Transformation for Resilient Landscapes and Communities Partnership

Can regional communities intentionally build resilient landscapes and communities?

An overview of three case studies from regional Australia

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New thinking for old problems

This document is for people who live, work, or have an interest in regional Australia and want to play an active part in shaping more sustainable futures. It is for those interested in actively taking on the intractable, so called 'wicked' social, environmental and economic resource use problems facing regional communities.

We have been working with such people for the past five years. The case studies and the lessons presented show how those people, the organisations they lead or work in, and the communities they support have used unfamiliar ideas to deeply engage with difficult resource use problems and intentionally embarked on a journey of transformational change.

This document describes the potential of new concepts and approaches including transformative action, resilience thinking, adaptive governance, collective learning and *planning by doing.* It articulates key lessons learned from applying these concepts in three regional case studies over a five-year period.

Whether you are a community leader, professional, land manager, part of a support organisation, passionate about where you live or just wanting to learn about new approaches to old problems, we hope these stories of change inform and inspire you.

The actual experiences outlined here come from an area of community and government activity known as natural resource management (NRM). However, these lessons are applicable to other areas including local government, disaster management, regional land use planning and infrastructure development,; any one of which can significantly affect daily life and the future options of communities and regions.

Transformation partnership: a summary

A Case for Change

Many regional communities in Australia are facing intractable natural resource management (NRM) and sustainability problems. These are often termed 'wicked' problems because they are not governed by simple cause and effect relationships and have no final solutions. They are the product of on-going interactions between people and nature (called social-ecological linkages), which continually change over time. Attempts to manage intractable problems often involve unintended consequences.

Tackling these wicked problems needs to take into account the complex cross scale linkages and underlying social and economic drivers that influence change. It should also focus on the role of the community and its capacity to proactively manage change, which is constant and inevitable and from time to time uncomfortably surprising.

What we propose

We propose that new approaches and different thinking are required to address intractable problems in NRM. Our research partnership set out to explore how to better equip communities in rural Australia, which depend on the natural resource base for their livelihoods, to respond to intractable problems. The focus of the partnership has been on developing community capacity to undertake deep systemic change (called transformative action) to influence the direction of change towards sustainability.

How can communities benefit from a new approach?

Many regional communities are experiencing forced transformations from both expected and unexpected changes to industry viability, policies and priorities, population and climate variability.

Responses to NRM problems often follow accepted norms or practices (we refer to this as business as usual) rather than exploring the situation more deeply before taking action. Examples of 'exploring more deeply' include: challenging all of the assumptions behind decisions on a plan of action and more closely scrutinising longer term impacts for possible unintended consequences.

Governance arrangements are the key to building community capacity. These arrangements should provide communities with the information, power, resources and flexibility to take collective action at the most appropriate scale. They should also support communities to understand that these complex problems essentially can't be solved but can be improved. Intractable problems therefore require governance for change and innovation. However, current NRM governance in Australia is still primarily governance for stability not for ongoing change and is full of mixed messages.

Research Propositions:

1. The concepts of Resilience Thinking (RS 3), Collective Learning (RS 4) and Adaptive Governance (RS 5) would be useful
2. The capacity to initiate transformational change would assist communities with their intractable problems (RS 6)
3. Cross scale linkages above and below the regional scale are important and need attention
4. NRM organisations should take a leadership role to assist regional communities in instigating change and supporting innovation.

Case Studies

This Partnership worked with regional leaders who recognised regional problems needed different thinking. Our intent was to integrate the study into the way their organisation does business, rather than as a separate project running in parallel. The case studies represented a mix of regional issues at different scales:

NSW Murray: A region facing top down transformations driven by access changes to forestry and irrigation resources, a 7 year drought, a contracting economy, small towns in decline with impacts on community life.

Cape York: Three decades of governments, developers, environmentalists and others with strong and influential ideas on the Cape's future with little regard to local residents' visions. This has created deep divisions within Cape York leading to high levels of uncertainty around future regional development.

Far North Qld: Major challenges to the economic base (floods, cyclones, terms of trade, live cattle export decision, tourism downturn), interest in building community capacity to impacts on landscape and livelihood from natural disasters, tensions around plans to develop northern Australia conservation and Indigenous agendas.

Study Outcomes

- Governance transformations have occurred in all case study regions. New practice models of adaptive governance have emerged that support transformative action. They are at the forefront of both adaptive governance and adaptive planning.

Expected on-ground contributions:

1. Improved frameworks for understanding and managing multi-scale social-ecological linkages
2. More supportive governance and institutions for innovation
3. Improved planning approaches and change strategies for tackling intractable problems
4. Enhanced transformative capacity in NRM and communities.

- The concepts of resilience, collective learning and adaptive governance have been useful to our partners as well as relevant and applicable to NRM in general.
- Integrating these concepts has led to a new approach to NRM planning using social-ecological systems (SES) as planning units. The Wet Tropics and Cape York models are well advanced in this approach. Farmers in particular find an SES planning approach makes more sense to them.
- A Resilience Planning Community of Practice (RPCoP) has now been established as an Australian-based network of regional practitioners, academics and agency staff applying resilience-based, SES approaches to natural resource planning and management. The website is at (www.rpcop.org.au).
- Regional NRM organisations do not get adequate support to take a leadership role or make rapid progress with a change agenda. Changes to current arrangements are required. Improvements in seven key areas resulting from case studies have national applicability; as described further in a series of reports and resource sheets at: www.ausresilience.com.au /research/transformation

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Study partners

This project while substantially supported by Rural Industries Research and Development Corporation would not have been possible without the contributions and assistance of the following researcher partners:

- the former Land and Water Australia
- Institute for Land, Water and Society, Charles Sturt University
- National Centre for Groundwater Research and Training
- NSW Natural Resources Commission
- the former Murray Catchment Management Authority
- Wakool Shire Council
- Cape York NRM Ltd
- Terrain NRM
- Regional Development Australia Far North Queensland & Torres Strait Inc
- Northern Gulf Resource Management Group.

Acknowledgements

The project has also significantly benefited from contributions to the concepts and ideas, research activity and documentation of Dr Michael Mitchell, Emeritus Professor Valerie Brown and Dr Brian Walker.

Abbreviations

CAP	Catchment Action Plan
CEO	Chief Executive Officer
CfOC	Caring for Our Country
CMA	Catchment Management Authority
CoP	Community of Practice
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSP	Community Strategic Plan
CSU	Charles Sturt University
CYNRM	Cape York Natural Resource Management Ltd
FNQ	Far North Queensland
ICM	Integrated Catchment Management
JCU	James Cook University
LGA	Local Government Authority
LWA	Land and Water Australia
MCMA	Murray Catchment Management Authority
MDB	Murray-Darling Basin
MERI	Monitoring Evaluation Reporting Improvement
NRC	Natural Resources Commission
NRM	Natural Resources Management
NSW	New South Wales
PSR	Pressure – State – Response (framework)
RDA	Regional Development Australia
RDA FNQ&TI	Regional Development Australia Far North Queensland & Torres Strait Islands
RIRDC	Rural Industries Research and Development Corporation
RPCoP	Resilience Planning Community of Practice
SES	Social-Ecological System(s)
TSRA	Torres Strait Regional Authority
WSC	Wakool Shire Council

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The case for new approaches

Many regional Australian communities that depend on natural resources for their livelihoods and existence are uncertain about their futures. Resource condition is declining in most areas and the programs and management approaches tried so far have not achieved a widespread reversal of this trend. Communities are also continually challenged by such issues as the declining terms of trade in traditional industries such as agriculture, unfavourable demographic changes, loss of essential services, changing access to resources and extreme climate events. These are persistent and largely intractable challenges that have roots deeply embedded in how societies function and our inter-relationships with environmental processes across multiple scales. These types of problems are characterised by high levels of complexity and uncertainty and low levels of controllability.

Natural Resource Management (NRM) is an area of community and government partnership that addresses the recognised decline of natural resources across the country. It has been operating for about three decades in its contemporary form. Establishing the importance of socio-economic-ecological interactions and of social change processes in NRM in Australia is a constant challenge. Frameworks that recognise these systemic interactions and attempt to address the causal factors of resource decline, have been introduced in the past but have not been fully understood or effectively implemented. Funding programs and project management, along with current institutional arrangements, tend to treat NRM as a predominantly technical and biophysical problem. Actions that aim to 'restore' the environment fail to recognise the way social and ecological systems work and as such have limited impact over time. It is also common practice to use expert driven processes to resolve complex landscape issues. As a result, rural communities are more likely to have solutions imposed on them rather than take the lead on developing and steering locally endorsed actions based on community knowledge and aspirations.

The development of the Murray-Darling Basin (MDB) Plan, which aims to address a history of water resource over-allocation and to restore river system health, is a good example of the latter. The initial draft in 2010 was widely rejected by Basin communities primarily because it focused on biophysical environmental issues and processes (reflecting the *Water Act 2007*). The Plan's consultation process was dismissed as an ineffective top down attempt by a central agency with little regard for local knowledge and experience and would not solve local problems without an equal bottom-up process involving local communities. Disagreement from many quarters continued until the Plan was signed into law at the end of 2012.

Governance arrangements provide a key to building community capacity to address intractable problems. Supportive governance arrangements can ensure communities have the information, power, resources and flexibility to take collective action at the most appropriate scale to manage complex problems that essentially can't be solved but can be improved. Intractable problems require governance for change and innovation. However, current NRM governance in Australia – while exhibiting some adaptive governance attributes such as institutions at different levels – is still governance for stability, not for ongoing change, and is full of mixed messages.

A 2009 scoping study[1] established a growing view among many regional NRM groups and local government bodies that 'business as usual' and current governance arrangements in their regions would not adequately or effectively address intractable or 'wicked' NRM problems or the wider sustainability implications for regional communities. Their past attempts to become more sustainable and to respond to intractable problems like climate change had been largely piecemeal and incremental. The study established that these organisations and rural communities were interested in exploring transformation (deep systemic change) as an option for tackling intractable problems and in the concepts of resilience thinking, social learning and more adaptive forms of governance. It concluded that the knowledge and necessary tools for managing transformational change or even to cope with forced changes in a region are not generally available.

[1] Griffith et al, 2009. Transformation for Resilient Landscapes and Communities, Scoping Study. Prepared for Land and Water Australia Research and Development Corporation, Canberra ACT.

[2] A framework for sustainability put forward by *The Forum for the Future* in Porritt, 2007.

Applying new thinking to old problems

Transformative action – capacity for deep systemic change

Our research partnership explored how to better equip communities in rural Australia, which depend on the natural resource base for their livelihoods, to respond to intractable problems. It sought to better understand those factors that contribute to developing the extra capacity to judge when incremental change is not working and when circumstances demand new approaches.

Landscapes are the product of on-going interactions between humans and 'nature' and are constantly changing for many diverse and interconnected reasons. They can also be described as complex social-ecological systems (SES). Landscape management needs to take into account the complex cross-scale linkages that exist in these SES as well as the underlying social and economic drivers which influence change. It should also have a focus on the role of the community and its capacity to proactively manage change which is constant and inevitable.

Change has four components of interest. These are pace, depth, scale and direction. The partnership focused on developing community capacity to undertake deep systemic change (called transformative action) to influence the direction of change towards sustainability. Many responses to NRM problems tend to continue with accepted norms or practices (we refer to this as business as usual) rather than exploring a situation more deeply before taking action. Examples of 'exploring more deeply' include; challenging all of the assumptions behind decisions on a plan of action; or more closely scrutinising longer term impacts for possible unintended consequences.

Having the capacity to manage deliberate change is dependent on access to adequate resources. Resources can be categorised into five groups of capital: social, financial, manufactured, natural and human capital[2]. The availability of capital and how it is used (capital stocks and flows) is important to understanding whether the direction of change is sustainable. Actions are unlikely to be sustainable if there are substantial gains in some of the capitals coupled with a long term decline of others. For example, the shift to industrialised agriculture brought about a transformational change in the way food is produced in the landscape. While there were increases in social, financial and manufactured capital there has been an ongoing decline in natural capital. Farming practices have led to concerns about declining water quality, soil health and habitats for native species, bringing about the need for NRM programs.

This project partnership has been interested in transformative action that recognises the trajectory of all capitals, particularly the direction of natural capital and therefore the sustainability of actions. Developing the capacity for deeper thinking to a problem opens up opportunities to bring about change through novel solutions.

No till farming is a good example of transformative action which takes into account the trajectory of change (Figure 1). For more than two decades there has been on-going

[2] A framework for sustainability put forward by *The Forum for the Future* in Porritt, 2007.

change to no till farming, which has transformed cultivation practices in Australia from traditional high disturbance soil cultivation practices to growing crops and pastures without ploughing.. It is described by some as a 'no-till revolution' as it is increasingly adopted around the world.

