	Issues	Opportunities
Risks & uncertainty	Risk assessment is an issue because of potential political and natural risks to success There is little wriggle room because risks are increasing, stakes are increasing and certainty is decreasing There is high uncertainty because of political and natural processes Governing is hard because we will never have full knowledge Time frames are an issue because the components in MDBA operate across orders of magnitude New governance to suit Australia's uncertainty and variability Uncertainty is an issue because decisions must be made now – can't wait for clarity – **3 blue votes** Increasing expectation, increasing risk, increasing uncertainty equals no wriggle room to succeed	
Vision & culture	Governing is an issue because the natural variability/cycles are outside control New arrangements are better and worse. Better – no longer tied to lowest common denominator. Worse – less opportunity to engage with external expertise. Uncertainty about finances, strategic direction and how we work together within the MDBC is an issue because it is distracting us from pursuing our external focus on governing the Basin. A lack of common 'vision' constrains progress because we are not focused to the common goal. The act constrains our freedom to innovate because it sets narrow boundaries	Opportunity to demonstrate through agreed goals An opportunity for building a united collaborative organisation – **4 red votes** Opportunity to develop a shared understanding of our vision – create ownership – **1 red vote, 3 blue votes** Liberalism is empowering for better organisational relationships, systems thinking, non-silos, because it fosters innovation/ideas – **1 blue vote** Developing a strategic vision is an opportunity to form our identity Providing clear vision is an opportunity to unite and inspire people to focus on achieving improvement in the Basin Building new identity for the organisation is an opportunity because identity of the organisation can be recast – **1 red vote**

	Issues	Opportunities
Internal reform	Staff frustration because of transition (and perceived lack of recognition for past work) Loss of identity is an issue because staff/organisation seems to have lost everything they had, but have not gained or seem to be gaining new identity The disproportionate effort on the basin plan is an issue because it ignores that NRM outcomes are being sought and delivered by the whole organisation We feel constrained and desire change. We recognise the need for change because we feel constrained	Develop skills in rapidly pulling info together The imbalance between process and tech is weak. Creates an opportunity to reflect on the needs of our stakeholders "New" science of operating in an uncertain and dynamic system – **2 red votes** Learn from past programs that have worked well (e.g. The Living Murray 1st step) – **2 red votes**
Relationships & stake-holding	Engagement is an issue because the multi-jurisdictional partnership is broken Without effective communication we will waste time re-inventing processes Relationships are tenuous in the MDBA and with stakeholders because our identity is uncertain Relationship management is an issue because it will determine outcomes	
Communications		Engage additional resources to assist in managing external communications Engagement requirements in Act are an opportunity because we must – **1 red vote, 3 blue votes** Communication an opportunity, if new ways are found to improve – **1 blue vote** Opportunity for General Manager and Executive Director level to incorporate communication activities into their role Preserving the existing strength and building new strength is an opportunity because new organisational framework provides for this Opportunity for clear delegation of communication of responsibility – **2 blue votes** Opportunity to develop key messages, etc, about us as an organisation – including, e.g., not using word "Authority", establishing tone, etc…

	Issues	Opportunities
Governance	Loss of strength is an issue because core technical strength of the organisation is being undermined by bureaucratic processes Lack of cooperation and collaborative spirit an issue because it focused people on unproductive things and territorial battles The shift in power is an issue because it jeopardised shared governance of MDB and maybe outcomes Multi-scale NRM remains critical because the MDB can't be managed from Canberra – **1 red vote**	The Act should be the lowest denominator, not the goal, because we need to do more than just what the Act legislates The shift in power is an opportunity because it allows new relationships The tension between Federal and State roles is an opportunity because it highlights the key importance of meaningful engagement at regional levels Change agenda is an opportunity to transform the way we do business – **1 red vote**
External environment	The tension between Federal and State roles is an issue because of the risks of the States disengaging and losing the vital regional perspective Communications are an issue as they are already problematic internally Management of external stakeholders – need to know Continuity is an issue because big change in communication processes and opportunities How do we ensure external stakeholders see the Authority as a capable organisation? External communications are an issue because of the range of stakeholders with different levels of involvement Very limited time due to political imperatives – **2 blue votes** Reporting arrangements for Basin Plan do not provide for direct State input. Sense of isolation/in competition with States	
Constraints	Process orientation is an issue because core technical strength of the organisation is being undermined by bureaucratic processes – **1 blue vote** Busyness is an issue because long-term and strategic focus is lost Has the MDBA got the capacity to make change? Roles are conservative/personal – naturally reverts to Act because of fear of negative consequences	

	Issues	Opportunities
Long term strategy		Opportunity is to record the uncertainty for each decision and allow revisit in time (adaptive management) – **2 blue votes** It would help us to understand our roles and functions and where they fit Clarification of functions and strategic intent is an opportunity – **1 red vote** NRM paradigm is an opportunity because water is not separate – **2 red votes** Rebalance water plans with NRM outcomes. Big opportunity to work together Anticipatory not reactive water policy – **3 red votes**

Appendix 5 Papers distributed to participants

Papers distributed

Measham, T.G. (2009) Social Learning Through Evaluation: A Case Study of Overcoming Constraints for Management of Dryland Salinity. *Environmental Management* **43**,1096-1107.

