




# Transformation for Resilient Landscapes and Communities Partnership

## **Progress Report to Rural Industries Research and Development Corporation**

by Rod Griffith, Paul Ryan, Michael Mitchell, Greg Walkerden,  
Sandy Robinson, Valerie Brown, Brian Walker

August 2011



# Contents

<b>Contents.....</b>	<b>ii</b>
<b>Executive Summary .....</b>	<b>v</b>
<b>1 Introduction.....</b>	<b>1</b>
1.1 Background to the research .....	1
1.2 What is meant by “resilience” and “transformation”? .....	2
1.3 The project’s first two years.....	3
1.4 Purpose of this report .....	4
<b>2 Aims and Objectives .....</b>	<b>5</b>
<b>3 Methodology .....</b>	<b>6</b>
3.1 Participatory action research and research design .....	6
3.2 “Planning by Doing” for transformative action .....	7
3.3 Research methods.....	7
3.4 Case study framework .....	8
<b>4 Key Concepts and Tools .....</b>	<b>9</b>
4.1 Transformability .....	9
4.2 Resilience thinking .....	10
4.3 Collective learning .....	12
4.4 Adaptive governance .....	15
<b>5 Towards a Practitioner-friendly Approach .....</b>	<b>16</b>
5.1 Progress with integrating key concepts .....	16
5.2 Use of rapid assessment tools and heuristics .....	20
<b>6 Case Studies.....</b>	<b>24</b>
6.1 Murray-Wakool .....	25
6.2 Cape York.....	29
6.3 Far North Queensland .....	31
6.4 Extending the community of practice .....	32
<b>7 Progress towards Project Aims and Objectives.....</b>	<b>34</b>
<b>8 Next Steps in the Project .....</b>	<b>39</b>

8.1	Development of collaborative reporting for Wakool Shire Council .....	39
8.2	Re-design of Catchment Action Plan process with Murray CMA .....	40
8.3	A way forward in Far North Queensland .....	41
8.4	Further development of the “transformation practice toolkit” .....	42
<b>References .....</b>		<b>43</b>

## Tables

Table 4.1: Glossary of terms used in resilience thinking (from Folke et al., 2011).....	12
Table 5.1: Example of a synthesising diagram depicting scale, domains and thresholds of potential concern. ....	22
Table 6.1: Overview of the project’s three case study areas.....	24
Table 6.2: Organisations and activities external to the project where components of the developing transformation toolkit have been trialled .....	33
Table 7.1: Lessons learnt which are guiding future design and trialling of processes and tools .....	37

## Figures

Figure 3.1: Research design: participatory action research in three case study areas which encompass local, regional and multi-regional NRM scales.....	6
Figure 3.2: Project Logic: <i>Transformation for Resilient Landscapes and Communities</i> project .....	7
Figure 3.3: Case study areas in the <i>Transformation for Resilient Landscapes and Communities</i> project .....	8
Figure 4.1: The Resilience Assessment Framework (Resilience Alliance, 2011b, <i>Workbook for Practitioners</i> ) .....	11
Figure 4.2: Four-step process for collective learning (adapted from Brown, 2008).....	14
Figure 5.1: A “Planning by Doing” system framework to build and maintain capacity to take transformative action.....	18
Figure 5.2: The adaptive cycle (Resilience Alliance, 2011) .....	22
Figure 5.3: Simple heuristic for determining the dominant approach (adaptive or optimised) to decision-making (Source: Peterson et al., 2003).....	23

# Executive Summary

## What the report is about

This report presents a review of progress of the first two years of a planned five-year program, for the *Transformation for Resilient Landscapes and Communities* project. The project is working with partners in New South Wales (NSW) and northern Queensland who are confronted with significant change and therefore interested in exploring the synergies between resilience, collective learning and transformability as they apply to natural resource management. Transformability, for the purposes of this project, is the capacity of actors within a social-ecological system to take intentional transformative action.

The report introduces a preliminary conceptual framework for building and maintaining capacity to take transformative action. The value of the framework is that it moves beyond stand-alone processes for the key concepts, to an integrated engagement, learning and capacity-building system with the potential to empower partners to work through the necessary complex processes for intentional change, in a way that is appropriate to their situations.

This report also provides an assessment of progress against project aims and objectives, in particular the development of a “practice toolkit” for rural and regional organisations interested in a more systemic approach to natural resource management (NRM). An overview is provided for each of the three case studies, including an assessment of the process lessons learnt for the Murray River region case study, the longest running case study in the project. The final chapter outlines current thinking on a way forward for the research agenda and partner objectives for each of the respective case studies.

## Who is the report targeted at?

This report is relevant to NRM practitioners, commentators and policy makers who are interested in transformational change, a more systemic approach to NRM and creating the flexibility for NRM organisations to innovate. It is aimed at leaders and decision makers across all levels of NRM policy development and implementation in Australia, particularly those working on regional capacity-building.

## Background

Most resource-based rural communities in Australia continue to face intractable NRM and sustainability problems. Many regions are currently experiencing ongoing expected and unexpected changes in such key variables as commodity prices and government policies and priorities, as well as ongoing uncertainties associated with climate variability and the future cost of energy. These problems are difficult to deal with for five key reasons: (1) they exhibit high degrees of complexity and uncertainty and low controllability; (2) they are not governed by simple cause and effect relationships; (3) they are difficult to articulate and scope; (4) they are often deeply embedded in the structure and function of modern societies; and (5) they have no final solution, with attempts to manage them simply changing the problem.

Current rational and market-driven approaches to NRM underpin fragmented, incremental investment programs for land, water, soil and biodiversity assets. After two decades of significant investments to address extensive natural resource problems nationally, the trend in condition is still in decline, and new issues have arisen. Action taken to address landscape problems is generally aimed at remediating the biophysical symptoms without adequate regard to the complex cross-scale linkages between people and the biophysical environment and the underlying social and economic drivers. Actions

which aim to “restore” the environment fail to recognise the way social systems work and consequently have limited impact over time.

The NRM governance in Australia currently, while exhibiting some adaptive governance attributes such as multi-level institutions, is still governance for stability, not for ongoing change. Accountability arrangements promote control, optimisation and efficiency, all of which are inappropriate responses to complex self-organising systems. Intractable problems require governance for change and innovation. Adaptive management, a widely held ideal in NRM that suits intractable problems, is largely prevented from being implemented because of the governance arrangements for stability.

## **Aims/Objectives**

The research presented in this progress report aims to explore how rural communities and sectors can build and maintain the capacity to take intentional transformative action. It also aims to build this capacity with the case study partners as the research progresses.

Towards these aims, the research objectives of the project are to develop and test a “Planning by Doing” framework (incorporating resilience thinking, collective learning, adaptive governance and transformability attributes) in different community, resource risk and climatic settings, as well as at different scales, with partners which are actively seeking to undertake an intentional transition in response to significant social and environmental resource-related challenges. A further objective is to build the capacity of the case study partners and their communities to undertake intentional transitions beyond the research project. Capacity-building of the partners is intended through direct skills transfer from the research team and provision of a “practice toolkit” derived from the research results. In addition, the intent is also to undertake capacity-building of the wider NRM community through exploration of alternative methods of extending and transferring the learning from the project to other resource-dependent communities not involved in the case studies.

## **Methods used**

The overall approach to the project is participatory action research in which researchers, champions from partner organisations, and communities work closely together. Researchers acknowledge that they are active agents in the transition process. In this way, learning from the process commences as the project commences, rather than at later stages of the project or at its completion.

The development of a “Planning by Doing” approach within the research is an extension of the terms, “learning by doing” and “experiential learning”, concepts which are fundamental to both resilience thinking and collective learning. The aim of this approach is to avoid comprehensive periodic planning and fixed interval plans that become out-dated very quickly in times of rapid change. The idea is that the planning and doing occur in parallel with learning from one activity informing the other, in contrast to the common approach of completing a plan before implementation can proceed. That is, planning, learning and doing all occur at the same time.

This research is using standard qualitative methods such as workshops, process diaries, interviews, evaluation forms and small quasi-quantitative surveys. Much of the research is “on the ground” and interactive. The project design includes a special role for partner champions. These people are the bridges between partner organisations and the research team. They take an active role in project design and evaluation, as well as a leadership role in implementation.

The research is based on three case study areas recruited to join the project on the basis of whether they are confronted by significant change and have a willingness to explore transformation as an option. The three case studies cover the areas of (1) Murray Catchment Management Authority (CMA) with a focus on Wakool Shire Council, (2) Cape York NRM Ltd and (3) Far North Queensland (FNQ), involving Terrain NRM, Northern Gulf Resource Management Group, Cape York

NRM, Torres Strait Regional Authority, and Regional Development Australia Far North Queensland and Torres Strait Inc.

## **Results/Key findings**

Overall, it is too early to make any definitive claims in relation to the aims and objectives of this research. The Murray region case study is in its second of three years, the Cape York study is approaching the end of its first year (although it has been significantly disrupted by the 2011 wet season) and the first major activity for the FNQ case study will not take place until early 2012.

In the spirit of participatory action research, opportunities have been provided for the funding organisations, on-ground partners from different case study regions and the research team to come together to evaluate progress and work together on improving processes, tools and future work plans. A partner meeting was held in Cairns in the first week of July 2011. In addition, a separate evaluation meeting was held with Murray CMA in late June 2011.

It is evident, however, that new partners are attracted to the reasoning behind why the key concepts would be useful in theory, and to arguments for conceptual integration. As longer-standing partners gain a deeper understanding of the concepts, they are starting to see their potential for the entrenched and emerging issues in their regions.

Of the key concepts, adaptive governance is perhaps having the greatest impact, and yet it is the least well-integrated into the emerging conceptual framework. There is evidence of significant shifts in governance arrangements in the Murray region, driven by adoption of new thinking by CMA leaders. The latest National Resources Commission (NRC) audit demonstrates the shift over two years, and recent decisions by the CMA Board on an approach to the Catchment Action Plan upgrade would support a conclusion that this journey of innovation is continuing. Resilience, by contrast, is the concept receiving the greatest attention from partners, particularly regional NRM bodies. This is not surprising, given its prominence in the NRM policy arena at the present time. The research design is actively testing new approaches to respond to criticism of resilience from a social science perspective, suggesting a lack of consideration of well-understood social processes such as institutions, reflexivity and agency. Collective learning has also had mixed results. While its use through a stand-alone workshop process has had success, there was one pivotal event which failed to meet expectations. Several of the research team and at least one champion are now using the process in situations outside the project, again with considerable impact. One area yet to be effectively negotiated with partners is the principle of ongoing learning through multiple engagements.

Integration of the key concepts has proved extremely difficult but has been identified as essential by the case study partners if they are to progress from theory to changed processes in their respective case study areas. To this end, a breakthrough has emerged by taking a step back from the established resilience and collective learning processes to the principles behind the tools and, through some creative licence, developing a conceptual framework which draws on synergies between the concepts and key transformability influences. As a result, “Planning by Doing” is starting to emerge. Some testing of components of the emerging framework has already been carried out in Cape York, and the learning is being incorporated into improved “Planning by Doing” models for the Catchment Action Plan upgrade in the Murray region and into the overall design of the FNQ case study.

The participatory action research relationship between researchers and partners has not progressed as anticipated, despite considerable effort by all parties. It is important here to highlight the distinction between trust that is needed to allow partner organisations to work with researchers, and the actual building of trust, agency, collaboration and adaptive governance arrangements among stakeholders in the case study regions. In the Murray-Wakool case study, researchers focussed too heavily on the first type of trust. Using an assessment tool, it has been possible to track change in governance from a baseline. By way of interviews and observations, we are also able to make some assessment of collaboration. However, assessing shifts in agency and trust needs more attention and has not been

done well to date. In the Cape York and FNQ studies, trust in the research, the team and the concepts has not been an issue. With some tightening of the participatory action research model, there has been a more rapid progression to working on the ground to address trust, agency, collaboration and adaptive governance internally within regions. New methods of setting baselines and partner-driven tracking/evaluation of change are being developed.

The experiences with the Murray-Wakool case study have provided a number of important lessons which have been used extensively in the design of the change process in Cape York and are now being applied to our new multi-scale case study in FNQ. These lessons have included the following principles:

- Resilience and collective learning tools do not work as effective tools for transformative action when used separately.
- Understanding the focal scale for taking transformative action is not necessarily readily achieved.
- The transfer of new ideas to communities interested in change, and even to leadership groups, cannot be instructed but must be learnt in the community members' own contexts and languages.
- The proposed "practice toolkit" will need to allow for different starting points, diversity of community views and the necessity for a choice of suitable tools backed by practice notes and narratives to guide implementation.
- Champions appointed by organisations may not be organisational change agents, and formal leaders are not always the "real" leaders in communities.
- Effective networks, necessary for transformative action, cannot be set up like a working group. The research has confirmed that shadow networks exist already in the community but become invisible when not respected by other processes.



# 1 Introduction

## 1.1 Background to the research

The funding partners for this project are interested in exploring the synergies between resilience, collective learning and transformability as they apply to natural resource management (NRM). They want to explore and understand more fully the potential and limitations of these ideas for dealing with the complexities and uncertainties facing rural resource-based communities and their support organisations.

Most resource-based rural communities in Australia continue to face intractable NRM and sustainability problems. Many regions are currently experiencing ongoing expected and unexpected changes in such key variables as commodity prices and government policies and priorities, as well as ongoing uncertainties associated with climate variability, the ongoing consequences of the global financial crisis and the future cost of energy. These problems are difficult to deal with because they:

- Exhibit high degrees of complexity and uncertainty and low controllability
- Are not governed by simple cause and effect relationships
- Are difficult to articulate and scope
- Are often deeply embedded in the structure and function of modern societies
- Have no final solution, in that attempts to manage them simply change the problem.

Landscape management is one of these problems. Current landscapes and communities are the product of the ongoing complex interactions between humans and nature (Ison, 2008). The resilience discourse describes this interaction as complex, self-adjusting social-ecological systems which are constantly changing for many diverse and interconnected reasons. The response or adaptation to change can be slow, subtle and incremental, or at times the change can be radical or transformative.

Current rational and market-driven approaches to NRM underpin fragmented, incremental investment programs for land, water, soil and biodiversity assets (Stratford et al., 2007, Morrison et al., 2011). After two decades of significant investments to address extensive natural resource problems nationally, the trend in condition is still in decline (see National Land and Water Resources Audit, 2008), and new issues have arisen. Action taken to address landscape problems is generally aimed at remediating the biophysical symptoms without adequate regard to the complex cross-scale linkages between people and the biophysical environment and the underlying social and economic drivers (Brown, 2010; Walker et al., 2009). Actions which aim to “restore” the environment fail to recognise the way social systems work and consequently have limited impact over time.

Current NRM governance in Australia, while exhibiting some adaptive governance attributes such as multi-level institutions, is still governance for stability, not for ongoing change. Accountability arrangements promote control, optimisation and efficiency, all of which are inappropriate responses to complex self-organising systems (Robins & Kanowski, 2011). Intractable problems require governance for change and innovation (Lebel et al., 2006). Adaptive management, a widely held ideal in NRM that suits intractable problems, is largely prevented from being implemented because of the governance arrangements for stability.

Our proposition in response is that NRM organisations should be able to lead, catalyse and support communities to undertake intentional transformative action to tackle intractable problems if and when

required. However, little attention has been directed to building the capacity for communities to deal with systemic change in a positive proactive manner.

This has led to practitioners, commentators and policy makers to call for:

- A framework for understanding and managing complex social, economic and ecological linkages, and cross-scale dynamics in NRM
- Improved intentional change management strategies
- The option to pursue deeper reform intentionally, when and if required
- The flexibility to innovate, a capacity which does not exist under the current arrangements.

The *Transformation for Resilient Landscapes and Communities* project addresses these calls.

## 1.2 What is meant by “resilience” and “transformation”?

Resilient landscapes and communities are those which are robust enough to absorb change and respond to shocks without losing basic structure and identity and continue to function effectively at all scales (Walker & Salt, 2006; NRC, 2005).

Resilience as an emergent property of coupled social-ecological systems (Holling, 1973; Gunderson and Holling, 2002) is not a new idea, although it is going through a surge in popularity. It is gaining interest and credence among policy makers and practitioners as a societal goal and a useful way of thinking about the human-nature relationship (Benson and Garmestani, 2011). The trend is particularly evident in the field of NRM, with recent inclusion in the *Caring for Our Country* Program Business Plan (2011-13), and is fostered by the Natural Resources Commission (NRC, 2010) of NSW. This growing interest in resilience and its entry into the NRM and regional development policy arenas potentially offer new windows of opportunity for rural communities in Australia to rethink some of the intractable challenges they are facing.