Figure 1: No till farming, an example of transformative action that has brought degraded agricultural land back into production, improved crop yields and improved farm profitability.
(Source: organicproducermag.com, vicnotill.com.au, bigpictureagriculture.com)

Further information on building transformative capacity is provided in:

- Resource Sheet No 6 - *What is transformative capacity?*
- Short report - *Transformative leadership for resilient landscapes and communities in regional Australia*

These can be found at www.ausresilience.com.au/research/transformation

Resilience thinking – working with complexity and uncertainty

Resilience thinking is one of three concepts (along with adaptive governance and collective learning) considered to have potential in assisting rural communities with intractable problems. When these concepts are built into NRM practice, they support an ethical, informed and adaptive or learning approach, well suited to the types of complexity resource managers are tackling, and to living with change. It involves an understanding of human-environment interactions, impacts and thresholds. This means that all decision making processes about human activities includes an exploration of the longer term ecological consequences of proposed actions and the impact these will have on achieving longer term community goals.

The term resilience is a very old one which in modern usage implies a toughness to overcome adversity and the elasticity to allow something to rebound after shocks, disturbances or danger. It can be a property held by people, machines, structures, manufactured goods, sporting teams, political parties, communities, ecosystems, economies, institutions and whole systems of people in nature like localities, landscapes or regions. It also has a number of more specific meanings when used in engineering, ecology and the social sciences.

Resilience thinking has developed as a theory around the idea that resilience is an emergent property of a social-ecological system (SES), such as an industry, region or landscape, that enables the system to absorb shocks, avoid crossing critical thresholds or tipping points into an alternate and possibly irreversible new state, and to learn and re-organise itself in

response to shocks. The ban on live cattle exports to Indonesia in 2011 is an example of a shock to a rural industry operating on low diversity, high connectivity and close to production and economic thresholds. Most cattle suppliers and associated businesses were confronted with the impacts of significant and immediate change. The level of resilience in their respective business models, plans and overall situation influenced whether businesses recovered, sustained long term impacts or changed to different enterprises.

Resilience is not the same as sustainability. Systems (of land use for example) can be highly resilient to some types of disturbance but not sustainable in the longer term because they undermine the integrity of the ecosystem. A good example is irrigated agriculture on floodplains where water can be stored and its supply regulated to reduce the adverse effects of droughts and floods. Farmers with access to irrigation are generally more resilient to long periods of drought than their dryland counterparts. But the downside is the disruption to the natural processes that relied on periodic flooding such as replenishing soil fertility, sustaining vegetation health and vitality and bird breeding events.

Systems that are sustainable (likely to persist without undermining ecosystem integrity or decline in human well-being) are likely to be characterised by general resilience, meaning the system will be resilient to a specific disturbance such as drought, and also be generally resilient to a much wider range of disturbances including, for example, rising salinity levels and changes to soil and water quality, as well as to management changes arising from a market shock (Figure 2).

Figure 2: Rural communities and industries are familiar with a range of 'shocks'. Resilience thinking supports improved planning for, and response to, the impacts and consequences of such events. (Source: moadoph.gov.au, dailytelegraph.com.au, abc.net.au)

Further information from this study on a resilience thinking approach is provided in:

- Resource Sheet No 3 – *Social ecological resilience in NRM?*
- A Practice Guide - *Resilient Regions – A Guide to Social Ecological Planning.*
- Short report – *Re-imagining NRM Planning from a social-ecological perspective*

These can be found at www.ausresilience.com.au/research/transformation

Adaptive governance – governance for change

Governance includes rules, processes, norms and systems that affect how power and authority are distributed and shared, how decisions are made, and how people are involved in decision making. It can play a strong role in either enabling or inhibiting change, and in

influencing the distribution of risks and benefits of any change. It is often the first factor identified by communities undertaking resilience assessments as a key social dynamic of their SES. Further, resilience case studies have shown that if governance transforms, particularly to adaptive governance, other transformations may follow.

Adaptive governance is a form of 'new governance' that suits decision making in conditions of high complexity and uncertainty and low controllability, which are the conditions associated with self-organising SES and intractable problems (Figure 3).

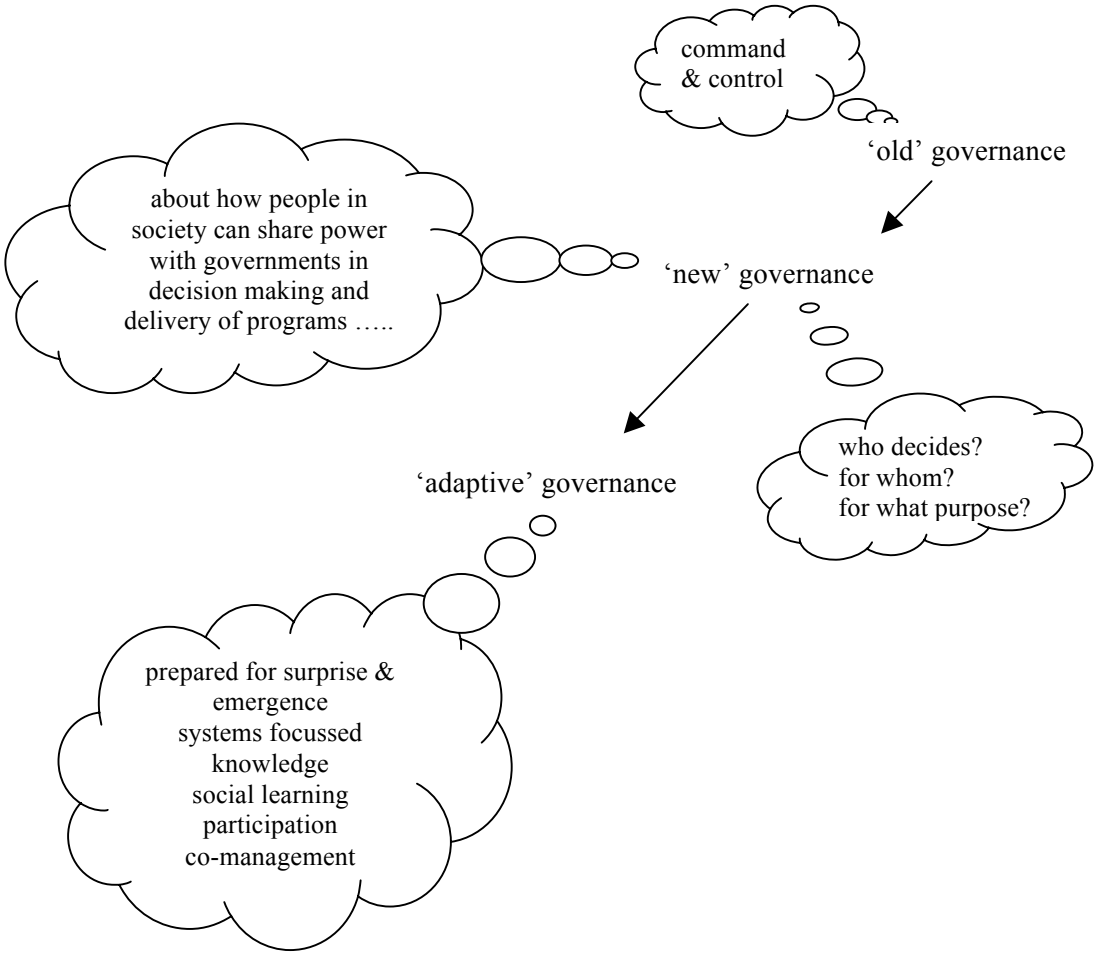


Figure 3: Attributes of an adaptive governance system

Intractable problems morph and shift over time and often involve unintended consequences. They therefore require governance for change, or adaptive governance. This learning-based adaptive governance has adequate flexibility of institutions to adjust and change to evolving situations as well as to provide the support required for self-organisation in an SES in contrast to those modes of governance that seek to 'command and control'. It involves multi-layered power sharing, support for experimentation and shared learning, engagement and decision making which enables adaptive co-management and hence resilience.

Further information from this study on adaptive governance is provided in:

- Resource Sheet No 5 – Value adaptive governance
- Short report – *Governance transitions for resilient landscapes and communities in regional Australia*

These can be found at www.ausresilience.com.au/research/transformation

Collective learning – respecting other knowledges

Collective learning, a form of social learning, provides a sound learning base through which communities and their support organisations can explore alternative futures, including radical adaptation options in a creative space. As most major NRM problems are wicked or intractable, these problem spaces are complex, deeply embedded in the social, economic and ecological fabric of landscape function and messy in that there are many different and equally legitimate perspectives on the problem. No quick fixes are generally available and intractable problems are, at best, not so much resolved as transformed and, at worst, actually made worse by intervention.

Collective learning is a way of bringing together people with different perspectives on the problem to learn their way through improving/transforming their situations. The outcome of these collective learning processes may be continuation of business as usual, incremental adaptation or taking transformative action. This project has been mainly interested in how to use collective learning and associated frameworks with our partners to tackle some of their intractable problems with transformative action.

A collaborative team working together to improve the governance and resilience of a particular area would build combined action from the knowledges of the following: the individuals involved (their livelihoods and everyday experiences); the community (their shared practices, events and symbols); specialist advisors (relating to aspects of biophysical condition, quality of life, loss of biodiversity); and organisations (whether it be government policy, industry profits, or social service; all of which have their own goals and agendas) (Figure 4). Creative thinkers are needed to achieve a shared understanding for cooperative action. Contributions from all these forms of knowledge are equally important to achieve sound and lasting decisions.

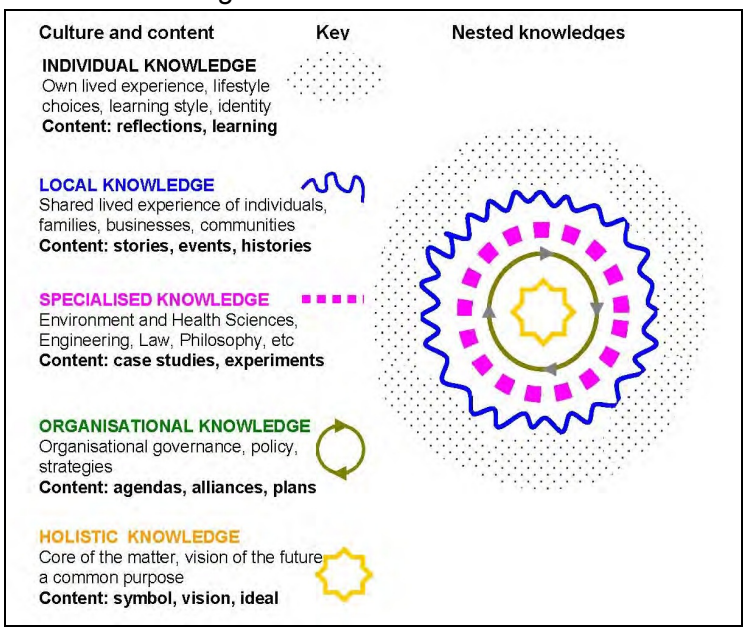


Figure 4: Knowledge cultures as nested systems (Source: Brown, 2005[3])

[3] Brown, V. A. (2005). Knowing: Linking the knowledge cultures of sustainability and health. In V. A. Brown, J. Grootjans, J. Ritchie, M. Townsend & G. Verrinder (Eds.), *Sustainability and health: Supporting global ecological integrity in public health* (pp. 131-162). London: Earthscan

Such a collaborative, collective approach is in stark contrast to that usually practised in decision-making processes where those who put forward knowledge different to the norm, i.e., from an expert or a position of power, are criticised or discounted as uninformed. In particular, community and individual knowledges are often treated as second best, and holistic knowledge is seldom acknowledged or used. All knowledges are respected equally in collective thinking, requiring a significant shift in current thinking.

Further information from this study on a collective learning approach is provided in:

- Resource Sheet No 4 – Value of collective learning
- Short report – *Social ecological systems as spaces for social learning and transformation*

These can be found at www.ausresilience.com.au/research/transformation

Adaptive planning – flexible plans that change with learning

Adaptive planning is an alternative to rational comprehensive planning for situations characterised by uncertainties, complexity and potential for surprise. It has several interpretations which have some commonalities but focus on different aspects of what it means to be adaptive. The approach is used extensively in the military and in corporate management though it also has application in landscape planning and has been used in water planning in Europe.

A composite list of attributes which capture the essence of the idea as it applies to NRM includes:

- Integration of planning and design concepts – allows focus on both specific courses of action and the setting in place the preconditions for anticipatory action under changing conditions
- A focus on both desirable and undesirable 'strategic endstates' and functional strategies to achieve or avoid those endstates
- Frequent situation analysis and situation matching – allows changes in the strategic environment to trigger changes in plans (refitting) at the appropriate level
- Agile rather than linear methodologies for project design
- Scenario testing which is cognisant of intended and unintended or unexpected consequences
- Learning by doing
- Plans are constructed in modular form with those at one level integrated to scale up to higher levels
- Living plans are created which change through frequent evaluation of underlying assumptions – this requires explicit documentation of assumptions and targeted monitoring focused on assumptions.