Checkland, P. and Winter, M. (2006) Process and content: two ways of using SSM. *Journal fo the Operational Research Society* **57**, 1435-1441.

Ison, R.L. & Russell, D.B. (2000) Exploring some distinctions for the design of learning systems. *Cybernetics and Human Knowing* **7(4)**, 43-56.

Armson, R. (2005) The PersSyst Project: A PQR approach to root definitions. Open University, UK.

Armson, R. (2004) The PersSyst Project: Root definitions (CATWOE). Open University, UK.

Other recommendations

- Ecosystem Sustainability and Health: A Practical Approach (Paperback) by David Waltner-Toews (Author)
  http://www.amazon.com/Ecosystem-Sustainability-Health-Practical-Approach/dp/0521531853
- Techniques for Environmental Decision Making (Order Code T863/TECH) Open University, Milton Keynes, UK.

Appendix 6 Evaluation survey responses

Title: Adaptive water governance and systemic thinking for future NRM

Section 1

This is a little about your background

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1. I participated in this project in the following ways (tick more than one if relevant):

	Response percent	Response count
Steering group member	35.70%	5
Steering group workshop	35.70%	5
Workshop 1 participant	78.60%	11
Workshop 2 participant	64.30%	9

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2. At what level are you positioned within the public service?

	Response percent	Response count
SES or EL	71.40%	10
APS 2-6	28.60%	4

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3. My academic background is primarily (tick more than one if relevant):

	Response percent	Response count
Science	69.20%	9
Social sciences	30.80%	4
Engineering	15.40%	2
Economics	15.40%	2
Planning	7.70%	1
Computing and/or IT	0.00%	0
Marketing / Communications	0.00%	0
Law	0.00%	0

Section 2

This section asks questions that will help us to gain a broad perspective on your experience of participation in the scoping project.

1. Overall...

	Totally disagree	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Totally agree
My personal expectations of participating were met.	0.0% (0)	0.0% (0)	0.0% (0)	21.4% (3)	35.7% (5)	21.4% (3)	21.4% (3)
The workshop(s) I attended had a good balance of different elements, such as new techniques, interaction, and participation.	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	35.7% (5)	64.3% (9)	0.0% (0)
I now appreciate how these techniques could be used for more effective water governance.	0.0% (0)	0.0% (0)	0.0% (0)	14.3% (2)	50.0% (7)	28.6% (4)	7.1% (1)
As a result of participating, my enthusiasm for learning and using systems thinking approaches has strengthened.	0.0% (0)	0.0% (0)	0.0% (0)	7.1% (1)	28.6% (4)	35.7% (5)	28.6% (4)
As a result of participating my awareness of how systems thinking approaches could enhance the work of the MDBA has increased.	0.0% (0)	0.0% (0)	0.0% (0)	7.1% (1)	42.9% (6)	42.9% (6)	7.1% (1)
I now understand how these approaches could enhance working within and between programs and divisions.	0.0% (0)	0.0% (0)	7.1% (1)	14.3% (2)	35.7% (5)	42.9% (6)	0.0% (0)
As a result of participating I now have a greater appreciation of how our performance can be enhanced to address strategic risks.	0.0% (0)	0.0% (0)	0.0% (0)	7.1% (1)	42.9% (6)	50.0% (7)	0.0% (0)
As a result of participating I would recommend further activity of this type to enhance the Authority's professional development and learning.	0.0% (0)	0.0% (0)	0.0% (0)	7.1% (1)	28.6% (4)	21.4% (3)	42.9% (6)
Recognising the limited scope of the project I judge the project to have been successful.	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	42.9% (6)	21.4% (3)	35.7% (5)

3. Section 3

This section asks questions that will help us to provide an understanding of potential impact of the project.