The *Transformation for Resilient Landscapes and Communities* project seeks to explore those opportunities. It is a study of natural-resource-based communities in regional Australia that are facing significant challenges and seemingly intractable change pressures. The project is an exploration of how these communities and their support organisations can build and maintain the necessary capacity to adapt or transform intentionally in response to these challenges and change pressures.

Change from both evolutionary and societal perspectives has always exhibited a tension between slow, shallow, incremental change forces and more rapid, deeper, often discontinuous transformational change forces (Griffith, 2002; 2010; Bawden, 1994). This suggests that two interdependent components of adaptive governance – adaptability (the capacity to manage slow change) and transformability (the capacity to manage deep change) – would be very useful and perhaps even essential capacities for rural communities and their support organisations. While adaptation studies are growing in number (Adger et al., 2009), knowledge of how to manage intentional transformation and how to cope with forced transformation and the necessary tools are still under-developed (Olsson et al., 2006). This project aims to develop and test contextually appropriate change processes and tools for building these capacities. By working with partner support organisations, it also aims to actually build adaptability and transformability in partner communities as the project progresses.

At first glance a project which proposes in its title that transformation is a necessary ingredient in building resilient landscapes and communities may appear to be contradictory, counter-intuitive and counter-productive to taking advantage of those new policy opportunities outlined above. However,

delving into the extensive literature supporting resilience thinking, particularly as it is used in the context of NRM, reveals that resilience is not always a desirable characteristic (Davidson, 2010; Pahl-Wostl, 2009). Some political regimes including dictatorships are very resilient, as are some degraded landscapes (Walker & Salt, 2006; Allison & Hobbs, 2004). It is now widely acknowledged that building resilience of one regime at one scale, perhaps a region, may require breaking resilience and embracing transformational change at another scale (Folke et al., 2010; Walker et al., 2009; Moore & Westley, 2011). In addition, resilience is a property which strengthens and weakens with self-organisation, learning, innovation and external influence, through an adaptive cycle (Gunderson & Holling, 2002; Lebel et al., 2006). Hence, we are more interested in resilience thinking as a contributor to managing long-term landscape and community co-evolution than we are in shoring up the resilience of existing social-ecological systems.

We have made an assumption in designing the project that three conceptual frameworks – resilience thinking (Walker et al., 2002; Walker & Salt, 2006), adaptive governance (Folke et al., 2005) and collective learning (Brown, 2008; 2010) – will separately and together assist communities to explore the pace, scale and direction of change associated with their particular social-ecological systems and to build capacity to take transformative action if and when required. These concepts are different, though potentially synergistic, ways of thinking about intractable problems.

### 1.3 The project's first two years

In March 2009 a scoping study for the *Transformation for Resilient Landscapes and Communities* project was completed by Rod Griffith & Associates for Land & Water Australia (Griffith, et al., 2009). The research design was based around three comparative case studies examining whether collaboration between local government and regional NRM bodies could assist in delivering transformative change and enhance community capacity to manage looming external challenges such as climate change. Resilience, adaptive governance and collective learning were identified as potentially powerful and synergistic concepts that could drive transformative change. The three case study areas were:

- North Queensland – based on the Townsville locality and involving Townsville City Council, Burdekin Dry Tropics NRM and Terrain NRM
- Southern Victoria – based on the Surf Coast Shire and involving the Council and Corangamite CMA
- The Australian Capital Territory (ACT) – involving the government planning agency and the ACT NRM Board.

While interest from collaborating universities (Charles Sturt University and Australian National University), partners and potential funders was strong, the termination of Land & Water Australia as a research and development (R&D) organisation prevented the project from proceeding to contract.

At about this time the NRC had also become interested in the ideas behind the project and put forward a proposal to work with a CMA from NSW. It suggested we approach the Murray CMA, as recent audits had shown the need for attention by that CMA to a number of matters, including governance, community engagement and knowledge of resilience (as embodied in the NSW goal for NRM). The Murray CMA subsequently agreed to join the project as a partner, along with the NRC and National Centre for Groundwater Research and Training (NCGRT). Subsequently, the Wakool Shire Council was invited by Murray CMA to collaborate.

The project commenced in earnest in November 2009. Year 1 of the case study is captured in a Working Paper published by the Institute for Land, Water and Society at Charles Sturt University (Griffith et al., 2010).

The Rural Industries Research and Development Corporation (RIRDC) became a partner in the project in August 2010, providing funding to assist with:

- Year 2 of the Murray-Wakool case study
- A new regional-scale case study in Cape York (as an indirect outcome of the 2009 scoping study)
- Scoping of a third multi-regional case study
- Development of a community of practice around transformative action for rural communities and a learning-based approach to resilience thinking.

## **1.4 Purpose of this report**

This report serves two purposes. First, it is a contractual obligation for the first year of RIRDC's involvement in the project and serves as a milestone for all partners. More importantly, however, the report documents a potential turning point in the project. Having paused to evaluate what has been learnt in relation to project objectives, the research team and partners have now reshaped and refocussed the direction for coming years.

The report is a “work in progress”, describing the status of the project nearly two years into a planned five-year program, working with rural communities through their support organisations such as local governments and NRM bodies. It explains why a focus on transformation, and particularly on building the capacity for taking transformative action (transformability), in rural communities is useful. It outlines why and how a number of partner regions that are facing significant change pressures are building transformability. It then describes how theory and practice associated with resilience thinking, governance and collective learning are being used in new ways to develop and test a toolkit for taking transformative action based on “Planning by Doing”.

## 2 Aims and Objectives

The overall aims of the project are to:

- Explore how rural communities and sectors can build and maintain transformability, i.e. the capacity to take intentional transformative action
- Actually build this capacity with our partners as we undertake the research.

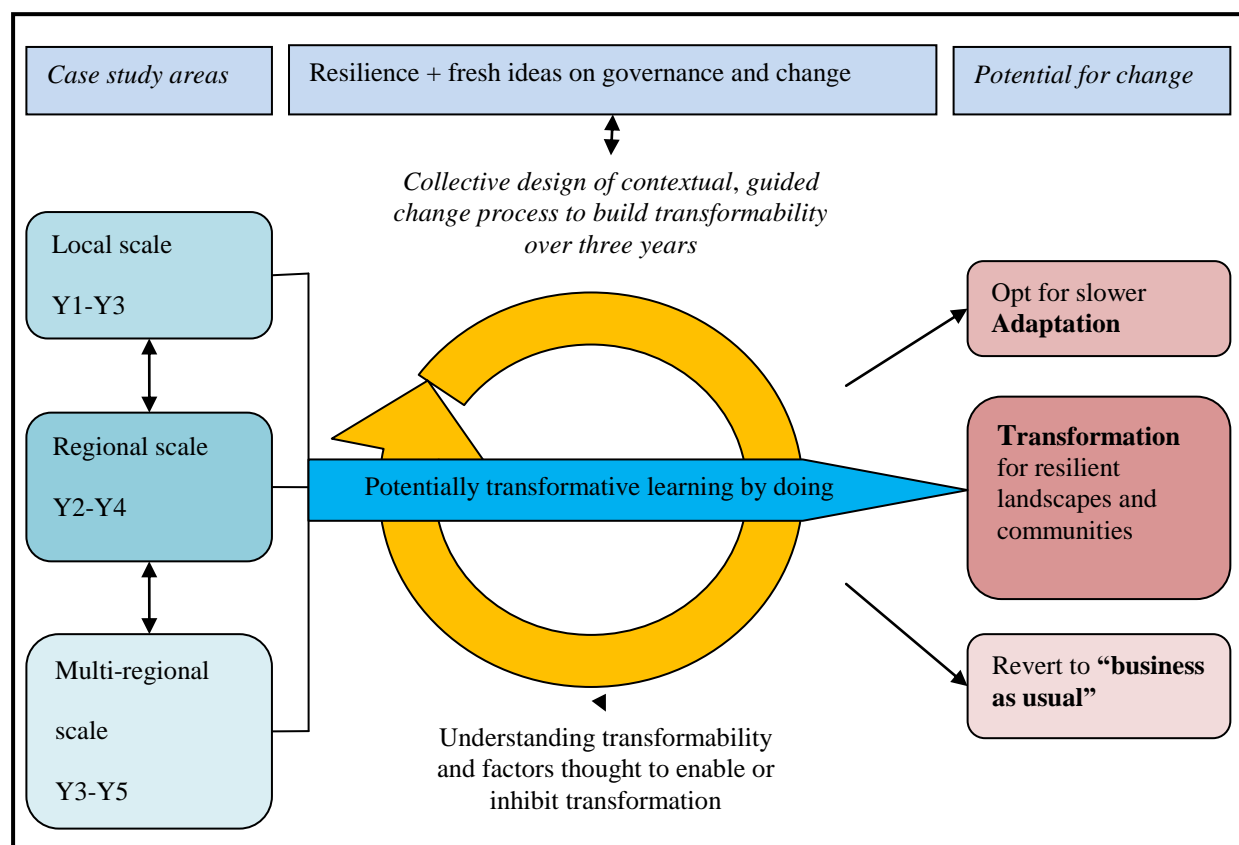
The project has several key objectives which are focussed on delivering long-term benefits to the participating communities. These objectives are to:

1. Explore the contribution that resilience thinking, collective learning and adaptive governance can make to rural resource-dependent communities facing significant resource, social and environmental challenges
2. Draw on and enhance synergies between these concepts to develop a transformative “learning by doing” framework for rural resource-dependent communities to undertake an intentional transition in anticipation of emerging risk
3. Apply and test the framework in different community, resource risk and climatic settings and at different scales in order to develop a set of tools appropriate for each participant’s situation, rather than a “one size fits all” model
4. Build the necessary trust, agency, collaboration and adaptive governance arrangements with partners and communities to enable them to undertake intentional transitions
5. Develop strong inter-connections among the case studies so that learning gained in one setting can be extended and transferred
6. Explore alternative methods of extending and transferring the learnings from the projects to other resource-dependent communities not involved in the case studies.

# 3 Methodology

## 3.1 Participatory action research and research design

The project design is based on three cascading case studies covering three key scales in NRM: local, regional and multi-regional. This was essentially to account for the idea that resilience and transformation are scale-interdependent concepts. Each case study spans three years, starting one year apart, so that learning can be transferred and under-performing events avoided (see Figure 3.1).



**Figure 3.1: Research design: participatory action research in three case study areas which encompass local, regional and multi-regional NRM scales**

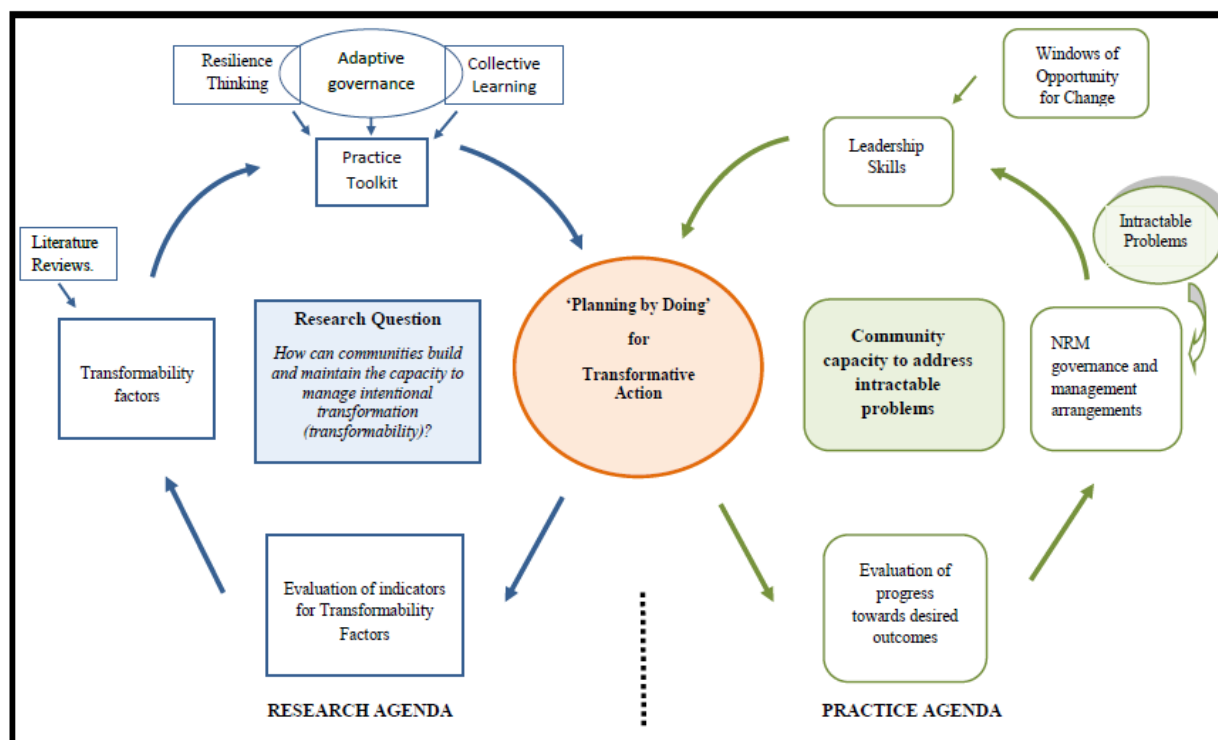
The overall approach to the project is participatory action research in which researchers, champions from partner organisations, and communities work closely together. Researchers acknowledge that they are active agents in the transition process. In this way, learning from the process commences as the project commences, rather than at later stages of the project or at its completion.

For the research team, the learning revolves around answering the focus question for the research:

*How can communities build and maintain the capacity to manage intentional transformation (transformability)?*

In particular, how can theory and evaluation of practice in partner regions interact to inform the development and improvement of a “practice toolkit” including a broad “Planning by Doing” process for transformative action which is tailored by the communities to suit their particular needs?

For the partner organisations and communities, the focus is on the community capacity to address intractable problems and how applying the toolkit has assisted them to achieve progress towards desired outcomes. This community learning is used to improve governance, management arrangements and leadership skills. This description of the project as continual interaction of community and research interests through participatory action research is illustrated in Figure 3.2.



**Figure 3.2: Project Logic: *Transformation for Resilient Landscapes and Communities* project**

### 3.2 “Planning by Doing” for transformative action

“Planning by Doing” is more a quest than a fully developed type of planning, although there are some examples of planning with this label in the literature (Brombacher et al., 1994). For the purposes of this project it is an extension of the terms, “learning by doing” and “experiential learning”, concepts which are fundamental to both resilience thinking and collective learning.

The aim of this approach is to avoid comprehensive periodic planning and fixed interval plans that become out-dated very quickly in times of rapid change. The idea is that the planning and doing occur in parallel with learning from one activity informing the other, in contrast to the common approach of completing a plan before implementation can proceed. That is, it is planning, learning and doing at the same time. It also builds capacity and relationships between “planners” and “doers”, groups which more commonly tend to be separate.

### 3.3 Research methods

This research uses standard qualitative methods such as workshops, process diaries, interviews, evaluation forms and small quasi-quantitative surveys. Much of the research is “on the ground” and interactive. The project design includes a special role for partner champions. These people are the bridges between partner organisations and the research team. They take an active role in project

design and evaluation, as well as a leadership role in implementation. In Cape York the Board Directors and Chief Executive Officer have become champions. One Indigenous Director is also undertaking the Indigenous engagement at the community level and has developed a special relationship with researchers.

### 3.4 Case study framework

Partner organisations were recruited to join the project on the basis of whether they are confronted by significant change and have a willingness to explore transformation as an option. The existing case studies (Figure 3.3) as at June 2011 are:

- Murray-Wakool – involving Murray CMA and Wakool Shire Council
- Cape York – involving Cape York NRM and numerous communities on Cape York, many of which are Indigenous communities
- Far North Queensland – involving Terrain NRM, Northern Gulf Resource Management Group, Cape York NRM, Torres Strait Regional Authority, and Regional Development Australia Far North Queensland and Torres Strait Inc.