The term *Planning by Doing* for our purposes was adapted early in the study to capture adaptive planning and therefore adaptive governance that is suited to the type of wicked or

intractable issues found in NRM. It refers metaphorically to the idea of 'learning by doing' or 'experiential learning', which is fundamental to both resilience thinking and collective learning. In contrast to most planning which follows a linear top down progression, i.e. where the plan is created first and then implemented when 'completed', *Planning by Doing* involves organising parallel processes of strategising and doing - with learning from one activity informing the other; a process of planning, learning and doing at the same time.

The aim of this approach is to avoid comprehensive periodic planning and fixed interval plans (commonly 3 or 5 years) that go out of date very quickly in times of rapid change. *Planning by doing* builds capacity and relationships between 'planners' and 'doers', which more commonly tend to be separate groups in the sequential process of plan first, implement later.

Assumptions behind using these ideas

To take the ideas described above from theory to practice the project was based on a number of key assumptions from the outset, including:

- Landscapes and the way they function are products at any point in time of cumulative social and ecological interaction or co-evolution from the time of first human settlement
- Many NRM issues are wicked, persistent or intractable problem spaces deeply embedded in the social system – quick fixes are rare – command and control has limited success – problems are changed by intervention but not generally solved
- This type of problem often extends over multiple scales – tackling the problem at one scale is not likely to work
- As NRM is as much about people as it is about natural resources. It is also more about futures than pasts. Current NRM frameworks, governance and funding arrangements, which focus primarily on biophysical strategies and technical solutions, are ill suited to tackling this type of problem
- The extent of change required to improve situations is significant – business as usual is unlikely to achieve this required scale of change – going beyond business as usual and probably transformational change, will be required to tackle many NRM issues – therefore rural communities and their support organisations will from time to time require a capacity to instigate and navigate their way through profound change, i.e., transformative action.

Leading to four research propositions

Based on these assumptions we take the view that:

- landscapes, communities, industries and problem spaces can all be conceptualised as multi-layered, complex, adaptive or self-organising social-ecological systems (SES)
- a learning approach is required to seek improved or transformed situations

- who decides what matters most, how those decisions are made and how power is used, will shape landscape functions and futures.

This framing of the situation highlights the importance of governance in NRM and leads to the four propositions of our Partnership study:

Proposition 1: Resilience thinking, adaptive governance and collective learning concepts separately and particularly together would be useful in tackling these issues and enabling transformative action.

Proposition2: The capacity to instigate transformative self-organisation and shape transformations and transitions (transformative action) is therefore a useful capacity for rural communities that should also assist communities to influence and adjust to forced transformations from above.

Proposition 3: Successful transformative action by communities and support organisations will require attention to, and engagement with, the social-ecological interactions linked to scales above and below the one on which they base their identity.

Proposition 4: Australian regional NRM bodies (despite current institutional impediments) can and should take a leadership, bridging and agency building role to assist communities in instigating and shaping community driven transformations/transitions towards sustainability when necessary.

Figure 5: Aims for the research partnership project: *Transformation for Resilient Landscapes and Communities*

Case studies – ideas into practice

Partner organisations were recruited on the basis that they were confronted by change and were willing to explore transformation. It was stressed that participation in the study was about changing the way their organisation did business, not a separate project running in parallel to organisational activities. The level of success would depend on an on-going interactive partnership between the study team and the partner organisations and beyond to their communities. The study design was based on a partnership in which all activities would be negotiated and agreed between all parties.

Changes to circumstances within and outside the partnership became common from the outset. Our research design and arrangements with case study regions were subject to constant renegotiation and redesign. This often forced radical change to planned activities and in some cases abandonment of pilot processes and projects.

The case studies were initially designed to focus on different spatial scales. Respectively, these were the NSW Murray Region (local scale) (Figure 6), Cape York (regional scale) (Figure 7) and Far North Qld (multi-regional scale) (Figure 8). However, for differing reasons, they all became studies at a regional scale which all took into account scales above and below the respective regions. This is because attention to the scales above and below the scale of interest is important for understanding social-ecological systems.

Each case study commenced in consecutive years (starting with the Murray in 2009) and ran for three years. The third case study formally finished in June 2014. All three contributed a diversity of NRM related issues for consideration and reflection.

The NSW Murray Region

The regional partners for this case study were the NSW Murray Catchment Authority (MCMA) and the Wakool Shire Council (WSC).

Figure 6: Location of the NSW Murray Catchment Management Authority region (regional scale) and Wakool Shire (local scale)

As the NSW Murray Region case study was commencing, the region was facing a top down transformation driven by changes in access to forestry and irrigation resources. There had also been changes to River Red Gum forest policy and proposed changes to irrigation water allocations as part of the MDB Plan. A long severe drought, which started in 2002, was in its 7th year. Federal Government exceptional circumstances provisions were in place, livestock

production and cropping were at record lows, particularly rice production, and the regional economy had contracted. Populations in the small towns were declining with impacts on community life.

Cape York NRM region

People living on the Cape want to shape their own futures. For three decades governments, developers, environmentalists and others have had strong and influential ideas on the Cape's future with little regard to local residents' visions. Many of these outsider proposals have created deep divisions within Cape York and the broader Australian community, as they are often interpreted as either seeking to 'lock up' its natural assets or to 'destroy' them through large scale inappropriate development. This has created huge levels of uncertainty about how regional development could occur into the future.

The regional partner for this case study was Cape York Natural Resource Management Ltd (CYNRM).

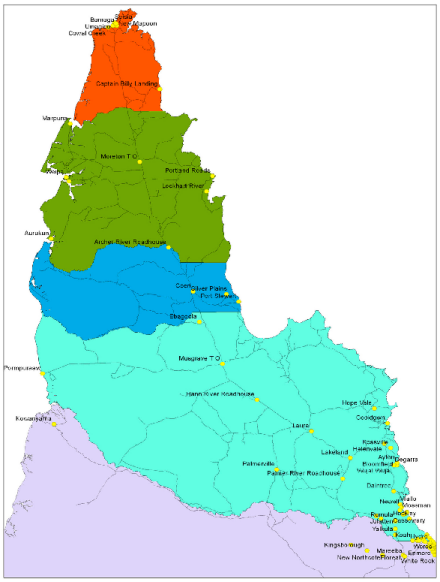


Figure 7: The Cape York NRM Ltd region showing the four Indigenous sector zones

Multi-regional scale in Far North Qld

The intention for this case study was to explore collaboration arrangements in which CYNRM had already become involved rather than set up new arrangements. Cape York shared a number of issues with its neighbouring NRM regions. They had already started to self-organise to work with their Regional Development Australia organisation (RDA FNQ&TI) and were collaborating on the development of a Regional Roadmap as a guide to strategic development of the region.

Therefore the initial design of the multi-regional case study included as partners: CYNRM, RDA FNQ&TI, Terrain Natural Resource Management (Terrain NRM), Northern Gulf Resource Management Group (NGRMG) and Torres Strait Regional Authority (TSRA).

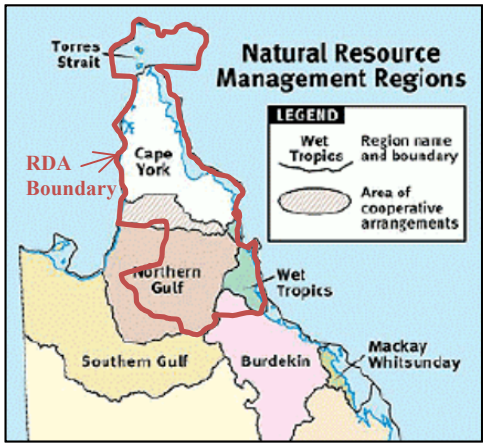


Figure 8: Regional Development Australia Far North Queensland and Torres Strait Inc covering the four NRM regions of Cape York, Northern Gulf, Torres Strait and Wet Tropics.

Both Terrain NRM and NGRMG identified issues in their horticulture, grazing and tourism industries. The economic base in all three regions faced major challenges for various reasons including from floods, cyclones, terms of trade, live cattle export decision and a downturn in tourism. All three regions were interested in the role of NRM organisations in building community capacity to respond more effectively to the interlinked landscape and livelihood issues that comes with natural disasters.

Tensions around the agenda to develop northern Australia versus conservation and Indigenous agendas were present in all regions. Highly influential policy processes by successive governments driving the direction of the regions from outside was a common thread in discussions. This has often left people within the regions frustrated with the local consequences and wanting to shape their own futures through regional processes but with government help.

Working with our regional partners

The roll out of research activities had significantly greater lag times than anticipated due to our partners many other competing priorities coupled with seasonal rural issues. At times it appeared to the research team that the research inputs were not as useful as expected and little change was observed in partner processes. However, our experience has been that with those partners committed to the project, it is in the third year of the case study, and beyond, when significant changes in operation become evident.

The study approach was based on participatory action research principles. This is a type of research where researchers have an active role over the course of the study and therefore an acknowledged influence on shaping actions, events and outcomes in the case studies. Part of that role is advisory and being involved in joint design activities with partners and part is reflecting with partners on how various activities are unfolding and working.

The partners, and in particular those leaders or practitioners who self-identified as champions for these different ideas being explored through the study, also have the option to be researchers helping the research team to understand and learn from a practice perspective as we go along. Given we are dealing with wicked or intractable problems, which usually do not have quick fixes or permanent solutions, the intention is to improve both understanding and practice in parallel as the study proceeds rather than wait until the end to share results and findings.

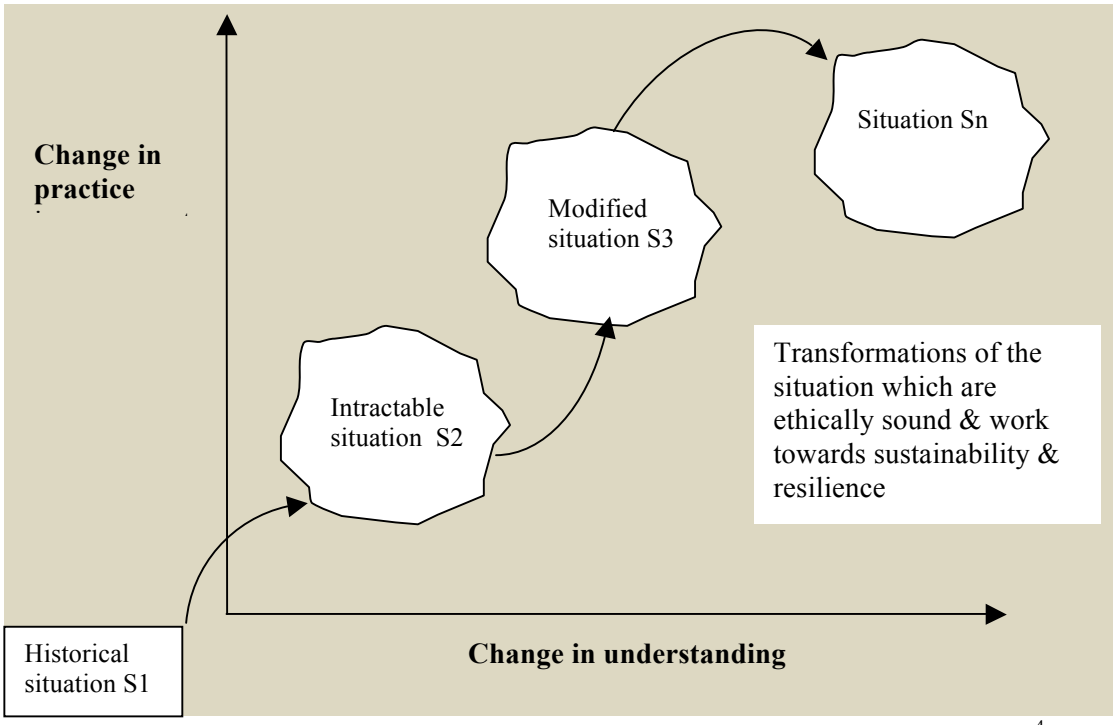


Figure 9: Social learning and intractable problems modified from SLIM project (2004)[4]

The approach taken in each case study region (Figure 9) was based on an example of a negotiated transformation of an important but contested wetland in Norway. The researchers in that study found that transforming the way the wetland was managed

[4] SLIM social learning for integrated water managing at slim.open.ac.uk

involved key leadership skills. These skills shaped four phases of community negotiation for change:

- a period of trust and alliance building involving connecting networks
- a window of opportunity for change
- a period of 'shooting the rapids' requiring navigation through the turbulence with few known guides
- a period of consolidation of new governance arrangements.

Frameworks for both adaptive governance and collective learning were applied in original and modified forms as stand-alone tools in various workshop settings in all case study regions. The adaptive governance framework was used to establish a governance baseline for assessing whether governance had changed over the course of each case study. The original assessment tool proved challenging for most leaders to respond to as it asked for scores out of five for unfamiliar concepts, principles and language generally.

We subsequently used interviews to gather information, trialled simpler versions of the assessment tool in Cape York to be used as social learning devices in group situations and board meetings, and a PhD student is currently in the process of developing and trialling a new assessment tool. Brown's collective learning framework[5] worked well in Board meetings in both Cape York (the Cape York NRM Board) and the Wet Tropics (the Terrain NRM Board) for working through specific focus questions.