1. How do you rate your ability to use systemic thinking before and after the project?

	No ability	Little ability	Modest ability	Significant ability	Excellent ability
Before the workshop	14.3% (2)	35.7% (5)	42.9% (6)	7.1% (1)	0.0% (0)
Now	0.0% (0)	7.7% (1)	61.5% (8)	30.8% (4)	0.0% (0)

2. As a result of my participation in the workshop(s)...

	Totally disagree	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Totally agree
My perception of how the thinking and techniques could be used in my work has changed	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	71.4% (10)	28.6% (4)	0.0% (0)
I have an increased understanding of the characteristics of thinking and acting systemically.	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	64.3% (9)	28.6% (4)	7.1% (1)
I have an increased understanding of the importance of social issues in effecting improvement in the MDB.	0.0% (0)	0.0% (0)	21.4% (3)	0.0% (0)	42.9% (6)	28.6% (4)	7.1% (1)
I have an increased understanding of how systems techniques and methods could be used in my work.	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	57.1% (8)	35.7% (5)	7.1% (1)
I have changed the way I think about or 'frame' the situations in which I work	0.0% (0)	0.0% (0)	7.1% (1)	21.4% (3)	28.6% (4)	35.7% (5)	7.1% (1)
My appreciation of the role of new governance arrangements for NRM has changed.	0.0% (0)	0.0% (0)	14.3% (2)	35.7% (5)	35.7% (5)	7.1% (1)	7.1% (1)
I have a better understanding of new ways of working that could be followed to enhance working in the MDBA	0.0% (0)	0.0% (0)	7.1% (1)	7.1% (1)	64.3% (9)	7.1% (1)	14.3% (2)
I have an increased understanding of the institutional/organisational complexity in achieving the MDBA's purpose.	0.0% (0)	0.0% (0)	14.3% (2)	7.1% (1)	35.7% (5)	28.6% (4)	14.3% (2)
I have an increased understanding of the nature of controversies the MDBA faces	0.0% (0)	0.0% (0)	7.1% (1)	42.9% (6)	28.6% (4)	14.3% (2)	7.1% (1)

	Totally disagree	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Totally agree
I have recognised the need for more effective inter-disciplinary approaches.	0.0% (0)	0.0% (0)	0.0% (0)	14.3% (2)	42.9% (6)	21.4% (3)	21.4% (3)
I have come to better appreciate contributions other professionals can make	0.0% (0)	0.0% (0)	0.0% (0)	14.3% (2)	64.3% (9)	14.3% (2)	7.1% (1)
I have strengthened and/or made new contacts in the MDBA.	0.0% (0)	0.0% (0)	0.0% (0)	14.3% (2)	57.1% (8)	21.4% (3)	7.1% (1)
I have an increased appreciation of how science/practitioner interactions can contribute to achieving our purpose	0.0% (0)	0.0% (0)	0.0% (0)	28.6% (4)	35.7% (5)	28.6% (4)	7.1% (1)
I have a greater sense of urgency to effect changes in our practices.	0.0% (0)	0.0% (0)	0.0% (0)	14.3% (2)	42.9% (6)	35.7% (5)	7.1% (1)
I have greater understanding of some facilitation techniques that could make my organisation more effective.	0.0% (0)	0.0% (0)	7.1% (1)	0.0% (0)	64.3% (9)	28.6% (4)	0.0% (0)
Based on my experience I would recommend the MDBA invest in a second phase of this work.	0.0% (0)	0.0% (0)	0.0% (0)	7.1% (1)	35.7% (5)	14.3% (2)	42.9% (6)

3. What, if any, new practices have you carried out as a result of your participation in the scoping project (tick more than one if relevant)?

	Individual work	Within my group	Between groups	With other organisations or stakeholders
I talked with people about the ideas and techniques	42.9% (6)	71.4% (10)	57.1% (8)	21.4% (3)
I have changed how I see my/our situation	66.7% (8)	58.3% (7)	16.7% (2)	16.7% (2)
I am using one or more of the techniques.	71.4% (5)	71.4% (5)	57.1% (4)	14.3% (1)
I have used the facilitative techniques such as conversation maps as used in the workshop.	66.7% (2)	33.3% (1)	0.0% (0)	0.0% (0)
I am framing policy options differently.	80.0% (4)	60.0% (3)	20.0% (1)	20.0% (1)
I have taken an active role in advocacy of these approaches in the MDBA	44.4% (4)	77.8% (7)	44.4% (4)	11.1% (1)
None	50.0% (1)	0.0% (0)	50.0% (1)	50.0% (1)

Other (please specify):

1. Have not been able to fully utilise the learnings yet, but intend to do so

4. Section 4

This is an opportunity to respond to two open ended questions or, if you wish to, offer a comment that you particularly wish to make.