For each of the Murray-Wakool and Cape York case studies we have followed a change process informed at the time of design by the available set of transformability factors identified in the literature, and learning gained from practical application in other case studies and elsewhere.

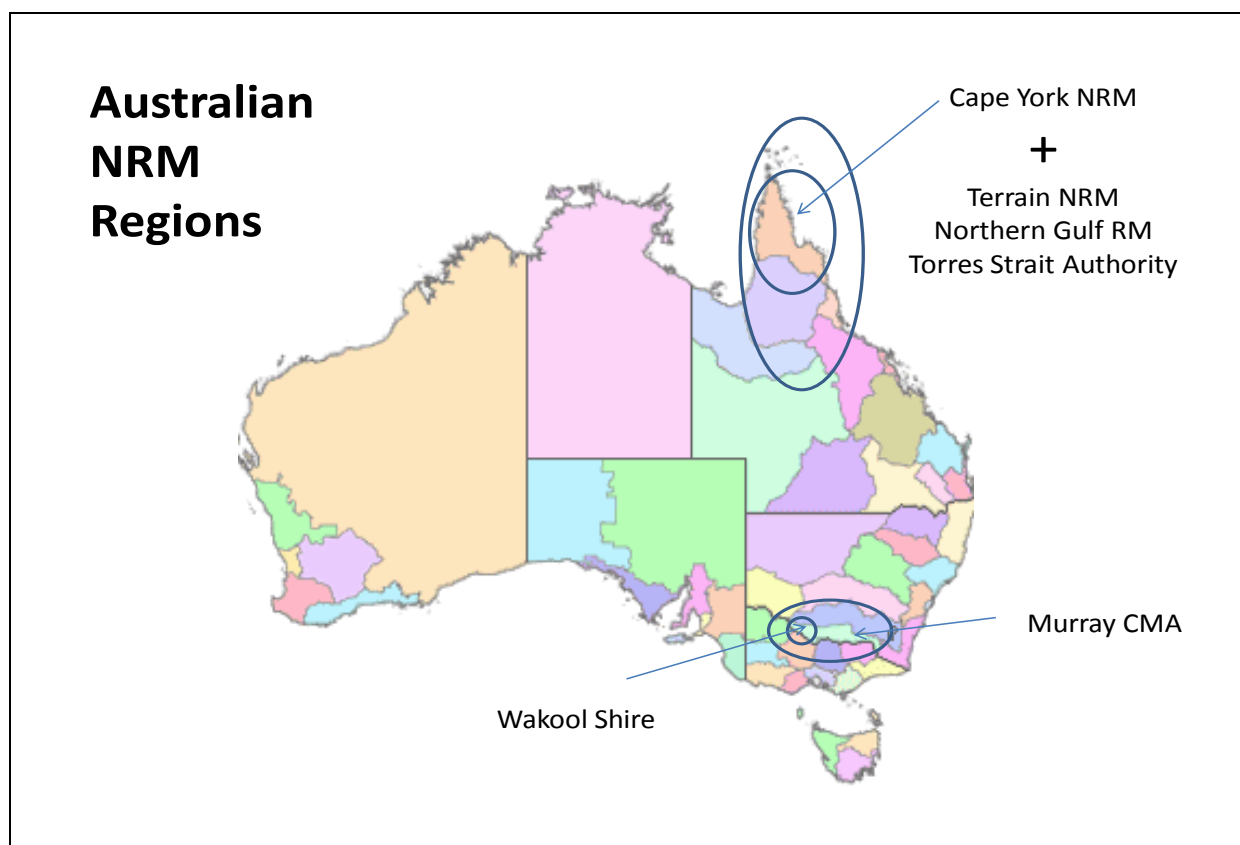


Figure 3.3: Case study areas in the *Transformation for Resilient Landscapes and Communities* project



## 4 Key Concepts and Tools

The central concepts embodied in the project are transformability, resilience thinking, collective learning and adaptive governance.

The iterative development and testing of a toolkit for use by rural communities and their support organisations (Figure 3.2) is informed by the available literature on transformational change and transition management and, as far as possible, by our emerging understanding of transformability.

The toolkit and “Planning by Doing” approaches are also informed by resilience thinking and collective learning theories, linked by adaptive governance. Both resilience and collective learning theories accept the wisdom of working with change and support experiential learning and a “Planning by Doing” approach. They also recognise transformability as essential to well-being in dynamic co-evolving social-ecological systems. They differ in their approach to influencing change and therefore have developed different tools and audiences.

The following outlines of the central concepts are not intended as comprehensive accounts but rather as a working overview of each concept and the overlaps among them. The references provide links to the theoretical debates in which the concepts are embedded. A summary of this project’s initial literature review is contained in Working Paper 1 (Griffith et al., 2010) and provides further links to relevant literature on these concepts.

### 4.1 Transformability

Transformability, for the purposes of this project, is the capacity of actors within a social-ecological system to take intentional transformative action.

The project commenced with a limited set of factors or influences, thought to have relevance for transformational change in social-ecological systems and for building transformability, identified in review papers, principally Olsson et al. (2006) and Lebel et al. (2006). These factors were also drawn from previous unpublished work by Griffith (2000, 2002, 2009), which reviewed some of the organisational change, governance and systemic development literature.

Key factors that influence transformability (over and above the capacity required to assess and manage resilience, i.e. adaptability) include:

- Leaders who are willing to tolerate creative improvisation, embrace/foster new social structures and build confidence in significant change. These leaders can boundary span (spatially, temporally, administratively and paradigmatically), motivate and reassure people during uncertainty and surprise, recognise and if necessary open windows of opportunity, and navigate through turbulent times with few reference points
- Shadow networks or informal groups that self-organise to explore alternative futures and can quickly offer feasible ways forward when windows of opportunity arise
- Conditions for double- and triple-loop learning (learning that challenges the assumptions underlying “business as usual” and slow adaptation)
- The assessment capability to recognise when existing systems of resource use or governance are not tenable even with adaptation and careful threshold management
- Deliberative mechanisms that bring different types of knowledge communities and stakeholders to bear on intractable problems

- Institutional mechanisms that can bridge scales of governance with strategic collaborations that can coordinate the navigation process at multiple scales.

In 2010-2011 additional factors were identified in the literature. Others with potential to be important have emerged from working with partners on the ground. Folke et al. (2010), for example, noted a linkage between transformability and general resilience attributes. Work on safe arenas in transition management (Rotmans & Loorbach, 2009) and a related idea called social innovation (Westley & Antadze, 2010; Moore & Westley, 2011) has also contributed to our understanding of cross-scale interactions and the role of “OK to fail” experiments. As contact with communities on the ground has occurred, the importance of “identity” (how communities relate to their landscapes and themselves) in resisting transformation and garnering interest in landscape management has also emerged as a factor. These ideas have been influential in the design of transformative processes in new case studies, in particular reinforcing the value of “Planning by Doing” as a way of “learning by doing”.

## 4.2 Resilience thinking

Resilience thinking (Walker & Salt, 2006) is more a broad set of related ideas, rather than a single concept. It embodies:

- Complex systems analysis as a way of understanding dynamics in linked social-ecological systems and landscape resilience (variables, feedback and thresholds are key components)
- Resilience as an attribute of a social-ecological system
- Adaptive management (or “learning by doing”) as the means of managing for resilience
- Adaptive governance as the enabler of adaptive management.

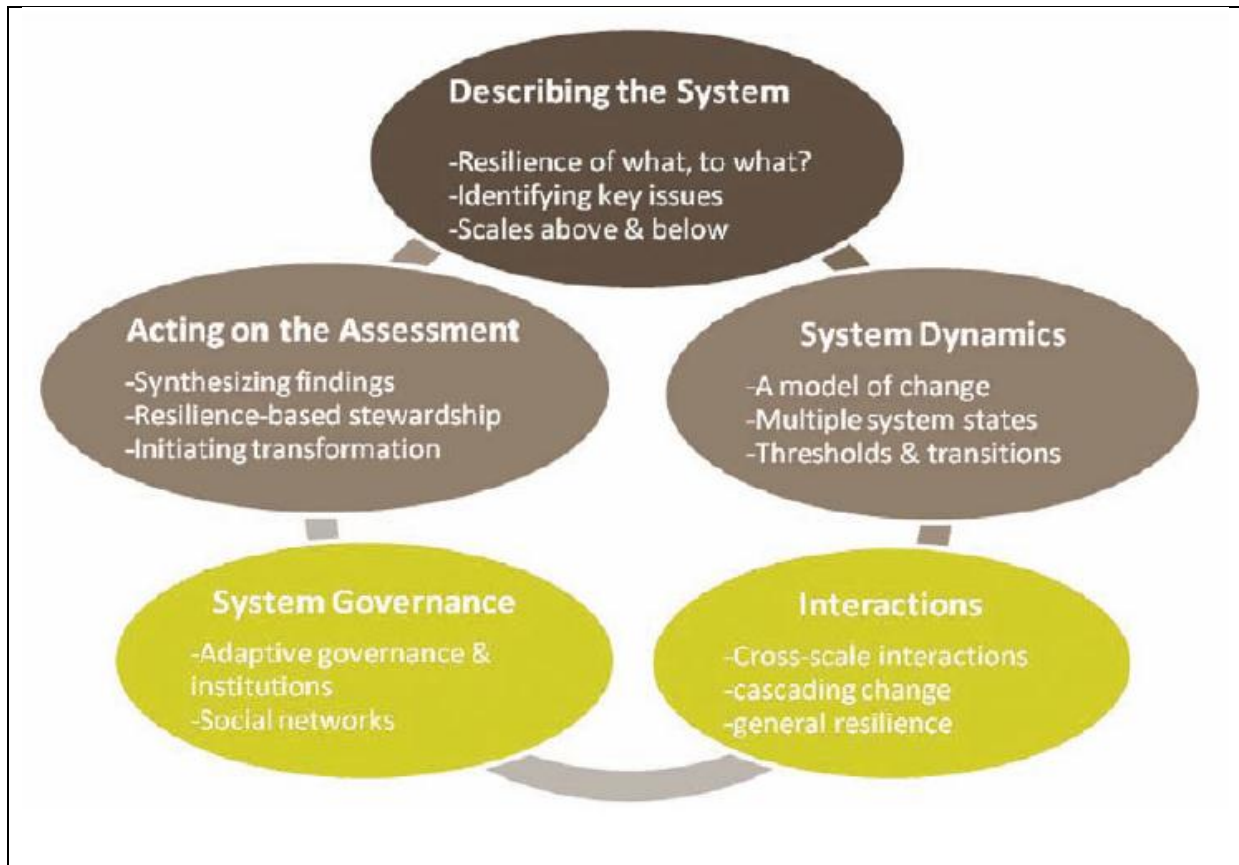
The foundation for resilience thinking stems back to the early 1970s when Buzz Holling (1973) applied complex systems thinking to ecological change. He then identified adaptive management as a means of managing resilience. Later it was recognised that adaptive governance was an essential enabler of both adaptive management and resilience. We have reviewed the evolution of the resilience discourse in our first Working Paper (Griffith et al., 2010) and demonstrated how its social dimension has developed to cover many of the criticisms coming from the social sciences.

Resilience thinking is complex systems thinking, and so the published tools for assessment and system intervention generally follow systems analysis conventions. Drawing on earlier material developed by Brian Walker (Walker et al., 2002), the Resilience Alliance published a process for assessing resilience in social-ecological systems and for making decisions on appropriate interventions. It is presented as two workbooks – one for scientists and one for practitioners (Resilience Alliance, 2011a, b). Differences appear to be mainly the language used and comprehensiveness of the process steps; otherwise, the basic intent is similar.

From prior experience in change management and capacity-building, there was evidence that the workbook process appeared to be a very blunt, knowledge-driven instrument for building capacity to manage social-ecological systems. The process seemed to have limitations for taking transformative action, in that many of the transformability criteria outlined in the previous section were not explicitly covered. This was evident in the Goulburn Broken catchment study (Walker et al., 2009) where the CMA and the community failed to take transformative action despite the findings of a technically robust resilience assessment.

Since commencing this project, updates of both workbooks have been released. Initially, this was in the form of added modules, e.g. a module for network analysis. More recently (Resilience Alliance, 2011a, b), both workbooks have been modified, and a new workbook on social-ecological inventory

has been added. The process from the current version of the workbook for practitioners is shown in Figure 4.1. The trend in the workbooks is for greater inclusion of and attention to the dynamics of the social system and inclusion of social science techniques.



**Figure 4.1: The Resilience Assessment Framework (Resilience Alliance, 2011b, *Workbook for Practitioners*)**

A glossary of terms used in resilience thinking is set out in Table 4.1 below. More detailed treatments of the social expansion of the concept and its application can be found on the Resilience Alliance website ([www.resalliance.org](http://www.resalliance.org)) and in their journal, *Ecology and Society*, from about 2005 onwards.

**Table 4.1: Glossary of terms used in resilience thinking (from Folke et al., 2011)**

Term	Definition
Active transformation	The deliberate initiation of a phased introduction of one or more new state variables (a new way of making a living) at lower scales, while maintaining the resilience of the system at higher scales as transformational change proceeds.
Adaptability (adaptive capacity)	The capacity of actors in a system to influence resilience.
Adaptive cycle	A heuristic model that portrays an endogenously driven four-phase cycle of social-ecological systems and other complex adaptive systems. The common trajectory is from a phase of rapid growth where resources are freely available and there is high resilience (r phase), through capital accumulation into a gradually rigidifying phase where most resources are locked up and there is little flexibility or novelty, and low resilience (K phase), thence via a sudden collapse into a release phase of chaotic dynamics in which relationships and structures are undone ( $\Omega$ ), into a phase of re-organization where novelty can prevail ( $\alpha$ ). The r-K dynamics reflect a more-or-less predictable, relatively slow “foreloop” and the $\Omega$ - $\alpha$ dynamics represent a chaotic, fast “backloop” that strongly influences the nature of the next foreloop. External or higher-scale influences can cause a move from any phase to any other phase.
Forced transformation	An imposed transformation of a social-ecological system that is not introduced deliberately by the actors.
General resilience	The resilience of any and all parts of a system to all kinds of shocks, including novel ones.
Panarchy	The interactive dynamics of a nested set of adaptive cycles.
Regime	The set of system states within a stability landscape
Regime shift	A change in a system state from one regime or stability domain to another
Resilience	The capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure and feedbacks, and therefore identity, that is, the capacity to change in order to maintain the same identity.
Social-ecological system	Integrated system of ecosystems and human society with reciprocal feedback and interdependence. The concept emphasizes the humans-in-nature perspective
Specified resilience	The resilience “of what, to what”; resilience of some particular part of a system, related to a particular control variable, to one or more identified kinds of shocks.
Stability domain	A basin of attraction of a system, in which the dimensions are defined by the set of controlling variables that have threshold levels (equivalent to a system regime)
Stability landscape	The extent of the possible states of system space, defined by the set of control variables in which stability domains are embedded
Threshold (aka critical transition)	A level or amount of a controlling, often slowly changing variable in which a change occurs in a critical feedback causing the system to self-organize along a different trajectory, that is, towards a different attractor.
Transformability	The capacity to transform the stability landscape itself in order to become a different kind of system, to create a fundamentally new system when ecological, economic, or social structures make the existing system untenable.

### 4.3 Collective learning

Collective learning is a particular type of social learning coined and described by Valerie Brown (Brown, 2008). It has a theoretical basis in adult and experiential learning and draws on a long history of enquiry in the philosophy of science on how knowledge is constructed.

Ison (2008) describes social learning as:

A new paradigm for natural resources management which moves beyond information provision, consultation and stakeholder participation to address the systemic complexity associated with multiple stakeholders attempting to transform their situations.

Brown (2010) has identified five types of knowledge cultures that make up the suite of interests in social-environmental decision-making, all of which need to be present and active to achieve ethical responses to intractable problems:

- Individual
- Community
- Specialised
- Organisational
- Holistic.

Each of these knowledge cultures has its own set of criteria for validity, usually rejected by other knowledge cultures. Collective learning seeks to bring these cultures together to work on intractable problems.

