section four

Facing up to wicked problems

The complexity and value-laden nature of sustainable development as shown in the previous sections provide examples of wicked problems. Creating solutions to these require new modes of thinking and new ways of working. Here we reflect on some of the theoretical insights and how these play out in practice. Much of this is in its infancy and the pathways to maturity will take time and considerable effort.

We first look at academic insights, then provide an example in practice in Canterbury, before we examine a suite of technologies that are being developed to help us face up to wicked problems. We conclude with a review of how sustainable development strategies have been developed in New Zealand and Scotland.

Sustainability Technologies 101: 'Wicked problems' and other such technical terms

Good research builds on theoretical insights as well as experimental evidence. Here we reflect on our readings and writings

Looking through a Governmentality lens – a bit more theory

A specific framework to understand and assess society's progress to greater sustainability

Water allocation. Canterbury's wicked problem

The management of water allocation and quality is critical for New Zealand's long-term prosperity and well-being. The bulk of this is allocated in Canterbury where it represents a problem of a truly wicked nature

Social learning – a basis for practice in environmental management

Social learning as a framework for approaching complex problems

Sustainability appraisal techniques

A brief summary of techniques examined and some of the main points arising

Getting under the bonnet. How accounting can help embed sustainability thinking into organisational decision making

Accounting technologies can be a surprisingly successful vehicle to stimulate organisational change to greater sustainability, as these case studies demonstrate

Stakeholder analysis

An assessment tool for identifying and better understanding critical stakeholders

Supporting effective teamwork

A checklist for evaluating team performance

We are not alone: National Sustainable Development approaches in New Zealand and Scotland

We examine the Scottish National Sustainable Development Strategy and the NZ Sustainable Programme of Action to assess progress and identify future needs

Sustainability Technologies 101

Wicked Problems and other such technical terms

Bob Frame

Summary

- Here we define terminology used within research to build capacity for sustainable development. Researchers often coin new words to explain the phenomena they are investigating. Sometimes these words help clarify what is new, and sometimes, alas, they obscure the innovation and blanket it in impenetrable jargon. If society is serious about building capacity for sustainable development then consistent, transparent terminology is essential. However, in some situations, this does mean branding new concepts so that the difference from business as usual is made clear for policymakers and other interested parties.

- This chapter explains some of the concepts used elsewhere in this eBook, namely 'wicked problems', 'post-normal science', and 'sustainability technologies solutions', and puts them in the context of broader scientific literature. It then looks at one example, Futures Studies (discussed in detail in Chapters 1 & 4), as a useful example of a sustainability technology. It also points the reader towards some of the formal academic journal articles developed under the project.

INTRODUCTION

Many existing technologies (e.g. cost–benefit analysis or environmental impact assessment) at the science–policy interface were developed to support decision-making in a world of infinite resources where rational decisions could be developed from relatively simple models of processes. While still perfectly adequate for specific purposes, many are insufficient for the complexities of contemporary society and its drive towards greater sustainability. New technologies are required that, while building on knowledge and experiences to date, will need to be very different from those upon which they are built. It is only by examining the ways in which sustainable development will sharply differ from our current state of unsustainable development that we can develop new technologies to extract ourselves from our current predicament. We first examine the concept of wicked problems to describe elements of that predicament.

WICKED PROBLEMS

'Wicked' problems can't be solved, but they can be tamed. Increasingly, these are the problems strategists face – and for which they are ill equipped. John Camillus, Harvard Business Review, 2008[1]

The term was originally coined by two management scientists, Horst Rittel and Melvin Webber, formally in 1973[2] to explain social policy and planning. In recent years the term has become fashionable in relation to planning for infrastructure, developing company strategy and broader policymaking. In 2006, Steve Rayner[3] reduced Rittel and Webber's characterisation to unique aspects of wicked problems, that is, they are:

- Symptomatic of deeper problems
- Unique opportunities that cannot be easily reversed
- Unable to offer a clear set of alternative solutions
- Characterised by contradictory certitudes
- (Contain) redistributive implications for entrenched interests
- Persistent and insoluble

These characteristics have gone on to become part of the management literature, as noted in the quote from John Camillus at the start of this section and by others including Jeff Conklin.[4]

To complement his characterisation, Steve Rayner described three types of solutions strategies that are typical responses to wicked problems, and notes that each of them reflects a coherent organisational worldview that shapes the definition of the problem to be addressed:

- Hierarchical strategies which simplify issues and apply routine, such as new forms of legislation that exert authority
- Competitive strategies which rely upon expertise to control resources, such as market-based mechanisms or use of incentives
- Egalitarian strategies which open the problem to more stakeholders, through participatory processes such as citizen juries