A resilience framework was demonstrated to CYNRM to show how in Cape York a systems analysis might be used in a Western context to portray traditional Indigenous knowledge of fire management processes.

A number of different framework options, which combined resilience, social learning and adaptive governance, were loosely developed and tested in the earlier stages of the study. Our approach was to use known principles from transformation studies to build visual guides or interpretation devices (heuristics) to represent what we called '*planning by doing*' as this integration of theory and practice. Two of these heuristics were subsequently developed further – one as a guide for NRM planning, which became known as 'the clouds diagram' (Figure 11), and one as a tool for building and assessing transformative capacity (Figure 12).

In the latter part of the Murray case study our partners shifted away from earlier requests for an integrated pre-designed planning framework. Instead they wanted to become familiar with the individual concepts and experiences of others in applying those concepts so they could design their own applications. For us, this indicated a maturing of the NRM system. The heuristics that had been developed earlier became useful as conversation starters in new situations from which locally developed, owned and operated change processes emerged.

[5] Brown, V. A. (2008). Leonardo's vision: A guide to collective thinking and action. Rotterdam: Sense.

The degree of co-design with the research team varied from case to case. In each new setting the latest understandings and practice gained from previous applications were incorporated into the conversation starters so new users could access the latest thinking.

Expectations of what could be achieved

For each case study the research team has continually reflected on how to be of practical assistance to the partners with their 'on-ground' efforts.

It was our expectation that through this study our on-ground contribution to participating communities, and those beyond the study interested in applying new thinking to old problems, would be:

- Improved frameworks for understanding and managing multi-scale social-ecological linkages
- More supportive governance and institutions for innovation
- Improved planning approaches and change strategies for tackling wicked/intractable problems
- Enhanced transformative capacity in NRM and communities.

The approach to taking the research partnership assumptions and propositions from theory to practical outcomes for our regional partners is illustrated in Figure 10.

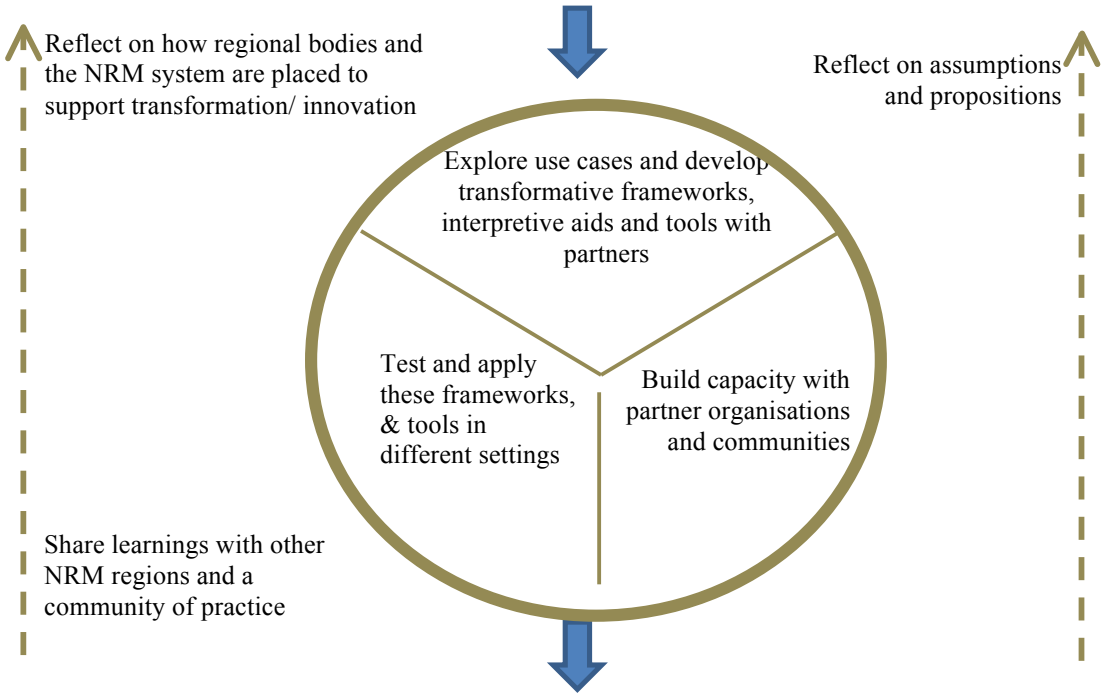
The remaining sections of this document summarises the extent to which each of the above four outcomes have been progressed in different case study regions and settings.

IDEAS INTO PRACTICE

Assumptions:

- NRM problems are mostly wicked problems
- Transformation is necessary to tackle 'wicked' or intractable problems

Proposition 1	**Proposition 2**
Resilience, social learning and adaptive governance will be useful	Transformative capacity will be a useful capacity for regional communities
Proposition 3	**Proposition 4**
Attention to cross scale dynamics will be critical	Regional NRM bodies can and should take a leadership role



Expected on ground contributions:

1. Improved frameworks for understanding & managing multi-scale social-ecological linkages;
2. More supportive governance & institutions for innovation;
3. Improved planning approaches & change strategies for tackling wicked/intractable problems; and
4. Enhanced transformative capacity in NRM and communities.

Figure 10: Project and case study design

Improved frameworks for understanding and managing multi-scale social-ecological linkages

One of our study propositions was that resilience, collective learning and adaptive governance concepts applied together could make a contribution to an improved framework for tackling wicked/intractable NRM problems in regional Australia. These concepts would improve the identification, understanding and management of the complex systemic social, economic and ecological linkages, and cross-scale dynamics which characterise our landscapes.

A key hypothesis was that the multi-level NRM framework in this country was not encouraging sufficient innovation in the regions to tackle intractable problems and was limiting the opportunities for transformation and therefore successful funding programs. This view has since been reinforced by regional leaders.

Hence, one of the objectives of this study was to explore the potential contribution of these concepts to the efforts of communities and support organisations in navigating their way through deep systemic change or transformation. Initially we were more interested in how communities, such as those in the Wakool Shire, might intentionally instigate transformations at local scales to take an active role in shaping their regional futures for resilience and sustainability. This interest remains important if intractable problems in NRM are to be effectively addressed.

The study was designed around the idea that bringing the three concepts and their frameworks together in a new way would help develop a new decision making framework that took advantage of the strengths in original frameworks brought to the project but also addressed deficiencies identified in the literature and by our partners.

We expected that a new model of NRM would emerge that was:

- more cognisant of social-ecological interactions
- more focused on the landscape processes that matter
- more aware of the intractable nature of many NRM problems
- more supportive of innovation; and
- provided more opportunities for communities to take a more appropriate role in managing their resources.

To this end, partners were aware they needed to demonstrate to peers and governments that the ideas, frameworks and tools were available and could work in practice.

Emergence of social-ecological planning

One of the heuristics that emerged from early attempts to integrate the key concepts became known as the ‘clouds diagram’ (Figure 11). It modified an existing resilience assessment approach by adopting principles from social learning and adaptive governance.

It has been demonstrated and refined over time, both within the case study regions and in other NRM planning forums. The MCMA's catchment action plan, the other 12 NSW CMAs plans, and some examples of climate change planning in Victoria, South Australia, Western Australia and Queensland are based on or influenced by 'the clouds diagram'.

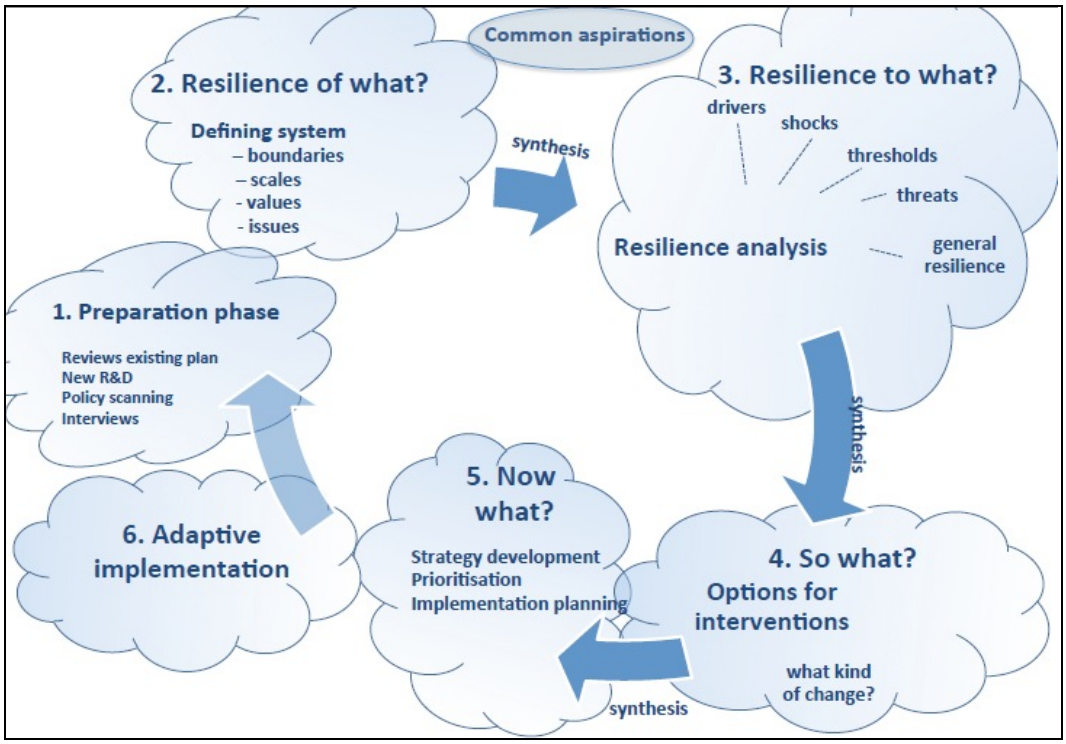


Figure 11: The Clouds Diagram: diagram of the approach used to guide activities with regional partners. This adaptive process integrates resilience assessment with social learning**.**

The result is a number of examples of regional NRM planning processes that are:

- wider in scope;
- more socially and institutionally aware;
- link people to landscape by focusing on social-ecological relationships; and
- far more adaptive and collaborative than previous rational-comprehensive style processes used in previous planning rounds.

We refer to this broad approach here as '*social-ecological planning*' although some of our partners have called it 'systems-based' or 'resilience-based' planning and others 'strategic adaptive management'. The latter label reflects a similar exploration taking place in conservation planning in Africa and Australia[6] which applies resilience thinking to managing ecological assets.

Most examples of strategic NRM plans based on the clouds heuristic shift away from the idea of managing assets, to planning for resilience in the wider social-ecological systems

[6] Kingsford et al (2011): Strategic adaptive management in freshwater protected areas and their rivers, *Biological Conservation*, 144, 1194-1203

(SES) in which the assets are embedded. In this way, *social-ecological planning* is complementary to strategic adaptive management, which focuses on the asset.

Early applications of this planning approach were in strategic level NRM planning, primarily driven by review cycles in NSW and Victoria and funding for climate ready plans around Australia. The effort is now shifting in a number of regions to applying social-ecological thinking to investment and operational areas. The approach is also consistent with new policy positions in NRM, which are more production-focused.

Evaluations from NSW applications of the approach are suggesting that adopting SES as planning units has led to increased engagement and provided opportunities for landholders, communities, experts and agency staff to hold meaningful conversations and develop shared strategies around matters of key importance to them. The resultant plans are structured differently to facilitate adaptive responses. At the same time adaptive management seems to have become better understood and is being operationalised.

The perceived benefits of these early applications of the approach by regional leaders, practitioners, community members and bodies like the NSW Natural Resources Commission has led to gathering participation, support and momentum for *social-ecological planning* in other States.

It has also led to the formation of a Community of Practice (CoP) to share ideas and further develop the approach (www.rpcop.org.au).

Evaluation of the NSW experience also suggests that the clouds heuristic has improved the social learning capabilities, and other aspects of the original resilience assessment framework, in regional NRM planning situations where empirical hard systems modelling is not practical. The heuristic has demonstrated that collective learning principles can work effectively with resilience theory in formal planning contexts. The practical nature of this work with NRM regions has attracted considerable attention from the international resilience community at three major international conferences[7].

However, from a transformation perspective, the clouds heuristic would appear to be as facilitator-dependent as either of its parent frameworks in relation to fostering innovation. Also, as applied in the NSW context, it had no explicit in-built treatment of governance and its importance for change. These issues are being given greater attention in heuristic development for application in the FNQ case studies.

Extending the frontiers of the social-ecological approach

Regional NRM organisations in Queensland operate in a different institutional environment to those in other states. In this setting there was no strong institutional driver for a systems or resilience based approach to planning as there was in NSW.

The planning guidelines for Queensland were developed by regional NRM planners themselves through the Regional Groups Collective as a response to concerns over traditional NRM planning approaches. The guidelines recognise resilience as an emerging

[7] Resilience 2011 Conference - Arizona, USA; International Conference: transformation in a changing climate (2013) - Oslo, Norway; Resilience 2014 Conference - Montpellier, France.

idea and goal and focus on the concept of a web based portal. Planning approaches developed in Cape York and the Wet Tropics regions are interpretations of these guidelines, using resilience, collective learning, adaptive governance and transformational change principles.