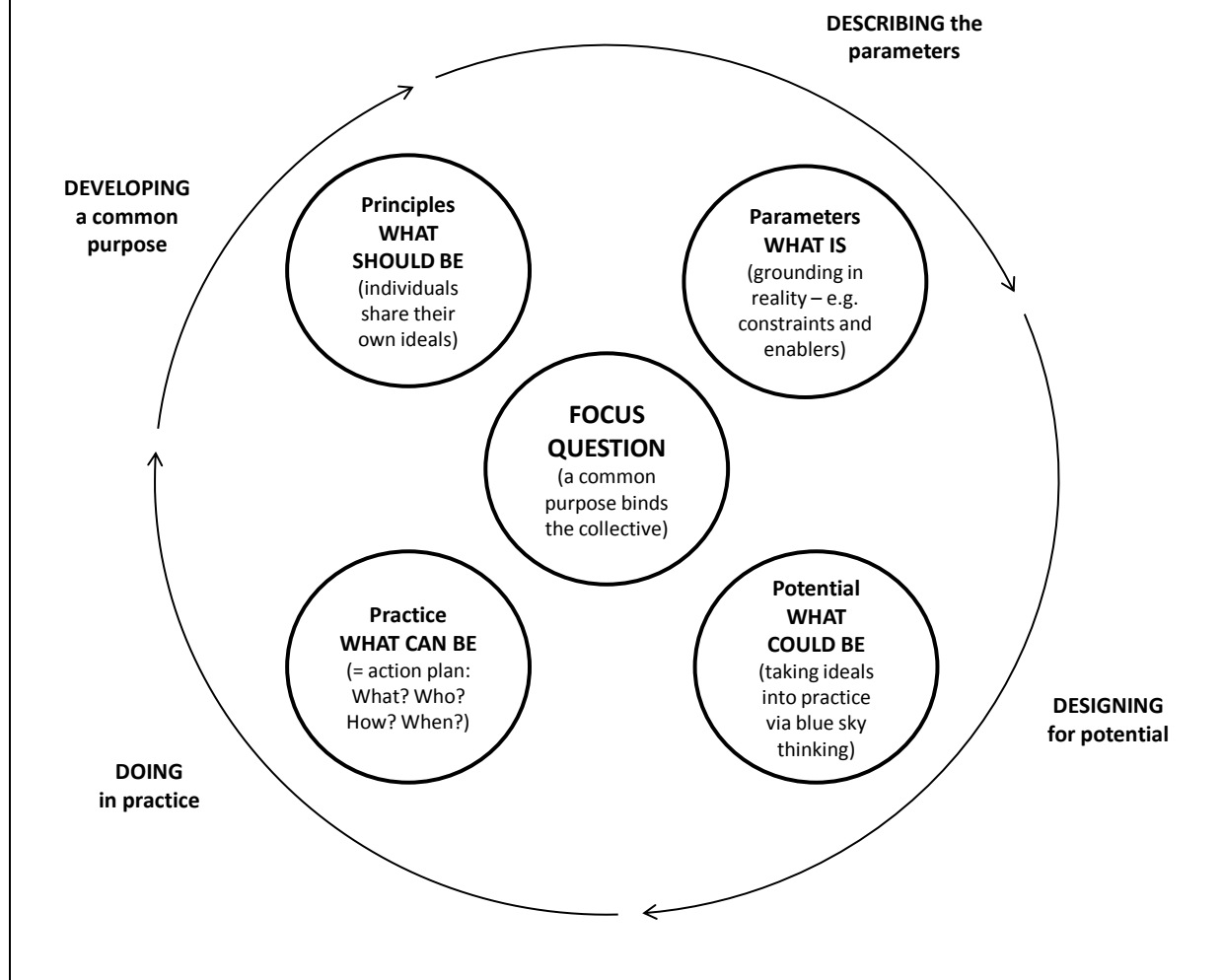
The collective learning process as described, practised and advocated by Brown (2008) involves a cyclical process involving four steps (see Figure 4.2). The four-step cycle is repeated so that it becomes a spiral of learning and action that builds on prior learning and action.

Collective learning is both a process and an outcome of constructive dialogue. Individuals engage in a structured process of exchange between shared ideals and experiential knowledge, leading to the development of a detailed agenda for collective action as an outcome. The process respects the notion that people come together with different ways of constructing knowledge about their world, but that by sharing ideals they can work together towards a common purpose. Taking time out to think about ideals also helps establish a process that enables participants to step out of immediate problems, providing scope for actions that are innovative and potentially transformative.

Most of Brown's and others' experience of this collective learning process has been in workshop settings, ideally run over two days, and with the same workshop participants involved throughout the process. However, other formats including working through the steps over several weeks or months have been successful (Brown, pers. comm.).

Four Steps:

1. *What should be?* (Articulating and organising the range of ideals within the collective)
2. *What is?* (Identifying the sets of facts from the knowledge cultures present)
3. *What could be?* (Dreaming up creative ideas for collective change)
4. *What can be?* (Determining an innovative program for collaborative action)



**Figure 4.2: Four-step process for collective learning (adapted from Brown, 2008)**

Ensuring that all knowledge cultures are represented and setting a focus question that all participants can relate to are important first steps. Brown believes that it is particularly important to develop shared ideals in a “what should be” step before addressing the current situation. Her experience is that starting with “what is” is inherently conservative, with the result that participants want to fix what is wrong with the current situation (system) or pursue “wish lists”. This effectively prevents double- and triple-loop learning and shuts down the creativity required for innovation in the “what could be” step.

The issue of where to start when embarking on a change process has been the main sticking point in developing greater integration between collective learning and resilience frameworks.

The notion that participants decide the action to be taken in the “what can be” step (relative to working towards shared ideals) is fundamental to the process of collective learning. This approach can be problematic if a predetermined format for action (such as a formal plan) is specified, thus restricting options for action.

## **4.4 Adaptive governance**

Adaptive governance in this project is interpreted as a form of governance for change (Folke et al., 2005; Bellamy, 2007; Olsson et al., 2006) and transformability as an attribute of adaptive governance (Griffith, Davidson et al., 2009). Adaptive governance is also closely linked to social learning (Pahl-Wostl et al., 2007) and therefore collective learning.

The following quote from Lebel et al. (2006) points out why governance, particularly adaptive governance, is a necessary consideration in managing resilience.

Strengthening the capacity of societies to manage resilience is critical to effectively pursuing sustainable development. This pursuit is a dynamic challenge in which it may be desirable, at certain times, to enhance resilience, e.g., when a system is in a domain of attraction associated with a desirable system configuration, and at other times to erode and help transform a system, e.g., when it is in a domain associated with an undesirable configuration. However, who decides when to intervene and identifies the desirable system configurations? Who decides what portfolio of challenges the system should be made resilient to and which are of priority interest? How are those decisions made? Who controls implementation? What are the consequences of alternative courses of action for different stakeholder groups?

Adaptive governance can be thought of in two equally legitimate ways. It can be rolled up with resilience thinking in recognition that the term was coined within that discourse (Folke et al., 2005) or it can be recognised as one variant of new or environmental governance, which has a separate history and theoretical basis (Bellamy, 2007). For this study we are accepting both interpretations on the basis that it may be at times useful to look at situations from the viewpoint of resilience thinking and at others to step back from that discourse and take a wider view.

The important role of governance arrangements in framing and tackling intractable problems and in enabling transformative action is explicit in our project logic illustrated in Figure 3.2. Linking governance and management highlights their close relationship almost as two sides of the one coin.

Tools for assessing adaptive governance are not well-developed. The assessment and improvement framework for establishing a governance baseline in the Murray-Wakool case study was taken from Griffith, et al. (2009) which drew on earlier work by Lockwood et al. (2007), as well as Folke et al. (2005) and Bellamy (2007). While considered useful by some leaders in the Murray-Wakool case study and in NRM in general (Productivity Commission, 2010), it has been criticised as too abstract by other leaders within Murray CMA and Wakool Shire Council. More recently, the Australian NRM Chairs (Ryan et al., 2010) have recast much of this work into a set of more practical principles for NRM.

The intention for the Cape York and FNQ case study areas is to revisit how governance is assessed to develop an adaptive governance baseline and how changes in governance can be better tracked to facilitate learning and improvement.

# 5 Towards a Practitioner-friendly Approach

## 5.1 Progress with integrating key concepts

A key objective of this project is to draw on synergies between the key concepts to develop a new “Planning by Doing” approach to building transformability and taking transformative action. In the initial scoping study (Griffith, et al., 2009), some deficiencies were identified in resilience assessment processes from a social science perspective. At the same time however, the potential for synergy between the key concepts was recognised, although a way forward for conceptual integration was not clear.

Our research proposition was that resilience assessment with its systems analysis and technical strengths could shape and add value to the on-ground content, while collective learning with its deliberative strengths would supply the transformative change process, with adaptive governance as the glue and overlap between the other two concepts. This relationship between the concepts was then, and still is, consistent with a view that NRM is essentially about working with people and communities who manage natural resources, rather than about direct management of the resource base.

In response to calls for integration from partners and better ways to communicate the conceptual basis of the project, the research team set out to develop a conceptual framework which builds on synergies between resilience, collective learning and adaptive governance. The intent has been to develop a more community- and practitioner-friendly approach, while not undermining the principles on which the original frameworks were successfully built and operated in other settings. Our integration efforts have aimed to build on existing frameworks, not replace them, recognising that these frameworks, as they have developed, continue to have roles in particular settings.

It is our understanding that an integrated approach to taking transformative action needs to:

- Recognise the difficulty NRM organisations have in getting stakeholders together for any more than a day at a time and involving them in extended processes
- Support a “Planning by Doing” basis with emphasis on the doing as “social innovation” or safe arenas
- Allow people with different mental models (knowledge cultures) to learn experientially and collectively about their connections with community and their landscapes
- Build the capacity of communities to adapt and transform, taking into account known and potential transformability influences
- Take into account the critical role of scale and cross-scale interactions in shaping futures
- Be tailored to suit application to any of the common vehicles for change in NRM (e.g. Regional NRM Plans or investment strategies) and windows of opportunity
- Operate within existing institutional arrangements even if it seeks to change those institutions.

An approach (illustrated in Figure 5.1) has been emerging over the course of 2010-2011. The framework has been developed, drawing equally on theory and practical experiences, through working closely with partners in the case studies. It represents a work in progress rather than a polished conceptual model. Initial reaction from one set of partners indicates that the research team has made a significant breakthrough in what has been one of the most challenging aspects of this project.



The “Planning by Doing” system framework is intended to function as a critical collective learning system for building transformability and as a process for intentional change – either adaptation or transformation, depending on the assessed need. The framework is based on an understanding that:

- Each of the subsystems is a site of engagement, learning and capacity-building about different aspects of the ongoing co-evolution process between people and nature or between communities and the landscapes to which they are coupled.
- Each subsystem is thought to be a necessary part of the functioning whole.
- The conceptual conflict over where to start a change process has been addressed. The idea is that communities and partners can start building or enter the system from any subsystem or connecting process since it is a recursive learning process which can be built up over time *via* a number of engagement activities, including by workshops. However, building the “Planning by Doing” system and, as a result, the capacity for taking transformative action should not be taken as a licence for random engagement with the system. In the end, to have built the capacity to take intentional transformative action, the subsystems will need to work both separately and together. Practice notes (shown in Figure 5.1) would provide principles, tools and cautions, e.g. it is better to share ideals before identifying problems with existing system dynamics (Brown, 2008). This assists potential users and respects the history of the concepts.

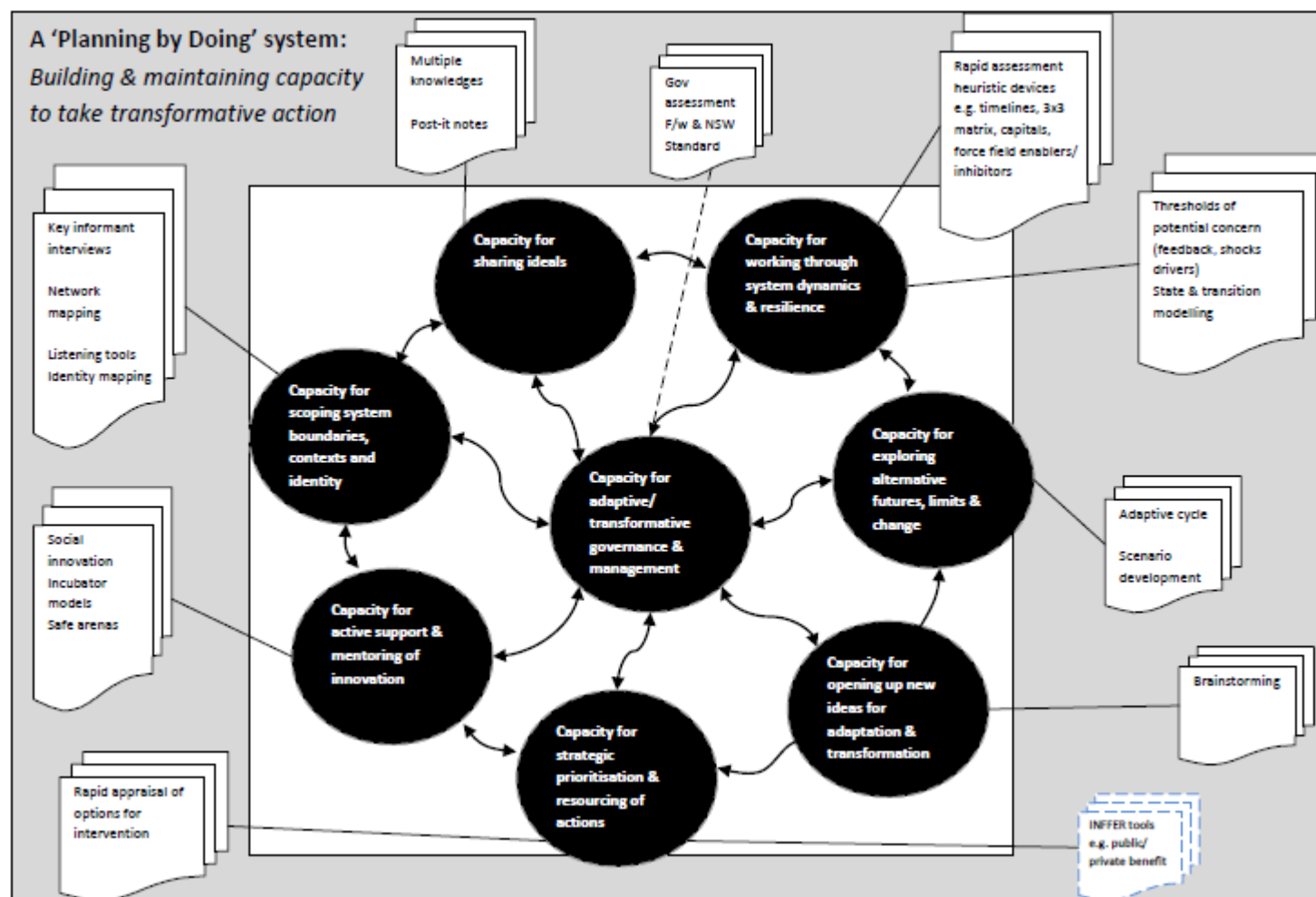


Figure 5.1: A “Planning by Doing” system framework to build and maintain capacity to take transformative action

The “Planning by Doing” system has at its centre a subsystem for adaptive/transformative governance and management which enables, structures and activates the other subsystems. The other subsystems (capacities) are for:

- Scoping system boundaries, contexts and identity
- Sharing ideals
- Working through system dynamics and resilience
- Exploring plausible alternative futures, limits and a case for change
- Opening up new ideas for adaptation/transformation
- Strategic prioritisation and resourcing of actions/projects/interventions
- Active support and mentoring of innovation and experimentation.

The capacity for scoping incorporates the idea of asking “resilience of what” from the resilience workbook and the requirement in Brown’s (2008) collective learning framework to develop a focal question to guide further learning. It is essentially a background research and listening site. Here, organisations may undertake network mapping to find existing structures, such as shadow networks and key knowledge networks, and understand nodes of influence and target engagement. Key informant interviews would also be useful for identifying different system boundary options and scoping key issues. Is there a problem? For whom is it a problem? Is it an intractable problem? The scoping may also extend to assessment or evaluation of existing governance arrangements and of the management action currently underway.

The capacity for sharing ideals is taken directly from collective learning, and its inclusion follows the same logic (see Figure 4.2). It is important to ask whose ideals are being shared, and so Brown’s (2008) multiple knowledge framework is a useful guide for engagement. While it is usually done in workshops, other options are being worked through in relation to Indigenous engagement, options which could be applicable to farmer groups, for example. While the resilience assessment process does not have a direct equivalent, a discussion of values is often used as a starting point in identifying variables linked to system dynamics. We are still working through this connection.