The characterisations and types of solution strategies provide a useful means by which to examine and understand wicked problems in, for example, development of the Auckland Sustainability Framework[5] (See Chapter 3) and Canterbury Region's water allocation (See Chapter 21). They also help us understand the potential impact of strategies developed to address them. Global wicked problems include climate change, healthcare, AIDS, pandemic influenza, international drug trafficking, terrorism, and nuclear energy. Indeed so wicked is the problem of climate change that it has even been termed a 'super-wicked problem'.[6] Why is that? Well much of the evidence from climate science arises from very highly structured experiments that inform our understanding of how the concentration of greenhouse gases in the atmosphere warms the planet. However the results will always be provisional and it may not be possible to provide a cast-iron definitive answer.[7] Yet society cannot afford to await such results as the stakes are too high and the levels of uncertainty too serious.

For example, as Lazarus[6] points out, for change legislation to be successful over the long term it needs to develop institutional

responses that insulate responses from '*powerful political and economic interests propelled by short term concerns*.' This brings up a deep-seated contradiction as traditional lawmaking implies that the present should not be allowed to bind future lawmakers. In other words strategies are needed that do NOT '*protect the present at the expense of the future but the precise opposite: to protect the future at the expense of the present.*'

To the established criteria for wicked problems, Levin et al.[7] add three more for climate change:

• Time is running out

• No central authority

• Those seeking to end the problem are also causing it

In some ways this uncovers a tension about the role of science, and its authority with wider society. In other words, how does scientific 'knowledge' interact with other realms of understanding such as politics and ethics? To understand this a little more clearly we need to study what we mean by science and how that plays out in practice – especially around some of the wicked problems. And to be open to the possibility that a 'new' way of doing science may need to emerge where values are embedded in the way science is done.

NORMAL SCIENCE AND, WELL…NOT SO NORMAL SCIENCE

Science has traditionally sought to be universal, objective and context-free. It was characterised by a lack of reflection by researchers and social actors on their worldviews and their socio-political contexts. Much of the philosophical discussion about this was marshalled in the 1950s and 1960s by Thomas Kuhn resulting in his classic text *The Structure of Scientific Revolutions* in 1962. He argued that science doesn't progress by a linear accumulation of new knowledge, but undergoes periodic *paradigm shifts* in which scientific inquiry in a particular field is abruptly revolutionised. In particular he argued that science is broken up into three distinct stages. *Pre-science,* which lacks a central paradigm, comes first. This is followed by *normal science*, when scientists attempt to
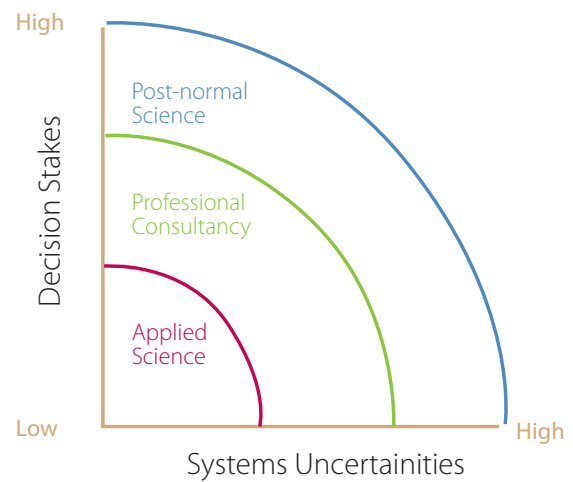

Figure 1 How science responds to increasingly complex decision stakes and uncertainties (Funtowicz and Ravetz's classic 1993 diagram). The key is that as science moves away from laboratory type experiments where conditions can be tightly controlled to 'real-world' complexity – additional skills such as facilitation and systems analysis are needed that build on traditional core scientific disciplines.

develop and enlarge a central paradigm by puzzle-solving. As anomalous results build up, science reaches *a crisis*, at which point a new paradigm, which subsumes the old, is created into one framework that incorporates the anomalous results. This is termed *revolutionary science* (in the sense of a scientific not a political revolution) with examples such as Einstein's theory of relativity, which challenged Newton's concepts of physics, or Darwin's theory of natural selection, which was an affront to theories of a world governed by design.

Kuhn also argued that rival paradigms are incommensurable – that is, it is not possible to understand one paradigm through the conceptual framework and terminology of another rival paradigm. In our Building Capacity project, we have repeatedly come to the same conclusion – namely, that the complexity of addressing sustainability cannot be addressed through the kinds of technologies that have delivered the crisis that we are now struggling to address. Fortunately other researchers globally have already wrestled with this and proposed a solution which has been gathering momentum in recent years.