To support the development of these two planning approaches in FNQ, a transformative capacity heuristic (Figure 12) was constructed that:

i. extended literature understandings of adaptive capacity attributes to apply to transformation

ii. brought collective learning rather than resilience thinking to the forefront as a conceptual basis

iii. applied lessons from the Murray case study in relation to building transformative capacity

At the same time we had been considering what shape a bridging organisation might take and what role it should play in NRM, again drawing on lessons from the Murray case study.

These two heuristics were used as starting points for reflective transfer with regional planners. The result is two related but different forms of adaptive planning. They are both pushing the frontiers further away from traditional comprehensive modes of planning and plans towards fully adaptive web-based systems of integrated planning and learning and doing (*planning by doing*), which actively seek and support innovation.

While roll out in both regions is still in the early stages, both planning approaches are showing exciting promise. The key elements and differences are illustrated in Table 1:

Table 1: Key attributes of *social-ecological planning* in Far North Queensland

Wet Tropics	Cape York
A knowledge hub and portal as the primary organising structure – contains the plan components, best practice, maps, photos, techniques, videos etc	
Transitioning from periodic planning – still planning first – doing follows – over time the intent is to become iterative	No previous agreed plan – building a planning by doing system through iterative planning, learning and doing
Spatially defined SES as planning units called local landscapes – but also more fluid SESs	Fluid self-organising doing units associated with opportunities and funded projects treated as SESs
Best available modular living plan intended	No formal plan proposed
Hard and soft systems analysis	Live community monitoring, as feedback
Collective learning in planning units and interest group consultations	Collective learning in projects, communities and industries
Emphasis on understanding the shifting institutional landscape	Emphasis on capacity building, bridging cultures and Indigenous participation

Key lessons and ways forward

We have identified a number of key lessons that are important to how we proceed with practitioner products and further interactions with people interested in improved frameworks for landscape management. These lessons are:

i. The study has confirmed, to varying extents, that each of resilience, collective learning and adaptive governance concepts have been useful to our partner organisations and champions as separate ideas. It has also confirmed that each of the concepts have relevance and applicability to NRM in general.

ii. Finding ways to integrate original resilience and collective learning frameworks was not as easy as first imagined despite their commonalities and shared links with adaptive governance principles. The differences in their assumptions about how knowledge is constructed and used and how change takes place posed early challenges. Our way of dealing with this tension was to envisage resilience assessment and collective learning as two different approaches to, or models of, adaptive governance that might have resonance in different contexts, cultures and capacities. Following that line of thinking, heuristics like the clouds diagram (Figure 11), which is resilience based influenced by collective learning principles, and the heuristic we developed around transformative capacity, which is collective learning based with in-built space for resilience thinking and social innovation (Figure 12),have achieved significant resonance with our partners.

iii. NRM organisations and practitioners in our case study regions and in other NRM regions have been able to make a shift from being framework takers to framework builders. The heuristics we developed from pilot processes were not the frameworks applied but merely conversation starters for development of the actual frameworks used. The heuristics used around Australia to stimulate and guide co-design and the emergence of context specific planning frameworks is outlined in the practice guide titled: *Resilient Regions – A Guide to Social-Ecological Planning* (see page 12). This represents a maturing of NRM and has implications for research and working with practitioners.

iv. A social-ecological approach to planning has emerged that is strongly influenced by the integration of resilience thinking, social learning and adaptive governance. It is resonating with our partners and a community of practice has formed around applying social-ecological understanding to NRM practice (www.rpcop.or.au). Using SES planning units is also making sense to farmers and improving their opportunities for understanding and tackling intractable problems. Evaluations have shown in the Murray and Cape York regions as well as in other examples of SES planning in NSW, VIC and SA in particular, that using SES as planning units, has opened up new opportunities for improved community engagement with regional NRM bodies and for social learning. Farmers have responded positively to these opportunities in the Murray region and report that engagement around social-ecological systems and participation in mapping system dynamics, drivers and feedback loops has opened up new conversations and opportunities for peer learning.

v. Our early ideas around planning-by-doing as the holy grail of adaptive governance are coming to fruition, particularly in Cape York. In that region entrepreneurial leadership and networking has produced a practical and coherent expression of the concept. This on-going process offers potential ways forward for most of the big resourcing challenges of the NRM governance system. We intend to remain closely involved in this process and look forward to further documenting and evaluating the model at appropriate times.

vi. Early attempts at defining SES were permanent place based and nested in other place-based systems. It has taken considerable time for practitioners to experiment with alternatives. However, the later SES used in Cape York and to a lesser extent the Wet Tropics, are based on 'doing' not 'planning' and are more diverse and in some cases fluid. There has also been an expansion in systems analysis techniques. While most NSW examples have conceptualised as hard systems, in Far North Qld soft systems analysis and critical systems thinking are also forming part of the change. These techniques are now being trialled by Terrain NRM in the Wet Tropics region and are showing promise.

vii. Initially we were more interested in developing frameworks that could be useful in guiding how communities might intentionally shape their regional futures for resilience and sustainability by instigating transformations at fine scales such as in particular industries, localities or local government areas. The Partnership has made considerable progress in this area both in tools and techniques to uncover and understand social-ecological linkages, and in strategic planning. This interest remains important if intractable problems in NRM are to be effectively addressed.

However it is evident in all three case studies that developing the means to participate in and cope with forced transformations and frequent institutional shifts from outside the regions is equally important and may be more frequently required. This will require extensions to the heuristics or possibly the development of new heuristics to guide navigation by leaders in this chaotic environment and is an area for further research.

Transitions to more supportive forms of governance and institutions

Based on the NRM literature and practitioner experience we didn't expect existing governance arrangements for NRM to provide ideal conditions either for the introduction of different thinking like social learning or resilience, or for intentional transformation and the innovation it requires. Rethinking NRM governance, potentially at all levels in the contemporary multi-level system of NRM governance, was necessary to seriously tackle intractable resource problems using these ideas.

At the conclusion of the study, all three of the regional NRM organisations that we worked with closely reflected on the:

- ideas brought to the Partnership
- roles their organisation could potentially play
- suitability of the governance arrangements in which they worked for the situation that they were facing.

The leaders of the two organisations that had been operating for a number of years instigated intentional organisational governance transformations. New roles, structures, and cultural conditions were established prior to commencing regional strategic planning upgrades and wider transitions of regional NRM governance.

Wider governance transitions are underway and continuing in three regions with varying levels of progress and subject to many challenges. Efforts at organised collaborations with local government and at a multi-regional scales among regional NRM bodies and with RDA have not generally worked out as expected. These outcomes are briefly outlined in the remainder of this section.

Organisational governance transformations

Both MCMA and Terrain NRM undertook intentional internal governance transformations. In part this is because they found themselves 'out of fit' with the financial and institutional realities facing their organisation. It was also to prepare the organisation for a revision of their regional plans applying ideas like resilience, adaptive governance and collective learning for innovation and taking transformative action on intractable problems facing their regions.

Both organisations reassessed their role in the NRM system and decided to shift from a delivery model to more of a bridging organisation. Both then designed new structures and managed culture shifts to support the new model, including recruitment to reinforce the new culture. Both also instigated strong programs to equip existing staff and Boards to make the cultural transition and to build agency for their new roles.

This phase of the transformation took about one year in each case with the respective leaders reflecting that this was the minimum time to ensure an effective process. Our role in

both cases was as a 'critical friend' but in practice most of the strategising and implementation was done with minimal researcher involvement. Both organisations then drew on new enthusiasm and capacities to build their planning functions in which we were invited to take a more active role. They have since faced and continue to face forced transformation as a result of government policy and administrative changes.

In the case of the Murray case study, recent institutional reform in NSW has resulted in the abolishment of CMAs and the establishment of Local Land Services (LLS). The new organisation has responsibilities across a wide range of primary production and land management orientated functions, bringing together responsibilities and staff drawn from five previous entities. This process has resulted in the forced, top-down transformation of Murray CMA, including governance, into a new organisation. The full implications of this forced transformation are yet to play out and the future of the concepts introduced by the Transformation project remains uncertain. While the new organisation is yet to establish its own culture and approach to strategic planning, there is evidence that some concepts introduced by the project will persist. The new organisation retains some functions and hence organisational processes, staff and projects from the 'old' MCMA. Recent interviews with LLS staff that were previously involved with the MCMA case study suggest they are attempting to embed key concepts into the new organisation. Specifically, adaptive governance, adaptive management, triple-loop learning and engagement approaches are being gradually deployed in the new organisation through the design of new governance structures and processes.

As a new organisation, CYNRM was in part borne out of discontent with the way NRM was governed and practiced in the Cape York region. While the organisation had to build its functional capacities from scratch, it did not start operations with a clean slate. The steering committee, which had managed the community consultation for establishing a regional NRM body, developed a charter of conditions which were imposed on the organisation. These conditions were based on a minimalist business model with an elected Board and an executive officer as the only staff member. This model could only have worked if one of the existing NRM delivery bodies on the Cape undertook all the support services. This wasn't feasible as it would have totally undermined the community's strong desire for a fresh approach.

The new Indigenous majority Board adopted the basic principle of a minimalist approach but did not follow the steering committee's model; preferring a more independent approach. At the same time both the QLD and federal governments imposed conditions on investment funding that ensured existing service providers would continue to deliver projects for the first year. This effectively removed any ability to bring about change from the new organisation, which frustrated all of the Directors.

When restrictions were lifted and some decision making responsibility was transferred to the new Board their insistence on improved accountability for project delivery resulted in challenges to the legitimacy of the new organisation. A situation developed of crisis after crisis and the organisation struggled for stability. It also struggled to dedicate time for more strategic thinking and to find a business model, organisational structure and culture that would allow it to actively pursue transformation of the NRM system on Cape York. Notwithstanding these chaotic operating conditions, major practice innovations have been conceived and are being implemented. We were invited to be part of this journey from the outset and to attend every Board meeting. As a fledgling organisation in a deeply divided

region wanting to achieve its aspiration of transformational change, the Board recognised the value of independent research ideas and advice through a three-year research partnership.

These examples of organisational change have highlighted many of the features of regime shifts and paradigm shifts from previous studies. These include:

- the importance of crisis, or critical mass of dissatisfaction with existing ways of doing things, in providing a window of opportunity for profound change
- entrepreneurial leadership
- the importance of bringing new thinking and innovative solutions to old problems
- attempts to create something new from the current or previous operating structure
- attempts to discredit the new
- that disempowered regimes just wait in the wings for an opportunity to re-establish.

What they also suggest is that transformation is not a one-time change which brings organisations into fit with new realities or stability. It may be required more often as the operating environment becomes more chaotic. These case examples also clearly demonstrate the dual importance of building capacity to undertake intentional transformations as well as the capacity to shape imposed transformations.

Regional NRM governance transitions

In the Murray and Wet Tropics case studies some changes to regional relationships and structures took place during organisational transformation of the regional NRM body. For example, Terrain NRM negotiated new resourcing relationships with various catchment groups in the region, and in the Murray region devolution or localism policy was implemented effectively by MCMA. In both cases the development/upgrading of the regional NRM plan was the vehicle of choice for wider reform of power sharing, engagement and decision making arrangements. While this process is in its early stages in the Wet Tropics, exit interviews indicate the potential for transformation to regional governance arrangements.

In the Cape York case the Board accepted our recommendation to build from the ground up both the planning function in the region and the transformation of how NRM was done on the Cape, rather than use a comprehensive planning process towards a fixed plan. This was necessary first, as previous comprehensive planning processes run by the State and by one of the NRM delivery organisations were perceived by Cape York communities to have been unsuccessful; one in its delivery and the other in its content. Second, Cape York had been described by geographer Holmes[8] as undergoing a multi-functional transition in which power relationships and expectations between white aspirations of production, green aspirations of conservation, and at least two different black aspirations are being negotiated and are shifting through resolution of land use, land tenure and decision making arrangements.

[8] John Holmes (2011): Contesting the future of Cape York Peninsular, *Australian Geographer*, 42:1, 53-68

These various positions were being played out against the backdrop of World Heritage nomination for the Cape.

Two innovative governance models emerged. One was *planning by doing* tailored to Cape York conditions. This model co-designed and supported by the research team is allowing transformations of governance at the local and sub-regional scales, which is having an aggregating effect on governance on the Cape generally. The other was a mode of Indigenous decision making based on the concept of Indigenous Reference Groups (IRG). The latter was proposed as an alternative to decision making arrangements supported by Noel Pearson and his set of institutional arrangements which interfaced between various Indigenous groups and the state and federal governments. The IRG approach and *planning by doing* are described in more detail in our report, *Governance transitions for resilient landscape and communities in regional Australia* (see page 13).