The capacity for working through system dynamics combines the “what is” step in collective learning with the “resilience to what” phase of resilience assessment. In resilience thinking, this is essentially a modelling process in which variables, feedback, thresholds, shocks, drivers, and state and transition models have roles. We are developing a rapid assessment approach as an alternative to comprehensive modelling for some circumstances. The objective from a collective learning perspective is to work through what it is about the existing system that influences achieving shared ideals. This is thought to be important in keeping the option for transformative action open. We have found that strategic planning tools such as force field analysis work well in parallel to resilience heuristics in a workshop setting.

The capacity for exploring plausible alternative futures comes from resilience assessment. To continue the “what is” theme, it is the site of learning regarding “what might be – if”. Scenario development is envisaged as a key tool, again comparing those scenarios with shared ideals. The adaptive cycle in its cross-scale form is also likely to be a useful diagnostic. We are still working through the idea of limits and their relationships, firstly to thresholds and then to targets in NRM and whether this is the appropriate site for learning for the topic. This is also thought to be the appropriate site for explicit consideration of the pace, scale and direction of change necessary to deliver on shared ideals – the “so what” question.

The capacity for opening up new ideas to pursue ideals is taken from collective learning and responds to the question of “what could be”. This is the arena in which “blue sky” or “outside the box” thinking is encouraged. It is the engine of innovation and novelty which supplies the raw materials for transformation. Undertaking this activity collectively promotes collaborative design and the synergies created by exposure to novelty. These designs may be the embryos of catalytic projects which kick-start transformative action.

The capacity for strategic prioritisation and resourcing of action is the processes of “what can be” where the practicalities of particular actions/interventions are considered and, if appropriate, codified. Here, tools like public and private benefit from Investment Framework for Environmental Resources (INFFER) ([www.inffer.org](http://www.inffer.org)) could be deployed. The team are also developing some rapid assessment tools based on resilience thinking for exploring the intended and unintended consequences of the action on social-ecological system dynamics. The idea of prioritisation has been included, with some reservations. On the one hand, it is essential in a setting where there are never enough resources to undertake all suggested interventions effectively. On the other hand, it is known to be important in transformation to foster experimentation on a “no regrets” basis. Therefore criteria such as ‘likelihood of success’ really need to be set aside for at least some proportion of investments.

The capacity for active support and mentoring of innovation and experimentation is partially included in collective learning (“what can be”) and referred to in the resilience discourse through its association with transition management, (Rotmans & Loorbach, 2009) but not explicitly included in the assessment workbook. This is where the “doing” is done, in the sense of on-ground action. Only the potentially transformative or adaptive component is represented in the title of the subsystem for emphasis, although other types of action are acknowledged. We are currently revisiting theories such as transition and social innovation and working closely with champions on the ground to refine possible tools which will assist communities.

Once all of these capacities are built and operating, planning and doing should operate seamlessly; as the context changes (identified through the subsystem for scanning contexts including feedbacks), decisions are made on the necessity to revisit other capacities. Changes are also feeding back constantly to governance and management structures and arrangements. Consequently, when there is relative stability, the arrangements are stable; when there is change, the system responds by adapting or transforming.

## **5.2 Use of rapid assessment tools and heuristics**

The “Planning by Doing” approach involves case study participants’ views, experiences and knowledge to develop shared understanding and collective action. This content is obtained by deploying rapid assessment tools and heuristic devices.

When applied within a deliberate change process, these tools and heuristics are intended to build the capacity of users to:

- Better understand the nature of complex systems
- Identify critical dynamics of their particular systems
- Generate viable options for managing those dynamics to deliver the desired outcome.

Drawn from other research and practice or developed from our experience, these tools and heuristics challenge people to think about aspects of their social-ecological systems in ways that differ from the traditional linear planning and thinking approaches.

A full set of tools and heuristics are yet to be tested within one process or case study (this will occur in Murray CMA and in FNQ this coming year), but trialling and refining of individual tools or heuristics and combinations of these have been undertaken within this project and through external opportunities (see Section 6.4). From these trials we speculate that at the very least, application of a suite of tools in the toolkit will provide very significant engagement and learning opportunities for communities and at best will provide the catalyst for transformative change where this is desired. Further testing of the toolkit with partners will both refine the set of tools and techniques for applying them and provide important practical insights into the appropriate settings and constraints for deploying them.

A sample of the current suite of tools and heuristics within a developing toolkit include:

***Social-ecological systems:*** Defining social-ecological systems reliably is a major challenge. Existing tools (e.g. social network analysis, stakeholder mapping and key informant surveys) provide a strong theoretical and practical basis for identifying and engaging with stakeholders. Other approaches and tools are available for defining ecological landscapes (e.g. bioregional planning tools). Little attention has been given to defining social-ecological landscapes that capture and link social and ecological functions in an integrated “planning unit” that can underpin resilience assessment and planning. While eco-civic regional mapping (Reeve and Brunkhorst, 2007) provides the closest approach, it does not seek to engage the community in planning or change processes. We envisage hybridising these existing tools to develop an approach to both defining social-ecological units and engaging with key stakeholders within those landscapes.

***Historical timeline:*** Timelines of the major socio-political and ecological events that have shaped the structure, function and therefore identity of a region provide important insights and lessons to past and future dynamics. By recording these events in chronological order, patterns of change and linkages between socio-political and ecological events emerge. Historical timelines are also a powerful knowledge integration tool, allowing local and formal knowledge to be brought together. It is possible to combine this tool with the adaptive cycle (see Figure 5.2) and look at periods of relative growth and stability *versus* periods of turbulence and change, providing important insights as to where the current system may be sitting and where it could shift next. Timelines can also be used to engage and build relationships among stakeholders.

***Thresholds of potential concern (encompassing drivers of change, controlling variables and shocks):*** First developed in South Africa, the thresholds of potential concern (TPC) concept encapsulates one of the core concepts of resilience, that change in social-ecological systems typically is not linear or incremental but rather is punctuated by periods of sudden and rapid directional changes in the dynamics of a system. These sudden changes are caused by drivers pushing key controlling variables across thresholds or tipping points, beyond which changes in feedbacks reinforce and sometimes accelerate the shift. Shocks (unexpected, significant events that impact on the dynamics of a system) can push a system across a threshold. Understanding the dynamics of a system, where there are TPCs, how close the system is operating to those TPCs and what possible shocks the system might experience can provide powerful insights into the resilience of a system and its capacity to recover from these types of events. Discussions of thresholds of potential concern or tipping points are usually supported by examples and graphs showing how social or ecological systems can shift from one “state” to another after crossing a critical threshold tipping point in the underlying dynamics.

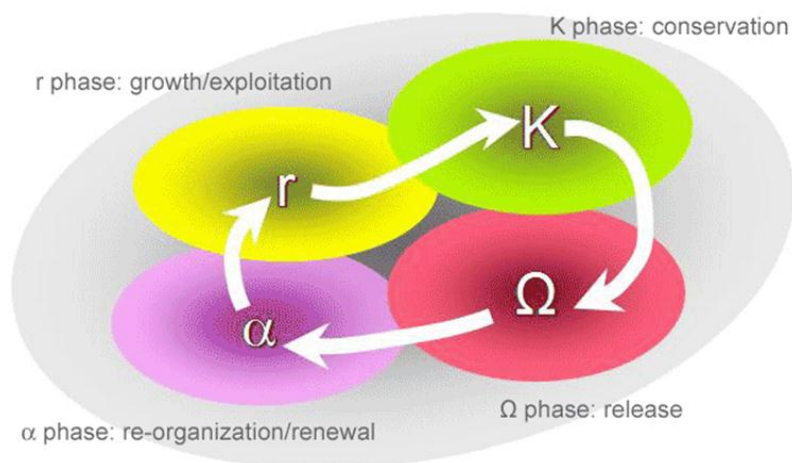
***Synthesis of scales, cross-scale linkages and thresholds (the 3x3 diagram):*** Outputs from discussions about scale (emerging from earlier discussions about social-ecological landscapes), interactions between scales and the impact of crossing and the knock-on effect (linkages) between thresholds can be summarised using a simple diagram (Table 5.1) that illustrates the key scales along one axis and the domains (social, ecological, economic) along the other axis. Thresholds of potential concern across these domains and scales can then be placed within the diagram, and linkages between these TPCs explored. This diagram has proven to be a useful synthesising tool and integrating tool.

**Table 5.1: Example of a synthesising diagram depicting scale, domains and thresholds of potential concern.**

Scale \ Domain	Farm	Landscape	Catchment
<b>Social</b>		Viable schools (x number students)	
<b>Economic</b>	Debt: income		Size of food processing sector
<b>Ecological</b>		Tree cover (%)	

**Conceptual models of change (state and transition models):** Once an understanding of some of the key dynamics of a system has been reached and any TPCs identified, it is possible to develop more detailed understanding of the dynamics of change for individual issues. State and transition models have been used by a wide range of biophysical scientists to describe the shift from one condition state to another for a particular ecosystem. We have experimented with this approach to capture social and ecological dynamics identifying the desired condition state, the drivers that push a system from one state to another, the shocks that might influence the dynamics, and points for intervention. These simple conceptual models of change have proven to be a very useful tool to support discussions and to build the capacity of stakeholders to engage in systems thinking and understand more complex concepts such as thresholds and feedback changes.

**The adaptive cycle:** The adaptive cycle is a theory of systemic change that identifies four distinct phases of change (r phase – regrowth; k phase – conservation and maturity; omega phase – release; and alpha phase – reorganisation) (see Figure 5.2). These four phases are generally organised into two larger dynamics: a relatively slow, organised change and stability (fore loop consisting of the r to k phases) and periods of rapid, disorganised change and instability (the back loop consisting of the omega to alpha phases). Understanding and recognising cycles of change are likely to be critical for people and organisations in managing deliberate change. Specifically, this heuristic provides important insights into *when* deliberate change is easier to introduce and more likely to succeed (the back loop) *versus* periods when it is more difficult to introduce (fore loop, late k phase). It may also provide some important insights into the historical dynamics of a system.



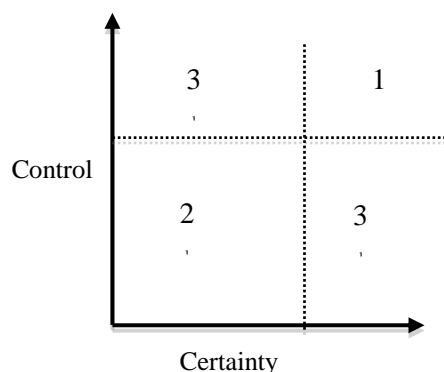
**Figure 5.2: The adaptive cycle (Resilience Alliance, 2011)**

**General resilience assessment:** Understanding general resilience (future coping capacity) is challenging. It involves trying to gauge how well a community will cope under some future stress. While published examples of attributes that confer general resilience provide some insight, these

attributes are often difficult to measure. During this project we have trialled new approaches to assessing general resilience and developed a new typology of general resilience attributes that has improved our capacity to communicate the concept and increased the ability of groups to engage in more informed discussions about the attributes that contribute to general resilience. This typology and approaches for assessing general resilience in workshop settings will be further tested with partners and stakeholders in future activities.

**Rapid appraisal of options for intervention:** Neither collective learning nor resilience assessment has a structured process for testing the effectiveness of any proposed interventions (or projects) aimed at catalysing transformation. We have developed a rapid appraisal approach to assess the likely effectiveness of proposed interventions or projects and, importantly, any unintended or secondary consequences of the proposed interventions. The appraisal process tests any proposed interventions against the systems understanding developed earlier, through a resilience assessment and analysis. The process can identify where and how the proposed intervention will deliberately change some of the critical dynamics controlling the system in its current configurations. Interventions that are unable to “disrupt” these dynamics are unlikely to be transformative in the longer term.

**Adaptation tools:** Two simple heuristics have been used to engage people and organisations in discussions about adaptation. The first is a simple diagram (Figure 5.3) that depicts two key elements of decision-making: the evidence on which to make decisions (certainty); and the power to influence the outcome (control) (Peterson et al., 2003; Allen et al., 2011). Trials using this heuristic with CMA Boards, to determine where any issue sits relative to the two axes (almost all issues in NRM fall outside quadrant 1), have provided new insights into technical, social and political dynamics. The types of strategies and approaches to decision-making that can be used in quadrants 2 and 3 can be explored and discussed.



**Figure 5.3: Simple heuristic for determining the dominant approach (adaptive or optimised) to decision-making (Source: Peterson et al., 2003)**

The second related heuristic revolves around a key evaluation question: *when is the signal strong enough (from the available evidence) to change the conceptual model underpinning decision-making about a particular issue?* This question integrates outputs from a number of the tools and heuristics above and drives the documenting of conceptual models of change and the assumptions that underpin those.

## 6 Case Studies

Consistent with the research design, work has been undertaken on three case studies during 2010-2011. A brief overview of these case studies is provided in Table 6.1.

**Table 6.1: Overview of the project's three case study areas**

Case study	Window of opportunity	Vehicle for change	Transformation pressures
Murray-Wakool	Integrated planning and reporting reform NRC guidelines for Catchment Action Plans	Community Strategic Plan Catchment Action Plan upgrade (Murray region)	10-year drought Redgum policy Water reform Population loss
Cape York	New community-based NRM body	Cape York NRM Strategy	Conflict Outside intervention Tenure change
FNQ	Resource-sharing agreements Regional development agenda	Revision of regional NRM plans Regional development roadmap	Economic vulnerability Opportunity to influence new NRM arrangements Climate change

Briefly, the key events for each case study to date are listed below.

### **Murray-Wakool**

- Governance baseline and one-year review
- Leadership and partner collaboration workshop
- Resilience workshop with futures network
- Resilience assessment, producing an issues paper for the Wakool community
- Community strategic planning workshop, generating potentially transformative action – community identified 12-15 ideas for taking action
- Working with community champions on ideas for transformative projects
- Draft plan for “Planning by Doing” for preparation of the *Wakool Shire Community Strategic Plan*, for the Department of Local Government by July 2012.

### **Cape York**

- Leadership workshop and development of a community engagement strategy
- “Planning by Doing” design workshop to tailor a framework for Cape York



- Initiation of two Indigenous engagement pilots
- Support for four innovative projects for Indigenous capacity-building to engage in NRM
- Strategic planning workshop with the Board of Cape York NRM Ltd
- Commencement of the development of a *Cape York NRM Strategy* based on “Planning by Doing”.

### **Multi-regional**

- Initial scoping meetings with potential partners
- Strategic planning workshops with Terrain NRM and Northern Gulf Resource Management Group
- Development of a preliminary project plan with partners for supporting a common approach to NRM across boundaries (resilience-based and multi-scalar).

## **6.1 Murray-Wakool**

The Murray-Wakool case study was initiated through discussion with the NRC, which identified Murray CMA as a potential partner. Murray CMA in turn proposed Wakool Shire Council as a collaborating partner in this project. Murray CMA was interested in exploring collaborative relationships with local councils across its area, and the research team was interested in the under-developed collaborative space between local and regional organisations. The project team was also interested in working with rural resource-dependent communities facing profound changes in access to the natural resources upon which their livelihood and identity depend.

The Wakool Shire Council area covers the westernmost end of the Murray Irrigation Area, and at the time of the project irrigators had received no water allocations for several consecutive years due to the prolonged drought. The outlook was for permanent reductions in irrigation allocations for the region through policy changes driven by concern for Murray-Darling Basin sustainability. At the same time forest policy in NSW was also changing, resulting in partial closure of River Redgum industries in the Shire. An outside-in or forced transformation seemed the likely outcome for the Wakool community. Combined with new leadership teams in partner organisations, both seeking to rebuild after governance failures, and new legislation for community planning at the local scale, there seemed to be a window of opportunity for intentional transformation to living with changed access to water and forest resources.

In early scoping and trust building with Murray CMA and Wakool Shire Council (see Griffith et al. 2010), interviews were conducted with key leaders from both organisations to develop a governance baseline from which future governance shifts (and hence transformability) could be gauged. The process was repeated one year later in December-January 2010-2011. By December 2010 a partner collaboration workshop for organisational leaders and a resilience workshop had been conducted. A “Planning by Doing” process for developing a community strategic plan (CSP) as a vehicle of change had been negotiated and a preliminary resilience assessment developed for the Shire. Ironically, by the time an issues paper had been prepared based on the resilience assessment, the drought had broken, and Wakool Shire like many other parts of Australia was experiencing floods.