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1. Can you suggest ways to provide 'traction' for the approaches you have experienced in complex organisations like the MDBA?

- MDBA Executive buy in/active support and participation
- build familiarity and repetition of exercises; requires circles of influence (and ownership) of the approaches (and commitment to it) at various levels; perhaps a buddy system to keep it all alive
- Make them "invisible" or at least a routine aspect of using different type of tools as part of a toolbox of choices to assist in problem framing and analysis. For example, add adaptive water governance and systemic thinking approaches and training to the standard list of options and /or integrate them with existing tools such as project management frameworks. They do not need to be portrayed as wholly different or new - rather as complimentary and adding value to existing approaches
- Commitment by executive to support the program. Would be useful for teams to engage in the workshops together to enable full understanding and appreciation of the approach - more likely to gain cooperation and support and a higher likelihood of use of the approach.
- Obtain endorsement from the Executive, Authority members and the Basin Community Committee by workshopping selective approaches with them. Direct input at Division levels
- Learnings need to be consolidated. This can be done through dedicating some time at our branch meetings to discuss initiatives taken by staff in the branch programs, and by including achievements into all staff presentations.
- Seems to me that need to embed and translate to accepted process and goals of organisation – e.g. will result in more effective staff etc.
- 1) Support of more courses, and promotion of your ?? Summer course (that I want to go to). 2) More people attending #1. Support from senior mentor group.
- Have shorter follow-up sessions for those who have already attended a half-day workshop; use concrete applications of this technique and provide short follow-up sessions to discuss these applications with experienced systems practitioners; get more SES/exec staff to do the workshops.
- It is difficult when senior managers do not see the value of social learning. Such initiatives need support at the highest levels.
- This approach needs to gain 'approval' at a higher level with the MDBA to be more widely adopted.

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2. On the basis of your experience, what, if any, strategic risks and unintended consequences might systemic and adaptive approaches minimize or avoid?

- when people stop complaining and start working together to find powerful solutions, I expect that the nature of risks and how consequences (intended or otherwise) are perceived changes fundamentally
- They can help avoid tendency to revert to the comfort zone of conventional approaches (tried/tired? approaches) rather than considering innovative alternatives or a full range of

alternative options or new perspectives which can be brought to bear as part of effective decision-making.

- Permits an opportunity to brainstorm in a different manner and consider various viewpoints in a group participation situation - appreciates everyone's viewpoints and ideas.
- Using sound systemic and adaptive approaches are more likely capture relevant and timely knowledge/information. Not using such methodologies could lead to gaps in knowledge and understanding and thus perverse outcomes.
- Duplication of effort, ineffective stakeholder engagement, fragmentation of strategic management plans.
- by having senior staff aware of risks and thinking through prospects of failure it should help broadened focus on a wider range of risks
- Systematic thinking, will promote avoidance/mitigation/adaption of risks to program/initiative in the first place. Maybe mid program health checks too?
- could help to avoid several work areas duplicating tasks or heading in conflicting directions; could help avoid efforts being 'wasted' on issues which are outside the appropriate 'sphere of influence'.
- Systemic approaches will make us realise that a legislative instrument alone will not deliver sustainable resource management.
- Duplication of effort, greater clarity on defining and prioritisation of organisational goals

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3. Personal comment:

- I hope to be involved in future activities!
- This experience has challenged and extended my understanding of the importance of reflection and learning as not just an individual task but of the need to consider learning as a much broader organisational responsibility. This means considering how we approach problems and learn as an integral part of how we fulfil our professional roles and responsibilities. Adaptive water governance, systemic thinking and social learning approaches, if we invest strategically and engage meaningfully, can help us to do this.
- Thoroughly enjoyed the workshops and working with the committee. Do think that there are territorial boundaries that are working to block use of these methodologies. Might need to address the Hawthorne effect in the report. Would be interested in looking at the intersections and possible opportunities for using these systemic and adaptive approaches in relation to Gov 2.0 initiatives.
- A number of the questionnaire questions have in-built assumptions.
- The workshop and subsequent readings are but a very first step in the right direction. It feels a bit like learning to walk, taking first steps but quickly losing our balance again. There is insufficient time to consolidate learnings due to busy work schedules.
- I think the approaches have merit but I must confess that the language used in the emails and documents advising of the workshop was very alienating. I did not understand it!
- very valuable project and I am hopeful it can continue to drive change within the MDBA
- I found the course really helpful. I have tried to implement the process at work, by bringing members into the course. However, there is still resistance to apply the process, because they

generally think that we do this 'naturally' anyway. So I think you really need to comment this aspect, for true systematic thinking uptake to take place in this organisation.