Key lessons for future generations of multi-level NRM governance

Key lessons from observing and taking an active role in these governance shifts include:

i. The study has confirmed that governance is an important consideration in shaping the participation in, content of, and effectiveness of change strategies such as regional NRM plans. Those plans like the MCMA CAP, which made efforts to address governance and tailor it to social-ecological thinking, were judged to have better planning processes and better plans than CMAs that did not address their governance arrangements. FNQ regions were able to learn that lesson and it is paying dividends in both increased funding for planning and in implementation.

ii. New models of adaptive governance focused on transformative action are emerging in case study regions. These new practice models, however, are also pushing frontiers of both adaptive governance and adaptive planning understandings and are expected to make contributions in both disciplines. The Wet Tropics and Cape York models are likely to gain international attention from the resilience community in particular and are already being viewed with interest by the Community of Practice supported by the Australian Resilience Centre. It is too early to tell yet whether these are prototypes of transformative governance.

iii. Regional NRM bodies have been motivated to rethink their role in the wider system of NRM. They have transformed their internal governance arrangements after exposure to ideas like resilience, collective learning and adaptive governance in the context of external shocks to their operating environment. These new arrangements are gaining community support in all three case study regions. Whether these roles can be stabilised will depend on how successfully regional bodies can communicate the benefits to state and federal governments. At the conclusion of this overview we outline some suggestions for future generations of NRM governance that would support regional NRM organisations to continue these transitions. Our short report on rethinking NRM provides more detail. (see page 12).

Change strategies for tackling intractable (wicked) problems

The intent of the Partnership study was for partner organisations and communities to:

- identify persistent intractable local, regional, cross regional and national scale problem areas
- make an assessment of whether incremental adjustment or deep system change was appropriate or necessary
- review or develop new change strategies for these problem spaces
- navigate their way through implementation and nurture innovations that arose.

Landscape resilience and sustainability were to be used as reference goals. The approach would use reflective transfer through the heuristics and frameworks, (relating to resilience, social learning, adaptive governance and transformation), adopted by or modified within the project. This would assist with co-design of engagement and of potentially transformative change processes either for individual problems or for broader strategic planning reviews. Experiences and lessons from earlier attempts were to be used to assist with design of later processes. Similarly exploration of options at one social-ecological scale would prompt reflection on appropriate scales for intervention.

Through this process two outcomes were expected. First, to be able to describe a number of retro-fitted and fresh design examples from each case study, and second, to be able to identify enabling and inhibiting factors or influences across different intractable problems and across case studies. As the following examples demonstrate, this expectation was overly simplistic and very difficult to put into practice when our partner organisations went about their operations in very different ways.

Regional NRM plans as change strategies

Most of the examples for designing intentional change are set in regional NRM planning contexts. This study just happened to coincide with a rare period of plan reviews around Australia. Five year reviews were due to commence in NSW and Victoria. In addition, all NRM bodies across Australia had been asked to review their regional plans to make them 'climate ready' using funding from reforms to carbon abatement and energy policies. Our partners, and other NRM bodies that we worked with, therefore had a driver and a vehicle for working on the study ideas and testing new frameworks.

As reported earlier, in relation to new frameworks for understanding and managing social-ecological interactions, the process developed and implemented in the Murray case study is an example of a new type of planning that has emerged. While the Murray planning process was highly innovative and their plan judged as best practice by an expert panel in an NRC assessment process[9], leaders were cautious about aiming for transformation. All the

[9] http://www.nrc.nsw.gov.au/Publications/AuditsAndAssurance.aspx

language was developed around incremental change and continual improvement. Evaluations showed this was a typical pattern across the NSW cohort of plans.

Leaders in FNQ were much more open and willing to explore transformative action on the ground. This may have been just a timing issue but may also be a benefit of not being government owned. However, a shared frustration for the partners and the research team in embarking on this change was a delay of about 18 months from the time the Australian Government announced the funding opportunity to the calling for submissions. Further delays occurred before the contracts were actually provided. Numerous shifts in expectation and administrative arrangements took place in that period. As it turned out the delay was positive for both Cape York and Wet Tropics regional bodies in that they had time to digest and develop new ideas and frame new approaches to planning. Both were able to secure significantly more funding than expected partly attributed to their proposed innovative approaches.

However, as planning processes have only started in earnest less than 12 months ago, it has been very limiting for this study. We have had little opportunity to see these new planning approaches put into practice let alone evaluate them as change strategies.

Tackling intractable problems at a multi-regional scale

A multi-regional workshop held in early 2012 brought together, for the first time, the NRM Boards for Far North Queensland (FNQ) those of Northern Gulf, Cape York and Wet Tropics regions and Board representation from Torres Strait. The workshop aimed to take the first collective step to exploring a set of common issues that participants considered could be more effectively addressed collaboratively rather than individually.

Participating regions identified several issues that had social and economic as well as ecological dimensions and that would benefit from being addressed at the multi-regional scale. These were rolled up into four flagship projects: New Agriculture, Conservation economy, Traditional Owner Business and Climate Change Futures. Board members put forward their views, concerns and ideas regarding how these projects might operate and how things might be done differently. A summary of points for one of these multi-regional projects is summarised in Table 2.

In the lead up to that meeting there were also partner expectations of a shared FNQ planning approach to shared intractable problems. One regional leader had a vision of pooling government planning funds to work collaboratively on these issues; particularly disaster responses after recent events across the region.

It soon became apparent, however, that the basis for collaboration over these problems was in itself problematic. Each region had very different governance arrangements in place and was in different situations with their current regional NRM plans. While this was important, particularly for the TSRA, it is typical of many collaboration efforts. We offered ways to overcome these differences although it became evident that among the mainland partners there were very different motivations for bringing about change. The partners also had very different outcomes in mind on how transformations would occur and issues of trust had arisen. In the end the deal breaker was the different ways in which regional partners decided to approach, or become involved in, the state government elections in 2012.

The QLD State Government has planned, and is currently prosecuting landuse transformations in agriculture, conservation and Indigenous business based on traditional development models. What they are proposing are very different from the models implied by the four flagship projects developed by Board members at the FNQ multi-regional workshop, although they closely reflect the intentions of one of the partner regions.

The FNQ Boards' initial efforts for cross regional collaboration for change, is another example of the vulnerability of intentional efforts at transformation to external forces, particularly those aimed at sustainability. In this case, the change processes being driven at the State scale above the FNQ regions, while consistent with just one region, are inconsistent with the locally developed directions resulting from the workshop based on collective community knowledge and aspirations.

Table 2: New Agriculture: output from the multi-regional NRM Boards workshop on a new approach to agriculture for Far North Queensland

New Agriculture	
Vision • agricultural resilience in a functional landscape • making agriculture more resilient • [vision re] what's its role in the landscape • integrating other outcomes into agriculture - biodiversity	*How* • diversify income - ecosystem services • reskilling - education and awareness - extension services • available & skilled workforce • diversified agriculture • land tenure - protected areas that are good agricultural land made available for farming • polyculture agriculture - alternatives to high pesticide / herbicide monocultures • change farming practices - more sustainable practices, e.g. biofertilisers, compost • educating public about higher nutrition food • feedback signal to consumers about cost of production • break up supermarket duopoly - farm gate price for produce • local food production + transport + consumption • food pricing transparency • growing to Australian conditions - macropods instead of cows? • recycling / reuse of what was previously seen as waste products – compost • good farm practices
Context • society's expectations about farming; social licence: public have higher expectations about farming practices • connectivity between urban people and farming land • food is so cheap - what people are willing to pay for food - food must reflect production and transport costs • poor perception of farming - average age 64+ years • in agricultural areas the social fabric is linked to family farming -> don't move to industrial agriculture • well-intentioned but perverse regulations • biosecurity issues • agriculture moving north	*Potential game changers* • Holistic and integrated farm practice extension services across all industries • Move from monoculture to polyculture • Consuming local produce: local distribution and consumption • Educating consumers

Community planning as a potential vehicle for change

The initial pilot for the study was based on whether a new form of local government planning in NSW, 'community strategic planning', could provide the conditions for transformation. In that particular case, in Wakool Shire, it did not. However, reflecting back and with the benefit of hindsight, the outcome was more to do with some process design issues and external factors other than this type of planning. A major influence was the breaking of a 10 year drought and a community that had been planning for a long term future with less water was now inundated with flood waters and went back to business as usual.

In Cape York we also tried community planning as a vehicle to explore alternative futures, this time in the Indigenous communities. Initially, this was an NRM Board sponsored engagement process. However, external influences made that process unworkable and the approach was tried through other community based planning processes associated with World Heritage nomination.

Neither of these attempts could be considered a reasonable trial of whether this type of planning is a suitable vehicle for taking intentional transformative action or as opportunities to explore key factors influencing change. Both attempts reinforce how vulnerable intentional change processes are to external changes in policy.

NRM projects as opportunities for collective learning and transformation

As Cape York has adopted a *planning by doing* framework they are working directly on intractable issues but predominantly in an integrated way through self-organising networks which have formed around SES. For example, turtle conservation has been a long running endeavour on the Gulf coast of the Peninsular with falling turtle numbers and one species endangered. People, pigs, dingoes, goannas and crocodiles are implicated in hatchling survival. Indigenous ranger groups, researchers and pest experts have formed an alliance (Western Cape Turtle Threat Abatement Alliance) to manage this complex social-ecological interaction. The problem has been reframed from just a pig problem to an opportunity to achieve sustainable relationships between turtles and the social-ecological processes that affect their conservation. There is already a co-ordination of activity, improved project design, better sharing of knowledge, local community benefits, and improved monitoring. Systems mapping techniques may be used in future.

Another example is the self-organisation of a group of grazing families, traditional owners and the Australian Wildlife Conservancy who manage a very large area of the Peninsular. They are collectively working through a number of intractable issues such as pests and weeds, fire management and erosion. Cape York NRM is acting as a broker investing from a public good perspective to help the group improve understanding and practice in relation to their own intractable issues. The strategy also extends to working with graziers at a Cape wide scale.

Key lessons and ways forward

Key lessons from co-design and reflection on these intentional change strategies include:

i. Most NRM leaders were able to quickly accept that NRM problems were wicked or intractable problems. However, this understanding was not reflected in previous NRM plans and project designs in the Murray and Wet Tropics regions and in NRM planning projects we were involved in outside case study regions

ii. It took a longer period of transactional exchanges between leaders, thought champions and researchers for partners to embrace the idea that local community plans, regional NRM plans and projects, are instruments of, or vehicles for, change to tackle intractable problems. Once that tipping point was reached, action was taken and results have been encouraging. The implication is that leaders, practitioners and particularly change agents will need to allow for enough time to change from strongly held mental models of what planning is and how plans work as change processes. This means that windows of opportunity may not stay open long enough if key decision makers are unprepared. The experience, and particularly the multi-regional attempt at collaboration in FNQ, would reinforce that a phase of trust building and alliance forming is a necessary first phase of a transformative change process.

iii. There has been lots of process innovation in the 25 or so regional NRM planning processes in which we have been involved. This may be an investment in social capital and governance change waiting to fully develop. For now, however, the strategies proposed and actions chosen to tackle the intractable problems in the early group of plans that were generated look at best like incremental improvement and in some cases like business as usual despite some reframing of the conceptual landscape. The opportunities for deeper systemic change in Cape York and the Wet Tropics look more encouraging at this stage of development.

iv. So far funded projects appear to be the most practical vehicle for transformative action. However, it was almost impossible to get NRM bodies to consider making strategic interventions outside the bounds of either formal planning processes or investment plan development. This seems to be both a deeply ingrained mental model reinforced by a 'welfare approach' to NRM and a practical reality of the constraints of working in a system where the responsibilities and accountabilities are devolved but the power is retained by government. Following a similar pattern partners were reluctant to redesign and retrofit projects that had already been approved.

v. The study is showing that intentional change strategies are highly vulnerable to external driver shifts and that current NRM governance arrangements inhibit rapid response to windows of opportunity for radical change. Our short report, *Governance transitions for resilient landscapes and communities in regional Australia* (see page 13) discusses how the system of NRM governance might be made more adaptive and supportive of innovation.

Enhanced transformative capacity in NRM regions

One of our study objectives was to assist partners in building adequate trust and agency so their regional communities could instigate and navigate their way through transformative action. Our proposition was that partner organisations can and should play a leadership role in building or enhancing this capacity for addressing intractable problems (a kind of specified transformative capacity), and more generally, to prepare the region for any circumstances in which transformation may be required (general transformative capacity).

We expected adaptive/transformative capacities would have been built or enhanced in the NRM community and at least some place-based, industry-based, problem-based or culturally-based communities after a full five year study period in far north Queensland. These expectations have been tempered by institutional barriers and our primary funder's decision not to continue with the last two years of the project. However, a review based on our transformative capacity heuristic (Figure 12) for the Cape York and Wet Tropics regions indicates that progress towards building transformative capacity is being made, albeit slower than expected.

Exit interviews suggest a similar prognosis could be made for the Torres Straits Region where a team from CSIRO and JCU are trialling resilience assessment as a change strategy. Communities are engaging and apparently responding but action is slower than anticipated.