The following assessment against the project aims (i.e. progress with building transformability) is based in part on quotes taken from the second round of interviews with key organisational leaders (without naming the sources). The assessment criteria used are the starting set of five transformability factors: leadership, self-organising networks, deep reflection, capacity to assess change, and bridging

mechanisms. The lessons in boxes are process lessons which have been used to improve design and partner relationships in Cape York and FNQ.

Overall, success with building transformability in Wakool Shire community and its support organisations has been mixed. The community has not embraced change and is probably still in denial of the need for significant change.

An influential factor was the end of the drought:

Now it's rained and it's put a different view on it ... it's rugged and hard in drought. It's ugly and it's depressing and it's hard when it's so hot and it's so dry ... The rain hasn't made it better. It's made it easier. People's spirits have lifted ... it just feels nicer. Life feels easier, when it's green.

With the end of the drought came greater optimism that life could improve, necessarily turning attention away from a crisis position and the possibility that a transformation of how the surrounding system functions was required. Yet the collaborative thinking of the research team and partners had already moved beyond the notion that an intentional transformation of the entire system was required, as eloquently put by one interviewee:

At the start of the project people were assuming that there would be a transformation, whereas I think we've moved on from that a little bit to acknowledge that it's more about the process of change rather than the end point of where the journey is taking us. And if the extent of the change means that there's a transformation, then that's where we'll head. But at the start we were making the assumption that there would be a transformation, whereas at the moment I think we're talking about the transformability of the environmental and social systems.

This shift from focussing on the transformation we expected would be imposed on Wakool Shire, to

**Key lesson:  
Transformation by little  
steps**

building the capacity for transformative action to bubble up from below, was partly a result of discussions at the resilience workshop in Barham in June 2010. The workshop was useful in clarifying the difference between transformation of the whole social-ecological system at the Shire scale and transformative experimental action at local property or township scales. This

led to greater community interest in the project.

However, the researchers overestimated the “readiness” of Wakool Shire to move to new arrangements for “Planning by Doing”, and hence the momentum with community members at the June workshop was lost.

There are some positive signs of transformability within the Council and the CMA and small indications of momentum in the community.

Strong leadership is emerging in the Murray CMA. Its Board has recently resolved to adopt a role as a change agency and to explore how it can work as a bridging organisation. Institutional arrangements to devolve decision-making have been put in place, enhancing networks and trust. One key leader has demonstrated capacity to boundary span, support innovation, motivate other staff and navigate with few reference points and has now absorbed a formidable understanding of resilience as it might apply to NRM. The capacity has also been diffused slowly through the organisation based on “learning by doing”.

The story in Wakool Shire Council is one of initial caution among elected and staff leaders, followed by a short period where one leader exhibited transformative leadership skills, followed by a severe shock to the system and momentum when that leader left the organisation. In the resultant vacuum, there was an initial retreat to “business as usual”, which has now given way to a more open position.

As this was happening a new champion has emerged who has demonstrated many of the known attributes of leadership for transformability.

At the commencement of the case study neither Murray CMA nor Wakool Shire Council had built high levels of trust with their shared communities, a not unexpected situation, given past governance

**Key lesson: Effective networks cannot be set up like working groups**

failures. Networks are repositories of trust and social capital. A rudimentary network analysis designed to reveal self-organising shadow networks suggested two or three key individuals as central to innovation in NRM, but no networks from a council perspective. In response, a new network (Resilience/Futures Network) was established

through this project to work through resilience and change. It comprised people considered by Council and to some extent the CMA to be “safe”. The key innovators identified above did not attend. Group members were initially very enthusiastic, but over time the group became a forum for officials from Council and CMA, and the community for various reasons drifted away. We have since uncovered self-organising shadow networks which are not engaged in the community strategic planning process but are focussed on other “more important” processes such as water reform. This highlights the need to take time in the early scoping phase of change processes to undertake well-designed network analysis to identify and engage existing shadow networks.

The Murray-Wakool case study wasn’t instigated or driven from the bottom- up (NRC→CMA→Council→Community), and hence participation was not driven by an inside-out perspective. The support organisations had limited linkages to the community when we started the

**Key lesson: How engagement occurs with intentional change is very different depending on the motivation(s) of partners and community (inside-out)**

project engagement. Therefore, collaboration with the wider community has been difficult to build and maintain. The limited community drive for change – and for transformative action – was always at risk of dwindling, as outsiders were perceived to be driving the change. A clear example of this is the Resilience/Futures Network discussed above.

In hindsight, it is apparent that the level of mistrust in the community about decisions taken, with little or no involvement of those affected by those decisions, was significant for partner-community relationships and engagement in the CSP. The two partner organisations tasked with representing their communities were also viewed by some as outside or disconnected from the community. Both the Murray CMA and Wakool Shire Council expressed a need at the outset for strategies to engage their communities better, and at the time of the interviews acknowledged the benefits they had received.

From Murray CMA: “It’s our involvement with this project that’s given us a skill set that ... has influenced the way we see and hear our community and our role in influencing our community.” For example:

We’re becoming much more aware that there are other agents for change out there that we’ve either been duplicating what they’ve been doing or they’ve been duplicating what we’ve been doing. But it doesn’t matter that there’s repetition out there ... We should be creating resilient communities and ... so we’re going to be having a lot more overlap and interdependencies between agencies and entities.

Wakool Shire Council also noted the influence of the project on how it engages their community: “There’s been a real change in how we actually talk to the community... it’s very much more inclusive and I think people really are listened to in a way that will make a difference ...”

These views of the value of the project have not remained constant, and the following serves as another example of the need for inside-out drivers. A Wakool Shire Community Action Workshop was organised in April 2011 by the research team. The workshop did not engage and build the community's capacity for action as well as had been anticipated. The workshop process on the day was below expectations, and this resulted in disengagement and disappointment on the part of many key participants. On reflection, it may have been more effective if the workshop design had had greater involvement and ownership of the community, rather than the research team and partner organisation driving the process.

An important lesson from this experience is that there was a disconnection between work on the resilience assessment, the community workshop and the needs of the CSP. An Issues Paper, prepared by the Wakool Shire Council (based on a resilience assessment developed by the team through the Futures Network) was circulated to all members of the Wakool Shire community. While this paper was intended to bridge the resilience and collective learning processes, it was not given any prominence at the community workshop, thereby losing the connection.

The decision to deliver the processes (collective learning and resilience assessment) separately and our expectation that the two processes develop synergies as progressed in practice are explained by

**Key lesson: Resilience and collective learning tools do not work as effective tools for transformative action when used separately**

Griffith et al. (2010). Partners were looking for practical ways to integrate resilience thinking with collective learning, but when an integrated package was not presented they just picked out what seemed to work well for them in their contexts. As one person from Murray CMA put it: "for local communities and for the CMA, it's been about picking the bits that work best for us – to deliver the results that we're

looking for – and not worrying too much about how well they link in a formal sense", while another person suggested that the ideas "can't be separated in my head ... it's all part of the whole thing, isn't it?".

Partner organisations and community members consistently raised with us the difficulty of the language related to the key concepts.

Maybe that's our influence back to the researchers. You might have a really good concept but if you can't communicate it we'll walk away from it quicker than you can see the dust settle. So I've enjoyed that part of the project change where we've been able to influence a bit of reality in how it has been delivered.

**Key lesson: New ideas must not be instructed but transferred to local change agents in their own contexts and languages**

There were a number of circumstantial factors which undermined the extent to which desired outcomes from the Murray-Wakool project were achieved. Foremost was the loss from Wakool Shire

**Key lesson: Loss of champions and leadership can have a significant effect on the direction, pace and scale of change**

Council of key champions for the project. While there were still others on the Council and in the organisation inspired by the opportunities the project could provide, there was a significant loss

of impetus and intellectual capital. This, of course, points to the need to consider succession planning, and how to build and maintain key champions, who may not be in leadership positions.

Our experience with working in Wakool Shire is that people do not identify with a community designated by an administrative Shire boundary.

**Key lesson: Administrative boundaries may disguise the most appropriate focal scale for analysis**

Instead, “identity” is shaped by proximity to certain towns or by other landscape factors. Early in the resilience assessment workshop, the discussion to identify a focal scale social-ecological system was predominantly led by organisational leaders, with little debate from community members. Although the Shire boundary was agreed, as the project has progressed it has become apparent that selection of an administrative boundary as a boundary of a social-ecological system has not aligned with how communities identify with the landscape and each other. In Wakool Shire we heard comments that people from other towns felt marginalised by the local dominance of Barham. It is clear that greater attention needs to be placed in the scoping phase to the definition of social-ecological system boundaries, taking into account different perceptions.

The case study has one more year to run, although the design will change. While the team will still be working with Wakool Shire Council as it builds its CSP process, Murray CMA will shift its focus to development of its Catchment Action Plan upgrade. The re-design addresses the needs of the Murray CMA more explicitly and includes capacity-building and skills transfer. It also provides an opportunity for the CMA to benefit more directly from its significant financial and other investments in the project to date.

## 6.2 Cape York

The research design called for a second case study in which the focal scale for decision-making was regional. The idea was that learning gained through working with organisations and communities making decisions at the local scale (Wakool Shire), and experiences with regional/local scale leadership collaboration (Murray-Wakool), would be transferred to assist a regional NRM body collaborating with multiple localities to build transformability at nested local and regional scales.

An opportunity arose in July 2010 with the establishment of Cape York NRM Pty Ltd as the recognised regional NRM body for the Cape York region in north Queensland. Unlike Australia’s other 55 NRM regions, funding flows, decision-making and engagement by community in NRM was fragmented, uncoordinated and often divisive. The new Board was elected by Cape York people after an extensive consultation process, to transform the way NRM was managed on the Cape (Cape York NRM Formation Steering Committee, 2009). Six of the ten Directors on the Board are Indigenous.

The Chief Executive Officer had previously engaged with the *Transformation for Resilient Landscapes and Communities* project during the scoping study phase and was keen to take a holistic, participatory and resilience-based approach to NRM in the region. Initial discussions with the Board resulted in agreement to adopt a community-driven “Planning by Doing” approach to managing change, in recognition of the history of too many top-down plans and not enough “doing”. This affinity with communities on Cape York stands in direct contrast to the relationships which both Wakool Shire Council and Murray CMA had with their shared community at the commencement of that case study.

“Planning by Doing”, as the name implies, can start with the doing, the planning or with reflection. The approach chosen by Cape York NRM has been to start in all three places in parallel. The key processes developed and now in progress include:

- Working with the Cape York NRM Board and staff at a whole-of-Cape-York scale to develop a strategic plan by 2013
- Active engagement of individuals, organisations and communities in discussions of healthy country at community scale. This includes trialling of community-scale “Planning by Doing” processes in two pilot communities in the Coen and Northern Peninsular areas

- Establishment of four new projects to build capacity of Indigenous communities to work collaboratively on design and implementation of NRM projects
- Review of existing plans and activities, including evaluation of existing larger NRM projects to inform transition investment.

These activities take into account the lessons from the Murray-Wakool study. So far, they have provided direct opportunities to tailor and test improvements to the “Planning by Doing” process and tools and to develop new toolkit components, including a “Planning by Doing” process specifically tailored for Indigenous communities on Cape York. As all processes are in the early stages of implementation, lessons so far are general and conditional on further evidence.

The initial engagement with the new NRM Board (Bamaga, October 2010) was through a standard collective learning workshop. Unlike Murray-Wakool, no attempt was made to introduce or explain resilience or adaptive governance or to provide any theory behind collective learning. The workshop successfully delivered a set of principles for community engagement in NRM on the Cape and in particular for Indigenous engagement. These principles were later used to design an engagement strategy. Included in the engagement strategy was the establishment of two pilots to test how the three key concepts could be integrated with Indigenous forms of communication to deliver a local NRM strategy and transformative projects.

An initial process for undertaking the Indigenous community pilots was developed jointly with Cape York NRM staff in January 2011. While we had previously tried to use collective learning principles to improve resilience workshop techniques in Murray-Wakool, this was the first opportunity to use resilience thinking to improve the collective learning process. The shift was made possible by moving away from the usual workshop format, which was considered to be unsuited to Indigenous engagement. Instead, the design process started from scratch, drawing on principles from both resilience assessment and collective learning, as well as on the lessons learnt from the Murray-Wakool experience. The following steps were developed:

1. Trust building: This may take one to several visits to establish. The visits also assist with early scoping of issues important to the pilot communities as well as to arrive at a focus question to drive collective learning.
2. Sharing ideals: This is based on the notion of “healthy country”, a term which Cape York NRM had agreed to use wherever possible, instead of the term, “natural resource management”. Healthy country has inbuilt social, ecological and economic dimensions and is deeply intertwined with governance.
3. Exploring how country and people have changed: This includes using resilience tools such as timelines to look at how events have changed the community, and the intended and unintended consequences of these changes. It also involves working through how the current situation may assist in meeting ideals and what may inhibit meeting those ideals.
4. Imagining innovative ways of meeting ideals: These take into account how country and people are changing.
5. Collaborating to put together projects which turn imagination into action: These projects would form the basis of local action plans for consideration in the Cape York NRM investment strategy.
6. Working with project teams to examine potential scenarios and set up community monitoring: These include the unintended consequences of projects.

The process is currently still in the trust-building and scoping phases. The idea is to reframe the systemic knowledge provided by Indigenous participants into resilience terms and relay this back to communities and the Board.

By the time of a second workshop with the Board (Cairns, May 2011), designed to identify the key elements of a strategic or corporate plan for Cape York NRM, an approach to synthesising resilience assessment and collective learning processes had been developed. This allowed testing of some heuristic devices for a resilience assessment at the “what is” phase of the collective learning process, and the introduction of a more overt focus on transformative action (particularly to stimulate double-loop learning). The devices worked very well with the Board, both from the perspective of eliciting information to inform strategic planning and from the perspective of learning about resilience of Cape York as a social-ecological system. The devices have since been further developed for addition to the toolkit.

In relation to the transformability criteria at this early stage of the partnership, and keeping in mind that a governance baseline is yet to be established, there are key differences emerging between Cape York and Murray-Wakool:

- Where leaders in Murray-Wakool organisations were generally inward-looking in the early days of the study, leaders in Cape York NRM have demonstrated willingness to boundary span, and ability to recognise and use windows of opportunity and embrace new social structures from the start of the project.
- In Cape York there are a number of shadow networks operating; Cape York NRM Ltd knows of them and has built bridges to these networks. There are also very well-developed knowledge networks, although connectivity between networks is less well-developed.
- Cape York NRM was established around the need for collaboration and a devolved governance model. While it was not aware of the term, “bridging organisation”, it is behaving as one.
- Identity is also emerging in Cape York as central to transformability. In Cape York the identity at a regional scale is very strong, as it is at local scales, following cultural boundaries and forming a set of more or less nested identities.

It is too early to test the ability to assess the need for different types of change, although in workshops Directors of Cape York NRM were able to choose between “business as usual”, adaptation and transformation. Similarly, it is too early to provide results in relation to deep reflection/double-loop learning.

### **6.3 Far North Queensland**

The research design also calls for a multi-regional case study to explore the benefits of cross-regional collaboration in taking intentional transformative action. A number of cross-regional groups were considered as a potential case study. These include the Rangelands Alliance and a group of NRM regions in FNQ which had begun resource-sharing discussions. The latter group, which included Terrain NRM, Northern Gulf Resource Management Group and Cape York NRM, were also involved in regional development planning with Regional Development Australia Far North Queensland and Torres Strait Inc.

Initial discussions in December 2010 established that this group of organisations was interested in exploring beyond resource-sharing arrangements and could see the need to embrace new ideas for NRM. Further workshops and meetings with individual regional bodies established that all were facing external transformative pressures and were keen to take a proactive approach. The third case study was scheduled to commence in July 2011.

At a recent partner meeting, representatives from each region scoped the aims, outcomes and initial steps of a multi-scale long-term study, with a strong request to RIRDC for funding support over five years. Partners considered that this amount of time would provide the opportunity for transformative change to be realised. Funding for the FNQ case study has since been approved.