- It's very easy to do a great workshop like this one and be very enthusiastic about the new skills/techniques.... and then quickly forget about it and slip back into old habits/patterns - very frustrating!!
- Long live 'out of the box' visionaries.
- Everyone needs the tools which facilitate change in a complex world and this is one of those tools.

Appendix 7 Explanatory statement - for ethics

Explanatory Statement - *An invited cohort of forty Murray-Darling Basin Authority staff members*

Title: *Adaptive Water Governance & Systemic Thinking for Future NRM*

This information sheet is for you to keep.

My name is Ray Ison. I am a Professor in the School of Geography and Environmental Science at Monash University. I am being assisted in this research by Prof. David Russell from the University of Western Sydney, Dr. Philip Wallis from Monash University and Ms Robyn Holder from the Australian National University.

The aim/purpose of the research
This scoping project aims to map out how the Murray-Darling Basin Authority can apply action research methods and social learning principles to improve its capability and capacity to deliver its functions under the *Water Act 2007.* Professional development, systemic thinking and integration are important for the successful delivery of the Murray-Darling Basin Authority's (Authority) NRM strategies and programs. This not only involves integration across land, surface and ground waters – but also requires an understanding of different stakeholder perspectives and interests in environmental, economic and social aspects of NRM.
Through this project, the Authority is proposing to scope an exploratory phase of work which maps out how to apply the social learning approach to improve capacity for both the external and internal dialogue needed for effective NRM outcomes. The project will explore a range of ways of improving capacity for understanding and delivering NRM strategies. It provides an opportunity to develop a more active learning approach, and will initially be focused primarily within the NRM Division, with involvement from other staff by invitation or nomination by managers. If the scoping phase is successful, the project's approaches may be extended more widely within the Authority. The project will be directed by Professor Ray Ison from Monash University and operate under the guidance of a steering committee to initiate and guide processes that support staff in:

a) Exploring and developing tools, techniques and conceptual models useful to adaptive water governance;
b) Developing more effective and complementary approaches to working within and between programs and divisions;
c) Building capacity to evaluate and assess effective performance, and recognise strategic risks;
d) Motivating deeper involvement with their work through assessing and creatively addressing the key challenges of their roles;
e) Actively exploring and developing a strategy to enhance the Authority's culture of professional development and learning;
f) Monitoring and evaluating measures of performance for the inquiry process;
g) Determining if the project's process and outputs are useful; and
h) Assisting in designing of a next phase of the work.

Why did you choose this particular person/group as participants?
We have chosen to engage with the Murray-Darling Basin Authority to scope learning system design and development in order to develop professional systemic and adaptive governance skills among Authority staff. Individual staff members have been proposed by the project steering committee, and invited by the researchers, to provide a cross-section of Authority staff.

Possible benefits

The anticipated outcomes of this project include a better understanding of how a learning culture can be developed more broadly across the Authority and with its external partners to assist the organisation in effectively carrying out its responsibilities.

What does the research involve?

The study involves voluntary participation in two training workshops and up to two semi-structured interviews.

How much time will the research take?

The interviews will typically take 30 minutes to complete but where time is available will be extended to 45 minutes maximum. Interviews will preferably be conducted in person at a location of your convenience.

Can I withdraw from the research?

Being in this study is voluntary and you are under no obligation to consent to participate.

Confidentiality

Your name or role will not be used in any publication and only general descriptions of your statements will be used.

Storage of data

Storage of the data collected will adhere to the University regulations and kept on University premises in a locked cupboard/filing cabinet for 5 years.

Use of data

The data collected from the interviews will be used to map out how the Murray-Darling Basin Authority can adopt action research methods and social learning principles. This data will be aggregated and presented to the Authority as a written report.

Results

If you would like to be informed of the aggregate research finding, please contact Ray Ison on +61 3 9905 2350 or email Ray.Ison@arts.monash.edu.au.

If you would like to contact the **researchers** about any aspect of this study, please contact the Chief Investigator:	If you have a **complaint** concerning the manner in which this research **2009000644** is being conducted, please contact:
Professor Ray Ison Phone +61 3 9905 2350 Fax +61 3 9905 9348 Email Ray.Ison@arts.monash.edu.au	Executive Officer Standing Committee on Ethics in Research Involving Humans (SCERH) Building 3e Room 111 Research Office Monash University VIC 3800 Tel: +61 3 9905 2052 Fax: +61 3 9905 1420 Email: scerh@adm.monash.edu.au

Many Thanks,

Signed:
Professor Ray Ison