Communicating and assessing transformative capacity

Partners have found that the heuristic developed for building and assessing transformative capacity has been useful and reflective of NRM business. Several versions of the heuristic were tried in reports but the biggest impact, as an awareness and capacity building conversation starter, has been when it was constructed on a whiteboard with NRM leaders. This freehand construction allowed business as usual aspects to be highlighted first followed by the more transformative aspects to demonstrate how they could change their understanding of situations and practice.

In this way we now understand that the heuristic is useful for demonstrating:

- the importance of natural, social, human, financial and built forms of capital and the services they deliver for renewal of communities and industries
- how establishing governance structures as spaces for the four key processes of collective learning and alliance building to take place, builds understanding and practices that helps communities to help themselves
- how building capacities for interpreting signals of change, challenging the effectiveness of business as usual, breaking the patterns of the past, and nurturing innovations would orientate the collective leaning toward transformation as an option
- how applying key stimulants of transformative action would open up opportunities for social learning and radical self-organisation.

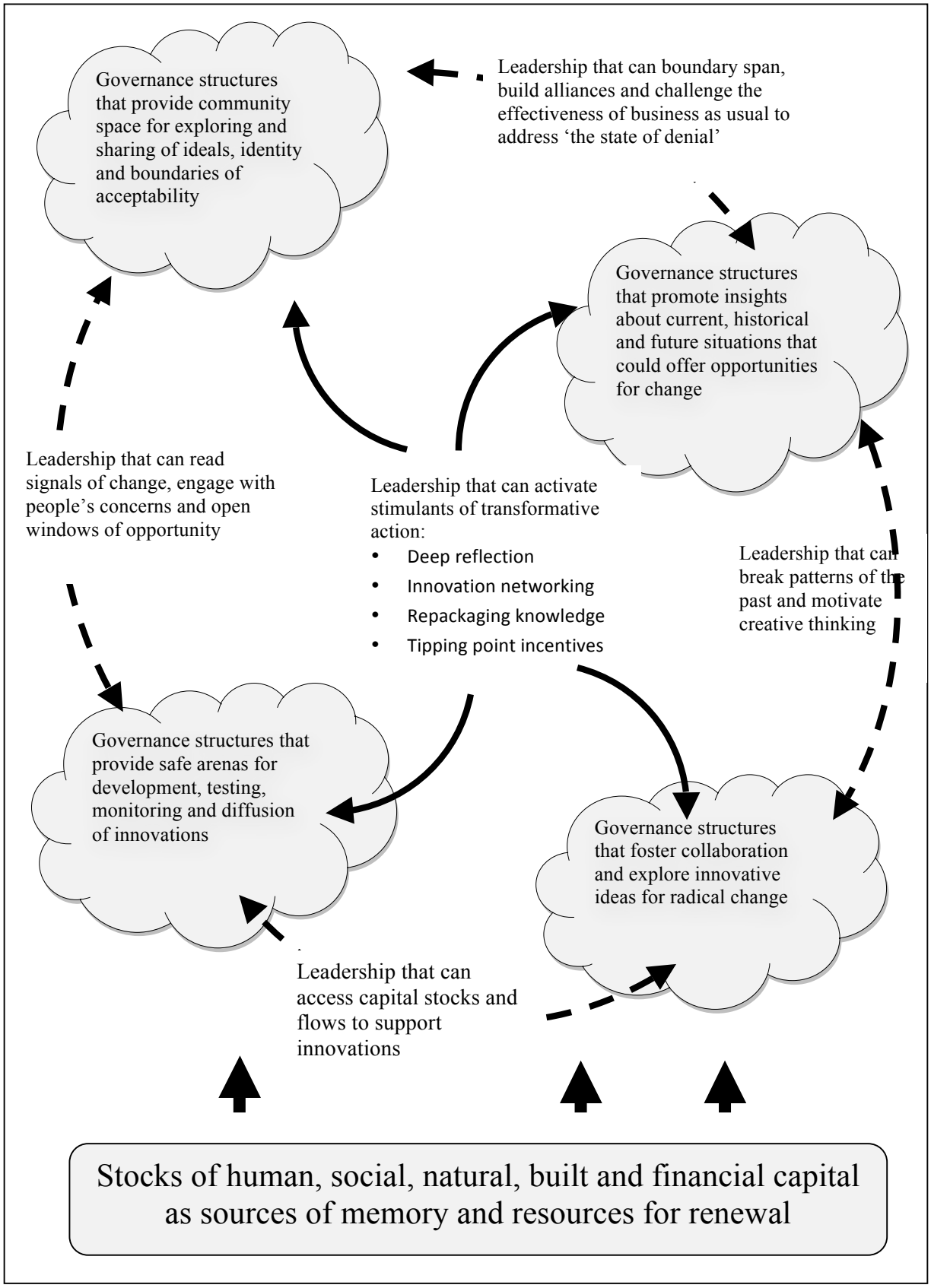


Figure 13: A transformative capacity heuristic

The key stimulants of transformative action derived from the literature are deep reflection, fostering and bridging innovation networks, reframing and repackaging knowledge, tipping point incentives and transformative or emergent leadership. By assessing these components

we can make an overall assessment of whether transformative capacity has been built in organisations, social-ecological systems, around particular intractable problems or across whole regions.

Functional governance structures established as spaces for collective learning

We have reported previously that transformative capacity was substantially built within the MCMA[10] and there was evidence of a similar process happening in the regional community. The CMA had established governance structures for scoping problems, sharing values and deepening understanding and insight of how place based or identity based SES (which they labelled as local landscapes) worked as spaces for social learning. It was also applying the key stimulants of transformative action in their engagement with regional communities. Their spaces for radical redesign of systems and for nurturing those innovations through to action were less well developed.

Follow up interviews were conducted with staff from Murray Local Land Services (which absorbed MCMA) who were involved in establishing new governance arrangements and the CAP planning process in that region. Through these interviews we hoped to assess if the embryonic transformative capacity identified in 2012 is enhanced in regional communities or has been reduced in the forced transformation of their organisation. The interviews reinforced our earlier findings that the Transformation project has built individual and by default organisational capacity to address complex problems, with the staff interviewed utilising key concepts in their area of influence and responsibility. Specific examples mentioned during the interviews of where project concepts were being applied included in the design of new governance and community advisory groups, designing processes for collective learning with community groups, and using system approaches developed under the MCMA planning approach to identify on-ground interventions and actions. The range of practical examples illustrates broad based capacity has been built within individuals and teams. It is unknown if this capacity can be maintained and spread through the new organisations as the reforms, driven by central government, continue to roll out.

Structures for collective learning with regional communities are being built through the roll out of NRM planning processes in both Cape York and the Wet Tropics. Terrain NRM has approached this in a similar way to MCMA although is making a number of modifications to engagement and system analysis options. They are also choosing to call their place based planning units ‘local landscapes’. We have not been provided with any reflections or results yet from engagement events so are not in a position to assess their effectiveness from a process or outcomes perspective.

SES are not fixed entities in the Cape York model but allowed to emerge around efforts by communities to tackle intractable issues for which CYNRM has funding. The structures in this case are built into the project design. The learning is regarded as being more iterative through regular contact within these groups. For example, a group of graziers, Indigenous traditional owners and conservation managers who had not previously worked together are

[10] Griffith et al, 2013. Taking Transformative Action in the NSW Murray Catchment Region. Progress report for the Transformation for Resilient Landscapes and Communities project, to Rural Industries Research and Development Corporation, Canberra, ACT.

building trust and sharing knowledge and resources in a new space by starting with one intractable problem (e.g. the spread of a weed called 'sicklepod' in their area of the central and western Cape). It is intended over time, and as trust and capacity increases, to introduce practical resilience and systems analysis guides and eventually the idea of thresholds as well as to move on to tackling more integrated suites of problems including fire management, weeds, pests, soil erosion and resilience of the grazing sector. The learning is taking place at several levels with a forum for graziers established in which conversations are held about issues that are critical to ensuring resilience in the industry and longer term sustainability. This pattern of providing space for self-organising communities to work on their priority issues is also evident in a number of these groups, which collectively cover significant areas of Cape York and all of the priority issues.

The establishment of the Cape York Atlas as a learning centre is another example of innovation in the Cape York *planning by doing* system. Both individuals and communities can add to the knowledge base as new understandings become available through projects. They can also access the knowledge provided by others consistent with cultural norms and limitations placed by knowledge holders. The Atlas is based on the idea of multiple forms of knowledge and has capacity for external knowledge where appropriate. For example, we attended an Indigenous traditional fire workshop and later were able to frame our learning from the event in the form of a causal loop diagram, which our regional partner found useful. The Atlas concept and a related initiative being put in place by Terrain NRM are significant new partner contributions to the partnership aim of re-imagining NRM for resilient landscapes and communities.

Examples of extra capacities that shift adaptive capacity to transformative capacity

A positive foundation for transformative capacity is providing the enabling space for social learning to take place across our case study regions. However, what we have been looking for in this study are those extra levers that would introduce the option of transformation as a feasible opportunity for regional communities. These levers would address known barriers like the 'state of denial' and promote novel solutions.

The four extra capacities proposed in our transformative action framework have been given considerable attention in the Cape York approach to *planning by doing*:

1. The first example relates to interpreting signals of change. In resilience language it is a demonstration of tight feedbacks. A new system of information scanning and feedback has been designed and is currently being rolled out to work in conjunction with the Cape York Atlas. This is essentially a community monitoring arrangement with live feedback so that data, pictures, maps, videos, etc., are downloaded to the Atlas and become available to users.

2. There is also evidence of questioning the effectiveness of business as usual in the Cape York system in the grazing example given above and in the West Coast Turtle Threat Abatement Alliance. This comes from comparing shared ideals and aspirations with availability of capital stocks and services and with understanding how the current social-ecological interactions work.

3. There are some examples, again from these projects, that patterns of the past and old dependencies can be and have been broken. The lessons of how difficult this can be

have been learnt the hard way by Cape York NRM in its attempt to develop new accountabilities around project delivery.

4. There is also evidence, in Cape York NRM's handling of these projects, of nurturing innovations through the turbulence created when old patterns are broken and novel solutions are introduced. Together, these are very significant achievements and foundations for transformative capacity in the Cape York NRM system.

It is too early to judge if these extra capacities will be developed in the Wet Tropics.

Applying stimulants of transformative action in Cape York *planning by doing*

There is strong evidence from exit interviews, in both the Murray case study and from more recent work in FNQ, that partners have understood the concept of stimulating transformative action and accept the value of the particular stimulants we originally proposed. There is also strong evidence, to a greater or lesser extent, that each has been adopted in principle by our partner NRM organisations and embedded in their culture. All leaders interviewed were able to give examples where deep reflection is taking place leading to both incremental adjustments to processes such as Indigenous engagement around climate adaptation in Cape York and to more radical redesign.

CYNRM also report that the stimulants have been applied in project design and in the design of the overarching *planning by doing* framework in which these projects sit. Reviews of these project proposals show that emergent leadership arrangements have been promoted through a network of champions supported by the NRM body. Innovation networking has been considered in novel ways, which suit the cultural and political contexts. Knowledge reframing is prominent in the proposals. Even tipping point incentives, which is a new idea and one difficult to grasp without understanding how thresholds operate, are mooted for application further down the track. This is a major achievement by this particular partner.

The impression from exit interviews is that the opportunity to apply the stimulants within the reality of project conversations will take place in the near future.

Key lessons and ways forward

The key lessons in transformative capacity include:

i. It is too early to ascertain from practice examples, but exit interviews conducted with our FNQ partners would suggest that the transformative capacity heuristic has been useful and has relevance to NRM leaders and practitioners. Its usefulness is enhanced when it is used face to face with explanation. The same effect has been difficult to capture in written form so far.

ii. Reflection on transformative capacity by partners and observation by the research team has led to a minor reframing. Transformative or emergent leadership while remaining a key stimulant of transformative action needs to be given a higher status as it is required to activate the other four stimulants as well as to establish governance structures and orientate capacities towards transformation. Our short report '*Transformative leadership for resilient landscapes and communities in regional Australia*' provides more detail and reinforces this shift in emphasis. The

implication is that communities, support organisations and change agents should pay particular attention to this form of leadership. Indications are that it is equally important in responding to externally imposed transformations.

iii. While the 'clouds diagram' (Figure 11) has its strongest roots in resilience theory and methodologies modified by social/collective learning principles and techniques, the situation is reversed for the transformative capacity framework/heuristic where governance takes a much more prominent role. For application in NRM, based on our experiences in the case studies and evaluations elsewhere, focusing on resilience tends to push communities toward a glass half full outlook and conservative action. That is, communities are interpreting resilience as a property that will overcome the necessity for change. Hence, communities are embracing resilience as a goal but not looking for any radical action or reorganisation, which is both contrary to nuances of resilience theory and to assumptions underpinning why we chose resilience as one of our starting concepts. It could also be a factor in why regions that have based their planning on the 'clouds' heuristic (Figure 11) have shown less interest in transformative capacity. Focusing on collective learning and using resilience assessment as a knowledge input seems to be opening up the option of transformation far more in Cape York. This issue is an area for further research.