## **6.4 Extending the community of practice**

Opportunities have arisen to trial and refine elements of the transformation (practice) toolkit with a range of organisations (Table 6.2) outside this research project. They have included varying institutional and social contexts, with differing maturity and capacities, all of which are factors likely to be important for the success or otherwise of deliberate attempts at substantive change.

In particular, the current review of regional plans in NSW, South Australia (SA) and Victoria has provided an opportunity to learn from organisations embarking on strategic planning processes and has provided additional real-world testing of the “learning by doing” approach. These external activities also test the research team’s ability to communicate the outputs from this project to a wider audience.

Additionally, involvement of members of the project team in the development, running, evaluation and now institutional and on-ground implementation of the Catchment Action Plan pilots with Central West and Namoi CMAs in NSW provides both a benchmark for resilience-based planning and an ongoing learning opportunity to test outputs from this project.



**Table 6.2: Organisations and activities external to the project where components of the developing transformation toolkit have been trialled**

<b>Regions</b>	<b>Components of the transformation toolkit trialled</b>
Hunter Central Rivers CMA, NSW	Variation of the rapid resilience assessment approach tested through an expert workshop on estuaries
Lachlan CMA, NSW	Collective learning process trialled during an initial strategic planning day  Strategic planning process for Catchment Action Plan developed with senior staff, based on the transformation toolkit  rapid resilience assessment approach used during staff capacity-building workshops
Border Rivers Gwydir CMA, NSW	Strategic planning process for Catchment Action Plan developed with senior staff, based on the transformation toolkit
Namoi CMA, NSW	Adaptive governance and management planning using “adaptive tools” from the transformation toolkit
Joint Rangelands CMA workshop, Broken Hill, NSW	Trialled variation of the rapid resilience assessment approach as part of a broader workshop on Catchment Action Planning for western CMAs in NSW
Coastal CMA’s Collective, NSW	Capacity-building process developed using the transformation toolkit. The capacity-building process will use individual tools at various stages. Regional staff will then use these tools in their own planning and community engagement process in each CMA.
Goulburn Broken and North East CMAs, Vic Adelaide and Mount Lofty Ranges NRM Board, SA	Design of strategic planning processes based on the transformation toolkit, for development of new strategic documents to guide future investment in these regions. These planning processes are currently in various stages of implementation, during which specific tools will be tested.
West Gippsland CMA, Vic South Australian Murray Darling NRM Board	Proposed approaches to strategic planning processes based on the transformation toolkit

## 7 Progress towards Project Aims and Objectives

The section provides an assessment of progress towards the project aims and objectives (what has been learnt) which in turn leads to an overview of what remains to be done (how can the lessons be incorporated into future activity).

In the spirit of participatory action research, this is done by bringing funding organisations, on-ground partners from different case study regions and the research team together to evaluate progress and work together on improving processes, tools and future work plans. A partner meeting was held in Cairns in the first week of July 2011. In addition, a separate evaluation meeting was held with Murray CMA in late June.

Progress against each objective is set out below.

**Objective 1:** To explore the contribution that resilience thinking, collective learning and adaptive governance can make to rural resource-dependent communities facing significant resource, social and environmental challenges

It is too early to make any definitive claims in relation to this objective. What we can say is that new partners are attracted to the reasoning behind why these concepts would be useful in theory and to arguments for conceptual integration. As longer-standing partners gain a deeper understanding of the concepts, they are starting to see more rather than less potential.

Of the three concepts, adaptive governance is perhaps having the greatest impact. Yet, it is the least well-integrated into the emerging conceptual framework. There is evidence of significant shifts in governance arrangements in the Murray region, driven by adoption of new thinking by CMA leaders. The latest NRC audit demonstrates the shift over two years, and recent decisions by the CMA Board on an approach to the Catchment Action Plan upgrade would support a conclusion that this journey of innovation is continuing. In Wakool Shire the dynamics of governance have been less purposeful and, at times, chaotic in pace, scale and direction, although there is recent evidence of shifts in thinking from a number of key leaders after a period of upheaval. In Cape York we are still working on a governance baseline, and leaders have not been exposed to the details of adaptive forms of governance as they were early in the Murray-Wakool context. Notwithstanding that position, governance has emerged from our scoping phase as the critical issue, particularly among Indigenous communities on the Cape. In FNQ our five partners have indicated that inter-regional governance links, i.e. the links between regional bodies and governments, is a crucial area for attention.

Resilience, by contrast, is the concept receiving the greatest attention from partners, particularly regional NRM bodies. This is not surprising, given its prominence in the NRM world at the present time. Resilience has remained a difficult concept to operationalise at the community planning scale in Wakool and has not gained much support from local government as a planning tool. It has gained more traction among the NRM partners. However, in the current workbook form it is a resource-intensive process. This project is concentrating on trialling rapid assessment processes which recognise the resource- and time-poor situations of many NRM bodies.

The initial research design took into account criticism of resilience from a social science perspective, suggesting a lack of consideration of well-understood social processes such as institutions, reflexivity and agency. We originally saw scope in this project to address these criticisms.

Collective learning has also had mixed results. We have used it successfully as a stand-alone workshop process. However, there was one pivotal event which failed to meet expectations. Several of the research team and at least one champion are now using the process in situations outside the

project, again with considerable impact. What we have not been able to negotiate effectively with partners is the principle of ongoing learning through multiple engagements.

Efforts from this point on will be directed at improving the integrated approach and tools which are being developed from all three concepts.

**Objective 2:** To draw on and enhance synergies between these concepts to develop a transformative “learning by doing” framework for rural resource-dependent communities to undertake an intentional transition in anticipation of emerging risk

After a very slow start, more rapid progress is now being made against this objective. Initial attempts failed to achieve conceptual integration, resulting in a cumbersome “Planning by Doing” process for community strategic planning in Wakool Shire.

As has been explained earlier (Section 4), while resilience and adaptive governance (in the way it is applied in resilience thinking) have a history of co-development, social learning and collective learning have until recently been absent from the resilience discourse. The assessment framework for resilience, embodied in a set of workbooks, is deeply grounded in systems analysis, which traditionally starts with problem definition and works through a rational and often expert-driven process of developing models of the way the system works (variables, feedbacks and thresholds) and then explores appropriate leverage points for system intervention. Governance is often identified as one of those leverage points. Collective learning starts with the assumption that the problem is fuzzy and ill-defined, with multiple perspectives deriving from different knowledge cultures, and then sets up the conditions for learning the way through the complexity.

By taking a step back from the established resilience and collective learning processes to the principles behind the tools, and allowing ourselves some creative licence, a conceptual framework which draws on synergies between concepts and key transformability influences and is based on “Planning by Doing” is starting to emerge (Section 5.1). Some testing of components of the emerging framework has already been carried out in Cape York, and the learning is being incorporated into improved “Planning by Doing” models for the Catchment Action Plan upgrade in the Murray region and into the overall design of the FNQ case study.

**Objective 3:** To apply and test the framework in different community, resource risk and climatic settings and at different scales in order to develop a set of tools appropriate for the participant’s situation, rather than a “one size fits all” model

Progress with testing has been hampered and delayed by a combination of lack of progress with conceptual integration, changes in environmental conditions and key staff in Wakool Shire, and a severe and prolonged wet season until early May 2011 in Cape York. As a counter-balance, the opportunities to test tools outside the case study framework (Section 6.4) has been much more extensive than anticipated.

**Objective 4:** To build the necessary trust, agency, collaboration and adaptive governance arrangements with partners and communities to enable them to undertake intentional transitions

The participatory action research relationship between researchers and partners has not progressed as anticipated, despite considerable effort by all parties. This is not a new phenomenon, and there are many accounts in the literature of similar experiences (Waltner-Toews & Kay, 2005). However, an

important distinction needs to be made here between the trust that is needed to allow partner organisations to work with researchers, and the actual building of trust, agency, collaboration and adaptive governance arrangements among stakeholders in the case study regions.

In the Murray-Wakool case study, researchers focussed too heavily on the first type of trust. Using an assessment tool, it is has been possible to track change in governance from a baseline. By way of interviews and observations, we are also able to make some assessment of collaboration. However, assessing shifts in agency and trust needs more attention and has not been done well to date.

In Cape York and FNQ trust in the research, the team and the concepts has not been an issue. This may be due to self-selection as a partner and prior engagement in the scoping study. From this position and with some tightening of the participatory action research model, there has been a more rapid progression to working on the ground to address trust, agency, collaboration and adaptive governance internally within regions. New methods of setting baselines and partner-driven tracking/evaluation of change are being developed.

**Objective 5:** Develop strong inter-connections between each of the case studies so that learning gained in one setting can be extended and transferred

This is the first year in which separate case studies have been operating, and so experience is limited. However, within the bounds of resources and time – always important factors – there has been willingness among partners to share and learn from each other. Two very successful partner meetings were held in Albury in November 2010 and in Cairns in early July 2011. The Cairns meeting had representatives from Wakool Shire Council, Cape York NRM, Terrain NRM, Northern Gulf RM, NRC, RIRDC and a potential new partner in Ecotrust Australia. A representative from Central West CMA had to withdraw at the last minute due to family issues but had been invited by a partner to share experiences with resilience in NRM planning in NSW. The exchange will now take place separately.

The lessons from the Murray-Wakool experience have been used extensively in the design of the change process in Cape York and are now being applied to our new multi-scale case study in FNQ. Some key lessons and plans to take those lessons forward are set out in Table 7.1.

**Table 7.1: Lessons learnt which are guiding future design and trialling of processes and tools**

Major lessons to date	Improvement opportunities
<p>Transformation by little steps</p> <p>Adaptation and transformation are not opposites. It has become apparent that transformation at a scale below may be necessary for adaptation at the focal scale.</p> <p>As the project has progressed we have moved from talking of system transformation to taking transformative action in key parts of the focal scale system.</p>	<p>The project conceptual model is being modified to make these relationships more explicit for partners and communities.</p>
<p>Administrative boundaries may disguise the most appropriate focal scale for analysis and management. Experience with developing a resilience assessment for the Wakool Shire and subsequent engagement regarding transformative projects have revealed that communities did not readily identify with the Shire boundary but with landscapes associated with their communities.</p>	<p>The engagement process has been modified to start with a scoping phase, part of which is to explore the communities' relationships with the landscape (identity) to identify appropriate focal scales.</p>
<p>Resilience and collective learning tools do not work as effective tools for transformative action when used separately. The partners were confused by two change processes and consistently asked for them to be combined.</p>	<p>The team has built a new framework (see Figure 5.1) which will be tested in the Murray CMA over the next 12 months and will form the basis of the FNQ project.</p>
<p>No single best way to build capacity for intentional transformation</p> <p>The toolkit should allow for different starting points and mental models and a choice of suitable tools, backed by practice notes and narratives as guides to implementation.</p>	<p>This will be taken into account in designing a "Planning by Doing" process for FNQ.</p> <p>The toolkit design is following this lesson.</p>
<p>Our experience has reinforced that the transfer of new ideas to communities interested in change, and even to leadership groups, cannot be instructed but must be learnt in the community members' own contexts and languages.</p>	<p>For new case studies the application of integrated resilience and collective learning tools will be based wholly on a "learning by doing" approach. More emphasis will be put on joint process design and language to overcome these difficulties.</p>
<p>How engagement occurs with intentional change is very different, depending on the motivation(s) of partners and community.</p> <p>The Murray-Wakool case study wasn't instigated or driven from the bottom up</p> <p>(NRC→CMA→Council→Community).</p> <p>The support organisations had limited linkages to the community when we started the project engagement, making collaboration difficult to build and maintain.</p> <p>The Cape York project, however, is driven from the bottom up, with active engagement and collaboration at many levels. The support organisation is well-coupled to community.</p>	<p>The approach for the FNQ project is to spend much more effort scoping the linkages between support organisations and their communities to understand the motivation(s) for intentional change. This will provide additional ideas for the project practice notes.</p>
<p>Champions appointed by organisations may not be organisational change agents, and formal leaders are not always the "real" leaders in communities.</p> <p>Loss of champions and leadership can have a significant effect on the direction, pace and scale of change.</p>	<p>Leadership and success planning are areas that require much greater partner consideration.</p> <p>In all case studies, efforts will be made to explore the ways in which a shift can be made away from reliance on a single change agent.</p>

Effective networks, necessary for transformative action, cannot be set up like a working group. A group of “safe” people was established to act as a futures network. It has not demonstrated any momentum or self-organisation. The research has confirmed that shadow networks exist already in the community but become invisible when not respected by other processes.	An improved governance baseline approach involving network analysis has been developed and is being trialled in Cape York. This will be extended, if successful, to new case studies.
---	---

**Objective 6:** To explore alternative methods of extending and transferring the learning from the project to other resource-dependent communities not involved in the case studies

It is too early in the project to discuss progress toward this objective in any detail. A framework for a transformation toolkit is outlined in the final section of this report. There has also been considerable diffusion of learning from the project already (see Table 6.2).

## 8 Next Steps in the Project

The project now has an additional five years of in-principle funding support from RIRDC as a “flagship project” of their Rural Communities Program. This will involve:

- Completion of the Murray-Wakool case study by the end of 2011-2012
- Integration of the current Cape York and proposed FNQ case studies into one exciting multi-scale study over five years.

The following sections summarise how the project is likely to unfold, given current commitments and knowledge.

In all case studies we have resolved to be more overt in negotiating change processes and activities with partners, in order to be more prepared for abrupt shifts in planned activities. We are also committed to pulling back from actual engagement and facilitation work on the ground, in preference for our partners to undertake those activities with guidance from researchers. This will mean greater attention to skills transfer and spreading the engagement as widely as possible within partner organisations to avoid the potentially critical impact of loss of champions.

There will be a shift in project emphasis, with less on conceptual development and more activity on:

- Testing of the concepts
- Evaluation and dissemination of the research findings
- Toolkit testing through an emerging community of practice.

Researchers will evaluate what has been learnt about transformability and building transformability, while partners will evaluate how and whether change has occurred and how the new thinking has helped address intractable problems.

### 8.1 Development of collaborative reporting for Wakool Shire Council

The window of opportunity for Wakool Shire Council to become involved in this project was through the introduction of an integrated planning and reporting reform for local governments in NSW. The collaborative work so far by Murray CMA and Wakool Shire Council has focussed on the planning aspect of this reform, involving the development of a community strategic plan (CSP).

While not delivering the NRM benefits for the CMA originally envisaged by CMA leaders, and despite significant upheavals and changes in environmental conditions, the Council has managed to build a draft CSP. In the process, new champions for a collective learning/resilience-based approach to planning have emerged within the council staff and in the community. Potentially catalytic projects have also been designed by community members and are currently being developed further and their potential for transformation assessed. However, the reporting aspect of the reform is yet to receive an adequate level of attention deserving of an integrated planning and reporting package.

With the assistance of a grant under the Australian Government’s Strengthening Basin Communities Program, Wakool Shire Council is now seeking to build a reporting framework which allows the community to track progress with both its strategies under the CSP and with projects developed through collective learning. The research team and Council have recently agreed on a process for progressing this reporting framework and the remaining aspects of the project over the next year.

Consistent with the directions explained in this progress report, future activities will identify practical ways to re-integrate resilience thinking into the planning process, both in terms of a deeper assessment of the actions proposed and an assessment of how the plan is packaged and communicated as integrated planning and reporting. These activities will provide guidance and support to Wakool Shire Council staff who will take the lead in design and delivery.

The team has already commenced work in creating a rapid appraisal tool for projects that people within the Wakool Shire Council have championed. Through observation and coaching, we anticipate that Wakool Shire Council staff and Murray CMA staff will be able to use this tool to assist project champions to make a strategic appraisal of the projects' consequences and how its outcomes could be enhanced. We will also draw on the resilience assessment undertaken for Wakool Shire to develop materials that can be used to explain the strategy behind the CSP and how that plan is communicated to the public. Finally, we will provide support to the Council in its efforts to strengthen a network of change agents supporting the CSP.

Murray CMA is committed to supporting this process by collaborating on some projects and by sharing in the learning and capacity-building. This support and collaboration furthers Objective 5 and provides the basis for Murray CMA to extend this kind of collaboration with other councils, potentially contributing to Objective 6.

## **8.2 Re-design of Catchment Action Plan process with Murray CMA**

For the Murray CMA, involvement in the project has been driven by both a need to rethink how the social and biophysical aspects of NRM can be better integrated, leading to improved performance, and by the need at some point in the future to embark on an upgrade of their Catchment Action Plan. Both involve building the skills and the capacity within the organisation to use resilience tools and thinking.

As the Murray-Wakool case study became more orientated towards delivering the CSP and more effort was required to adjust to shocks such as loss of key champions, the breaking of the drought and release of the Murray-Darling Basin Plan, not enough attention was paid to Murray CMA's expectation of skills transfer.

A further motivation for Murray CMA was our proposition that collaboration with local government was a largely undeveloped opportunity in NRM, particularly given the new integrated planning and reporting arrangements. This included the opportunity to share community engagement and tap into local networks. As it turned out, the strained relationships Wakool Shire Council had with its community proved to be a difficult impediment to overcome. A problematic collective learning workshop aimed at identifying key strategies for the future of Wakool Shire Council worsened the situation. As a result, innovation in relation to NRM did not emerge. Whether typical or not, the Wakool experience has led to a conclusion that perhaps the transaction costs of such collaborations in the context of local planning may be too great for collaborative efforts to serve as an effective mechanism for delivering transformative change in NRM. This realisation and a remaining vacuum in the transfer of skills, particularly for managing resilience, have led to a rethink of the way forward with the project.

A new agreement for the 2011-12 year, based on the Catchment Action Plan upgrade, has now been reached between the research team and Murray CMA, although the option of not proceeding at all was considered by the CMA. Given that skills and capacity transfer has been inadequate for their needs, a key aspect to our approach in the future is for Murray CMA staff to take a greater lead in activities and design, with the research team providing support, guidance and training.

For the Murray CMA, an initial practical concern is to consider and define the appropriate social-ecological scale at which a change agency can be developed for effective interventions in the system



to meet CMA objectives. The dilemma is that the concept of a social-ecological system implies multiple scales as it is, according to Griffith et al. (2010)

“a term to capture the idea that a particular place (or landscape) is a complex, dynamic and self-adjusting system that involves interactions and linkages at a range of scales between the social world and the ecological world wherein that place is situated”.

Therefore, identifying an appropriate scale involves understanding the objective as well as the social fabric through which the objective needs to be met. Our learning from the Wakool experience is that a key component that has been missing is to identify the scales at which communities identify with each other and the landscape. This will be addressed in the Catchment Action Plan upgrade process design.

The Catchment Action Plan process will be re-designed through regular face-to-face meetings involving Murray CMA staff and members of the research team. The objective is for practical outputs to be incorporated into Murray CMA’s Catchment Action Plan as the planning vehicle, while also addressing governance issues associated with planning, potentially finding opportunities to redefine governance arrangements to allow a more adaptive approach to planning and implementation.

The intention is that by mid-2012, having worked on the re-design of Murray CMA’s Catchment Action Plan process, the team and Murray CMA will be able to publish, as co-authors, a refined version of the “practice toolkit”, with an accompanying compendium of tools and practice guidelines. This package would be written for NRM organisations in such a way that the organisations could adopt it for application in their own contexts. The work with Murray CMA will provide an indication of how much external support may be needed to operationalise the tool kit.

### **8.3 A way forward in Far North Queensland**

The four regional partners in FNQ and the FNQ Board of Regional Development Australia have agreed to consolidate the Cape York and FNQ case studies into one multi-scale study, in recognition of the importance of cross-scale interaction in managing resilience and transformation.

The case study model is therefore now one of nested scales with collaborative action on key change strategies at multi-regional, regional and landscape/community scales. Multi-regional issues proposed by the partners so far are:

- Food security and new food systems
- New approaches to cultural, heritage and biodiversity management which do not necessarily lock up land and sea resources required for Indigenous well-being
- New governance arrangements for collaboration
- Shared systems for monitoring and reporting based on resilience thinking.

The preferred way forward is still being negotiated with partners, although they have agreed on some early project steps:

- Brief the Torres Strait Regional Authority (which has not been involved in face-to-face discussions)
- Bring boards together to:
  - Establish collaborative arrangements
  - Explore resilience of the region

- Decide on need for adaptation and transformation
- Set an agenda for change
- Conduct preliminary work: briefing for boards on the project and resilience thinking by people who attended the partner meeting and research team; work out a “one pager” to support briefing; possibly run tutorials
- Ensure partners and researchers develop a working agreement and change process to drive the project co-jointly, based on the outcomes of the cross-regional board meeting.

## 8.4 Further development of the “transformation practice toolkit”

A planned major output from this project is a “practice toolkit” for regional NRM bodies, local governments, rural communities and change agents interested in transformational change and a more systemic approach to NRM. The function of the toolkit is to supply a choice of tools for regional and local organisations and communities to lead, support and catalyse intentional change towards more sustainable system configurations and hence system identities.

The final structure of the toolkit and its actual content and choice of media are yet to be decided. What is envisaged at this stage of the project is that it will contain:

- A conceptual “learning by doing” framework for building transformability and taking transformative action which utilises synergies between resilience thinking, adaptive governance and collective learning principles. This should not be interpreted as a “one size fits all” model. Rather, it is intended to be tailored to suit different institutional and geographical settings and to suit the particular window of opportunity that is presenting at the time.
- A collection of “Planning by Doing” processes, tools and heuristic devices which can be employed to operationalise the framework. Again, particular tools may be mixed and matched.
- A set of practice notes for applying processes, tools and devices in different contexts to give guidance on the choice of the right tools for the job at hand.
- A set of narratives on how processes and tools have been applied in our partner regions and communities. These will include application to:
  - Community strategic planning by local government in Wakool Shire
  - Development of a Catchment Action Plan for the Murray Catchment Region in NSW
  - Indigenous community engagement in NRM in Cape York.

The toolkit will potentially include application to:

- Issues such as food security, carbon farming and biodiversity planning in NRM in FNQ
- Climate change programs in Torres Strait.

# References

- Adger, W. N., Dessai, S., Goulden, M., Hulme, M., Lorenzoni, I., Nelson, D. R., et al. (2009). Are there social limits to adaptation to climate change? *Climatic Change*, 93(3-4).
- Allen, C. R., Fontaine, J. J., Pope, K. L., & Garmestani, A. S. (2011). Adaptive management for a turbulent future. *Journal of Environmental Management*, 92(5), 1339-1345.
- Allison, H. E., & Hobbs, R. J. (2004). Resilience, adaptive capacity, and the 'lock-in trap' of the Western Australian agricultural region. *Ecology and Society*, 9(1): 3. [online] URL: <http://www.ecologyandsociety.org/vol9/iss1/art3/>.
- Bawden, R. (1994). *Systemic development: A learning approach to change* (Occasional Paper). Sydney: UWS Centre for Systemic Development.
- Bellamy, J. A. (2007). Adaptive governance: The challenge for regional natural resource management. In A. J. Brown & J. A. Bellamy (Eds.), *Federalism and regionalism in Australia: New approaches, new institutions?* Canberra: ANU E Press.
- Benson, M. H., & Garmestani, A. S. (2011). Embracing panarchy, building resilience and integrating adaptive management through a rebirth of the National Environmental Policy Act. *Journal of Environmental Management*, 92(5), 1420-1427.
- Brombacher, P., van Dijk, N., & Yadav, R. D. P. (1994). Planning by doing. *ILEIA Newsletter*, 10(2), 20-21.
- Brown, V. A. (2008). *Leonardo's vision: A guide to collective thinking and action*. Rotterdam: Sense.
- Brown, V. A. (2010). Collective inquiry and its wicked problems. In V. A. Brown, J. A. Harris & J. Y. Russell (Eds.), *Tackling wicked problems through the transdisciplinary imagination* (pp. 61-83). London: Earthscan.
- Cape York NRM Formation Steering Committee (2009). *Report on the Consultation Process on the establishment of a NRM Regional Body for Cape York Peninsula*. Cairns: Cape York NRM.
- Davidson, D. J. (2010). The applicability of the concept of resilience to social systems: Some sources of optimism and nagging doubts. *Society and Natural Resources*, 23(12), 1135-1149.
- Folke, C., Hahn, T., Olsson, P., & Norberg, J. (2005). Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources*, 30(1), 441-473.
- Folke, C., Carpenter, S. R., Walker, B., Scheffer, M., Chapin, T., & Rockström, J. (2010). Resilience thinking: Integrating resilience, adaptability and transformability. *Ecology and Society*, 15(4): 20. [online] URL: <http://www.ecologyandsociety.org/vol15/iss4/art20/>.
- Griffith, R. (2000). *Sustainable development: Should we read the obituary?* Paper presented at the 6th Annual International Conference on Sustainable Development, Leeds, England.
- Griffith, R. (2002). *How shall we live? The sustainability agenda and institutional change in local governance in Australia*. Unpublished PhD thesis, University of Western Sydney.

- Griffith, R. (2010). Rethinking change. In V. A. Brown, J. A. Harris & J. Y. Russell (Eds.), *Tackling wicked problems through the transdisciplinary imagination* (pp. 251-259). London: Earthscan.
- Griffith, R., Brown, V. A., Measham, T. G., Walker, B., Pollino, C., Curtis, A., et al. (2009). *Transformational change for resilient landscapes and communities: Scoping study*. Canberra: Rod Griffith & Associates.
- Griffith, R., Davidson, J., & Lockwood, M. (2009). *NRM governance for change: Revisiting 'good' governance through an adaptive lens* (Report to Land and Water Australia as part of the Pathways to Good Practice in Regional NRM Governance project). Hobart: University of Tasmania. Available from <http://www.geog.utas.edu.au/geography/nrmgovernance/>.
- Griffith, R., Mitchell, M., Walkerden, G., Brown, V. A., & Walker, B. (2010). *Building a collaborative framework for transformative action in the Wakool Shire (Transformation for resilient landscapes and communities project Working Paper 1)* (ILWS Report No. 61). Albury-Wodonga: Institute for Land, Water and Society, Charles Sturt University. Available from [http://www.csu.edu.au/research/ilws/research/reports/docs/61\\_Wakool\\_report.pdf](http://www.csu.edu.au/research/ilws/research/reports/docs/61_Wakool_report.pdf).
- Gunderson, L. H., & Holling, C. S. (Eds.). (2002). *Panarchy synopsis: Understanding transformations in human and natural systems*. Washington DC: Island Press.
- Holling, C. S. (1973). Resilience and stability of ecological systems. *Annual Review of Ecology and Systematics*, 4(1), 1-23.
- Ison, R. (2008). *Understandings and practices for a complex, coevolutionary systems approach*. Paper presented at the International Symposium on Selected Topics on Complex Systems Engineering Applied to Sustainable Animal Production, 29-31 Oct 2008, Instituto Tecnológico del Valle de Morelia, in Morelia Michoacán, Mexico. Available from <http://oro.open.ac.uk/27354/>.
- Lebel, L., Anderies, J. M., Campbell, B., Folke, C., Hatfield-Dodds, S., Hughes, T. P., et al. (2006). Governance and the capacity to manage resilience in regional social-ecological systems. *Ecology and Society*, 11(1): 19. [online] URL: <http://www.ecologyandsociety.org/vol11/iss1/art19/>.
- Lockwood, M., Davidson, J., Curtis, A., Griffith, R., & Stratford, E. (2007). *Strengths and challenges of regional NRM governance: Interviews with key players and insights from the literature* (Pathways to good practice in regional NRM governance Report No. 4). Hobart: University of Tasmania. Available from <http://www.geog.utas.edu.au/geography/nrmgovernance/>.
- Moore, M.-L., & Westley, F. (2011). Surmountable chasms: Networks and social innovation for resilient systems. *Ecology and Society*, 16(1): 5. [online] URL: <http://www.ecologyandsociety.org/vol16/iss1/art5/>.
- Morrison, T. H., McAlpine, C., Rhodes, J. R., Peterson, A., & Schmidt, P. (2011). Back to the Future? Planning for environmental outcomes and the new Caring for our Country program. *Australian Geographer*, 41(4), 521-538.

- National Land and Water Resources Audit (2008). *The National Land and Water Resources Audit 2002 - 2008: Achievements and Challenges*. Canberra: NLWRA.
- Natural Resources Commission (2005). *Standard for quality natural resource management*. Sydney: NSW Natural Resources Commission.
- Natural Resources Commission (2010). *Progress towards healthy resilient landscapes: Implementing the standard, targets and catchment action plans*. Sydney: Natural Resources Commission.
- Olsson, P., Gunderson, L. H., Carpenter, S. R., Ryan, P., Lebel, L., Folke, C., et al. (2006). Shooting the rapids: Navigating transitions to adaptive governance of social-ecological system. *Ecology and Society*, 11(1): 18. [online] URL: <http://www.ecologyandsociety.org/vol11/iss1/art18/>.
- Pahl-Wostl, C. (2009). A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. *Global Environmental Change*, 19(3), 354-365.
- Pahl-Wostl, C., Craps, M., Dewulf, A., Mostert, E., Tàbara, D., & Taillieu, T. (2007). Social learning and water resources management. *Ecology and Society*, 12(2): 5. [online] URL: <http://www.ecologyandsociety.org/vol12/iss2/art5/>.
- Pahl-Wostl, C., Holtz, G., Kastens, B., & Knieper, C. (2010). Analysing complex water governance regimes: The Management and Transition Framework. *Environmental Science and Policy*, 13(7), 571-581.
- Peterson, G. D., Cumming, G. S., & Carpenter, S. R. (2003). Scenario planning: A tool for conservation in an uncertain world. *Conservation Biology*, 17(2), 358-366.
- Productivity Commission (2010). *Market mechanisms for recovering water in the Murray-Darling Basin* (Final report). Available from <http://www.pc.gov.au/projects/study/water-recovery/report>.
- Reeve, I., & Brunckhorst, D. (2007). Spatially bounded regions for resource governance. *Australasian Journal of Environmental Management*, 14(3), 142-154.
- Resilience Alliance (2011a). *Assessing resilience in social-ecological systems: A workbook for scientists*. Available from [http://www.resalliance.org/index.php/resilience\\_assessment](http://www.resalliance.org/index.php/resilience_assessment).
- Resilience Alliance (2011b). *Assessing resilience in social-ecological systems: Workbook for practitioners (Revised version 2.0)*. Available from [http://www.resalliance.org/index.php/resilience\\_assessment](http://www.resalliance.org/index.php/resilience_assessment).
- Robins, L., & Kanowski, P. (2011). 'Crying for our Country': Eight ways in which 'Caring for our Country' has undermined Australia's regional model for natural resource management. *Australasian Journal of Environmental Management*, 18(2), 88-108.
- Rotmans, J., & Loorbach, D. (2009). Complexity and transition management. *Journal of Industrial Ecology*, 13(2), 184-196.

- Ryan, S., Broderick, K., Sneddon, Y., & Andrews, K. (2010). *Australia's NRM governance system. Foundations and principles for meeting future challenges*. Canberra: Australian Regional NRM Chairs.
- Stratford, E., Davidson, J., Griffith, R., Lockwood, M., & Curtis, A. (2007). *Sustainable development and good governance: The 'big ideas' influencing Australian NRM* (Pathways to good practice in regional NRM governance Report No. 3). Hobart: University of Tasmania. Available from <http://www.geog.utas.edu.au/geography/nrmgovernance/>.
- Walker, B. H., Carpenter, S. R., Anderies, J. M., Abel, N., Cumming, G. S., Janssen, M., et al. (2002). Resilience management in social-ecological systems: A working hypothesis for a participatory approach. *Conservation Ecology*, 6(1): 14. [online] URL: <http://www.consecol.org/vol6/iss1/art14/>.
- Walker, B. H., Abel, N., Anderies, J. M., & Ryan, P. (2009). Resilience, adaptability, and transformability in the Goulburn-Broken Catchment, Australia. *Ecology and Society*, 14(1): 12. [online] URL: <http://www.ecologyandsociety.org/vol14/iss1/art12/>.
- Walker, B. H., & Salt, D. (2006). *Resilience thinking: Sustaining ecosystems and people in a changing world*. Washington, DC: Island Press.
- Waltner-Toews, D., & Kay, J. (2005). The evolution of an ecosystem approach: The diamond schematic and an adaptive methodology for ecosystem sustainability and health. *Ecology and Society*, 10(1): 38. [online] URL: <http://www.ecologyandsociety.org/vol10/iss1/art38/>.
- Westley, F., & Antadze, N. (2010). Making a difference: Strategies for scaling social innovation for greater impact. *Innovation Journal*, 15(2), 1-19.