Reflections on the partnership

In the introduction, we made the point that change is an important and often taken for granted consideration in both daily life and in public policy. Individuals, organisations and various types of communities have to make decisions about the direction, scale/depth and pace of change and take into account the likely effects on their well-being, their identity, their future options and the environment in which they live, work and play. They often have to do this in a context of high levels of complexity and uncertainty and low levels of controllability, as is the case in NRM. These decisions can be reactive to change, instigated by others or from elsewhere, or they can be intentionally proactive.

Most studies of change seek to understand how events unfold through hindsight. However, in this study our partners were more interested in proactively influencing the direction, scale and pace of change in real time. We had initially intended to work closely with regional communities as they engaged with NRM issues. However, and as is often the case in participatory action research, this expectation changed during the study and we actually ended up testing ideas such as transformational change, transformative capacity, resilience, adaptive governance and collective learning primarily through designated regional NRM organisations.

Over the past five years our partners have focused on the daunting task of developing community capacity to take transformative action for deep systemic change toward sustainable resource use. Although this is an agreed societal goal it is poorly understood and weakly pursued. The scale of this task is substantial involving both halting the decline of natural capital stocks, and in some cases improving them, while putting in place strategies to support on-going sustainable resource use. The pace of change required needs to be rapid enough to make a difference and slow enough to interweave with the complex social-ecological interactions that both affect and are effected by change.

As a result, our reflections are about the capacity of these organisations to provide change leadership, the role they play in regional sustainability and the effectiveness of the governance arrangements within which they operate to support innovation and change leadership.

Transformative capacity in the NRM system

There is a well-developed capacity among community leaders, NRM officials, NRM practitioners and landholders to understand the challenging ideas and concepts on which this study was based. They have been able to contextualise them for use in their localities and regions and to apply them to important resource issues that have persisted in NRM for a number of decades. The ideas and language were initially challenging to most but became less threatening with careful thought leadership from partners and some trust building by the research team, to a point where we can say with confidence that NRM practitioners are not fearful of engaging communities with these ideas. This has confirmed for us the resonance of resilience, adaptive governance and collective learning concepts with stakeholders in NRM.

We can also confirm that integrating resilience, adaptive governance and social/collective learning theories has application for NRM. This has been demonstrated through the

emergence of social-ecological forms of planning in 25 regions across five States. Evaluations in NSW have indicated advances over previous models of planning with *social-ecological planning* delivering improved engagement and more meaningful conversations with land managers over issues that matter to them. There have been governance improvements for implementation, more transparent priority setting and tighter logics for investment. Further, there have been radical changes to the concept of an NRM plan and how it remains relevant over time. Gaps, misconceptions, deficiencies and methodological limitations in early attempts, including a tendency to conservatism, are being addressed in more recent efforts. The *planning by doing* approach, advances in resilience assessment and concepts of knowledge hubs being developed in FNQ regions, are showing great promise and are more overtly focused on transformative action. These examples indicate that regional NRM organisations can play a significant emergent leadership role in assisting regional communities to adapt to changing conditions and to instigate transformative action.

A network of skilled and enthusiastic leaders, practitioners and landholders is developing. They are supported by a set of ideas, frameworks, heuristics and tools that have been explored and trialled *in situ*. The establishment of the Resilience Planning Community of Practice is an example of a collaborative networking capability and capacity building. The CoP has its own website and capacity to exchange ideas and case studies and is an example of social learning in practice. In conjunction with the impact of social-ecological forms of planning this further confirms for us that the ideas this study was based on are considered by practitioners to be both practical and worthy of spending effort and time on further development.

The interventions that mobilise transformative capacity have been successful in some cases, notably in transforming governance. Other attempts have had marginal success or failed; as was the case in the Wakool Shire. Events are still unfolding in most cases. This indicates the understanding necessary to manage the direction of change in practice away from business as usual is only partially developed. This includes the need to further develop NRM organisations as change agents and NRM plans as vehicles of transformative change as well as better tools.

The growing adaptive and transformative capacity in the system seems to have emerged despite system constraints. From our observations, regional NRM organisations are not receiving adequate support to be fully effective in facilitating adaptation and/or transformation. Over the past five years the system of NRM governance in this country, of which regional NRM organisations are a part, has produced an operating environment bordering on chaotic for our partners. Cited in this and other reports, and in our resource kit, are numerous examples of our partner organisations embarking on a particular considered strategic course of action with community agreement and support only to be delayed, bogged down in paperwork and in some cases undermined by changes to policy and program administration. The high transaction costs involved are diminishing their capacity to learn and innovate and diverting attention from a focus on action on the ground.

Implications for NRM governance in Australia

Some key aspects of the NRM system in Australia need urgent attention if it is to build and support resilient landscapes and communities.

The narrative around NRM lacks clarity of purpose and function. It is confusing on scope, poorly articulates what is meant by success and has failed to mobilise bipartisan support. The result is unproductive pendulum swings in policy. A coherent, opportunity focused, consolidated narrative, which has bipartisan political support and with which corporate and civil society actors in the system can identify, is urgently needed. A number of new models of NRM have emerged from applications of *social-ecological planning* that challenge the status quo and may provide options for developing this new narrative.

A lack of a coherent narrative has led to a similar lack of clarity around an appropriate fit between the type of problems that characterise NRM and the application of conceptual frameworks in the design of governance arrangements, modes of planning, programs and projects. Hybridisation of concepts like sustainability, the Pressure-State-Response (PSR) framework, Integrated Catchment Management (ICM) and adaptive management with neo-liberalism has become so complex that any benefits are now obscured. At the same time, they can over emphasise efficiency and inappropriate use of competitive approaches leading to unintended consequences that are further limiting their effectiveness. There is an opportunity to rethink the conceptual foundations of NRM in such a way as to garner bipartisan support through the introduction of resilience, adaptive governance and collective/social learning in an inclusive systems framework.

Ongoing relationship tensions in the governance system over who owns the problem and who can best provide solutions are also undermining productivity. Each new iteration of policy attempts to redress the claims of omission of one civil society group succeeding only in alienating others and reinforcing the tensions. This unproductive and socially divisive cycle needs to be given priority attention and be replaced by a governance model that focuses on effectiveness. Our work with regional NRM partners has demonstrated that these organisations can play a critical leadership role in the system. They operate effectively as planners, coordinators, bridge builders and change agents. However, they are compromised in these roles because they cannot exist without also being active delivery agents of government programs. Attention needs to focus on a way forward in which governments support the legitimacy of regional NRM organisations as a 'third sector' to play these critical roles.

Over a decade ago, the multi-level and generally polycentric arrangements in NRM in Australia were widely lauded and held much promise. However, these arrangements have not fully come to terms with either the scale sensitivity of most NRM challenges, or with the notion of devolution. The across-the-system responsibility has been devolved but the power has not. While our multi-regional case study did not shed adequate light on a potential way forward the different models of governance developed by partners have much to offer.

The funding and MERI models reinforce a welfare dependency approach to NRM that entrenches unhelpful power relationships and locks governments into a paradox of owning the NRM problem but being unable through financial investment alone to actually make serious inroads into the problem. A major rethink is required. Our partner regions have all made significant progress with governance models that seek to help communities to help themselves and with creating tight feedback loops through information sharing. Separating funding for planning, MER coordination, knowledge brokering and capacity building from mainstream project delivery may be a way forward. It would also be a sound investment for

governments if they are to go down the path of reframing the NRM narrative as maintenance and improvement of ‘natural infrastructure’.

Addressing these key areas of the governance system should remove much of the institutional rigidity and excessive transaction costs which are inhibiting effort on innovation. These issues and a potential role for regional NRM organisations in a more adaptive NRM governance system are covered in more detail in our short report ‘*Rethinking NRM for resilient landscapes and communities’.*

Glossary

Adaptations: changes that fit with new situations or surroundings; sometimes as slow incremental adjustments and at other times as abrupt change or transformations.

Adaptive cycle: a widely used heuristic to characterise the growth, decline and re-growth stages that many systems – or parts of a system – experience over time.

Adaptive capacity/Adaptability: the capacity to adapt and to shape change. Adaptability is the capacity of actors in a system to influence resilience. In a social-ecological system, this amounts to the capacity of humans to manage for resilience.

Adaptive governance: societal power-sharing, institutional and decision making arrangements that can readily adapt in the face of uncertainty and constantly changing circumstances, and that can deal with different knowledges, values, interests, perspectives and power in ways that enable effective self-organisation in the face of change.

Adaptive management: structured learning-by-doing; the implementation of policies and programs in flexible ways that enable frequent monitoring, reflection on assumptions and changes in methods of implementation through learning.

Agency: capacity to carry out individual will – extended here to include capacity of a whole community to exercise its collective will.

Capitals Framework: a sustainability framework developed by the Forum for the Future in the 1990s, as a way of describing the five sources of capital stocks from which goods and services are derived. The five capitals are: natural, social, human, built and financial.

Collective learning: structured learning by a group of individuals with diverse interests and different ways of knowing (i.e. with different knowledge cultures) that come together to tackle intractable problems through a creative synergy

Feedbacks: signals within a system that loops back to control the system. In natural systems feedbacks can help to maintain stability in a system (negative feedback) or it can speed up processes and change within the system (positive feedback).

Heuristic: a useful, but not always universal, rule of thumb. A visual model or a metaphor to aid interpretation, for example the adaptive cycle

Identity: the key structures and functions that characterise a system and that make it what it is. In science it is purely descriptive. In a social sense it is normative – what we identify with, or belong to, including a place or landscape or community or industry. In a personal sense it is who we are or believe we are. These distinctions lead to confusion and misinterpretation.

Landscape: visible product of current and historical interactions between humans and their environment. They can be thought of as complex adaptive social-ecological systems. Some of the shaping forces can be slow and barely noticeable while others can be rapid and result in abrupt change.

Panarchy: the influences of multi-scale interactions; understanding that a system experiences a range of feedbacks across and between different scales. The term derives from adding pan- (across everything) to -archy (denoting a type of rule or government, as in hierarchy, monarchy, etc.).

Participatory action research: research where those being studied are collaborators, co-learners and/or co-designers of the research process and outcomes; where the researchers seek to actively influence the outcomes of the phenomenon being studied.

Planning-by-doing: a form of adaptive planning where plans are gradually built and updated from learning gained through taking action in projects. This is in contrast to comprehensive plans, which precede implementation and are reviewed periodically, nominally every five years.

Reflective Transfer: an extension of reflective practice used to describe the process of taking learning from one situation in a case study and providing the latest and up to date version of heuristics based on that learning to new partners.

Regime: a term from resilience science describing the set of possible system states within a stability landscape. A regime has characteristic structures, functions, feedbacks and therefore, identity.

Regime shift: is the rapid reorganisation of a system from one relatively unchanging state (or regime) to another.

Resilience: the ability of a system to absorb shocks, to avoid crossing a threshold into an alternate and possibly irreversible new state, and to regenerate after disturbance. There can be two types:
General resilience – The resilience of any or all of the parts of a system to all kinds of shocks, including novel ones
Specified resilience – The resilience 'of what, to what'; resilience of some particular part of the system, related to a particular control variable, to one or more identified kinds of shocks.

Safe arenas: a space where innovative practices and ideas can be nurtured without undue interference from countervailing forces

Scenario: scenario is a story that describes a possible future, by identifying significant events, actors and mechanisms. A set of scenarios that bracket the range of possible futures is a useful tool for examining the kinds of processes and dynamics that could lead to a SES developing along particular trajectories.

Shadow networks: networks of people that operate outside formal societal structures and can explore alternative futures with freedom.

Social-ecological system (SES): an integrated system of ecosystems and human society with reciprocal feedback and interdependence. The concept emphasises the 'humans-in-nature' perspective.

Social learning: broad-based societal changes in thinking that have resulted from shared experiences or purposeful collaborative activity – usually depicted as the outcome from such shared learning, but is also presented as the process of how to achieve such an outcome.

Stable state: refers to a system with stability. Stability being the ability of a system to return to an equilibrium state after a temporary disturbance. The more rapidly it returns, and with the least fluctuation, the more stable it is.

State variable: a component in the system for which the amount of that component can be tracked or measured. State variables include items such as land, biomass, livestock, farmers, roads, etc.

Threshold: a breakpoint on a trajectory of change for a particular variable (especially one that changes slowly) that, when crossed, changes a critical feedback causing the system to reorganise along a different trajectory and into a new regime.

Tipping point: he moment of dramatic, rapid change such as, with the rapid rise or fall of an epidemic, or critical mass of voters in an election.

Transformation: a change that results in a fundamentally new structure, function, feedback loops and identity. Can apply to personal world views or mental models, and paradigms. There can be two types.
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.
Forced transformation – an imposed transformation of a social-ecological system that is deliberately introduced by external actors.

Transformative capacity: the capacity to create a fundamentally new system when ecological, economic, or social (including political) conditions make the existing system untenable.

Transition: a transformation from one recognisable form or state to another, which takes place over a period of time by incremental steps.

Wicked problem: a highly complex and intractable problem such as those related to NRM and sustainability; a problem that is shared and persistent, where existing solutions often impede change and where more effective solutions can come from unexpected sources.