Post-Normal Science (PNS) was developed by Silvio Funtowicz and Jerome Ravetz and first published in 1993[8] as an attempt to characterise a methodology of inquiry that is appropriate for cases where 'facts are uncertain, values in dispute, stakes high and decisions urgent'. In this context post-normal science is the natural partner to wicked problems. It is primarily seen in the context of long-term, complex issues such as climate change

where we possess less information than we need. Its current relevance was revisited by Jerry Ravetz in 2006.[9] It is most well known through the diagram in Fig. 1, which reinforces the notion that post-normal science builds out of existing applied science and is informed by real-time experiences gained through professional consultancy. It should not be interpreted as a school of thought that is in opposition to contemporary practices. Rather it seeks only to extend the horizon and overall usefulness.

As a result PNS often struggles to deal with the uncertainties in real-world organisational and public policy contexts. A new form of research has been developing over the last 20 years or so, mostly in theoretical discussions, which implies a qualitative change in the way science and policymaking are approached.

PNS draws attention to aspects of uncertainty (e.g. through a lack of hard scientific data) and values that are often downplayed (or ignored) in traditional research (e.g. cultural attitudes to issues such as AIDS). Taking this a stage deeper we can see connections, for example, between family planning and climate change emerging. In a 2009 report from LSE[10] it is argued that public spending on family planning over the next four decades would reduce global CO_2 emissions by almost five times more than the same spend on low-carbon technologies. By meeting basic family planning needs, 34 gigatons (billion tonnes) of CO_2 could be saved – equivalent to nearly six times the USA's annual emissions. UN data suggest that meeting unmet needs for family planning would reduce unintended births by 72%, reducing projected world population in 2050 by half a billion to 8.64 million. This example shows that each of these elements (i.e. family planning and climate change) on their own is but one part of the overall complexity. Elsewhere Satterthwaite[11] points out that 'it is not the growth in (urban or rural) populations that drives the growth in greenhouse gas emissions but rather the growth in consumers and in their levels of consumption' (p. 545). Thus climate change becomes interwoven with consumerism and the perpetuated myth around economic growth – which remains sacrosanct above many other belief systems. However, research to reveal and evaluate practical solutions is very much in its infancy and it offers great opportunities to those successful in seeing beyond the current paradigm.

PNS more involves managing complexities to do with questions of survival than addressing uncertainties to do with technological risks. For example, regarding climate change it may question underlying assumptions of economic growth and success rather than suggesting palliative measures such as carbon offsets through tree plantings. This requires institutions to adopt new knowledge-making processes within risk-laden, uncertain environments.

In addition to recognising uncertainty, PNS also takes concepts of stakeholder input and democratic participation beyond notions of an integrated, single and internally consistent framework to one which allows for the coexistence of a diversity of perspectives and ways of understanding. It opens up possibilities for more inclusive, open and ongoing engagement processes.

However, one of the main difficulties of PNS is that it usually runs counter to the tide of existing normal science. That is, the bulk of contemporary scientists are working within an existing paradigm and they find it hard (or indeed possibly frightening) to step outside that paradigm to contemplate alternative stratagems. To do so requires courage and conviction to argue against one's peers in disciplines that are often deeply conservative in their belief systems. As a result, PNS is not widely accepted in established traditional institutions. PNS, however, may well offer the biggest opportunity for true innovation and competitive advantage around issues such as climate change. Yet this is not going to win the hearts and minds of risk-averse funding agencies looking for safe bets.

SUSTAINABILITY TECHNOLOGIES

Building on the theoretical notion of post-normal science, to be effective for sustainability, technologies[12] would be significantly different from existing normal forms. Such sustainability technologies (STs) would require very different structures than hitherto. It is important to understand that we are describing not just 'hard' technologies ('widgets' or machines) but also processes (such as accounting and decision-making) and that both have their place as enablers for society to control and adapt to its environment. In particular it seems likely that STs will comprise a mix of the following elements:

Technology is a broad concept that deals with our usage and knowledge of tools and crafts, and our ability to control and adapt to our environment.

Its origins are in the Greek *'technologia', 'τεχνολογία' — 'techne', 'τέχνη'* ('craft') and *'logia', 'λογία'* ('saying').

It can be defined as:

1: Practical application of knowledge in a particular area (e.g. medical *technology*)

2: Capability given by the practical application of knowledge (a car's fuel-saving *technology*)

- **Extended peer communities** – initiatives that involve multiple groups of people in decision making and policy implementation around sustainability issues and may include people without formal institutional accreditation who have a desire to participate in attempts to resolve an issue (e.g. citizens' juries). In this context extended peer communities are the only mechanism that enables the full range of relevant types of knowledge to emerge and develop into a meaningful solution. Increasingly, extended peer communities operate in the virtual space, through new social movements or in science shops such as set up in Europe to make innovation readily available to potential clients, and the Internet will provide extensive opportunities for experimentation.

- **Agonistic processes** – ways to deal with 'irreducible difference' through potentially positive aspects of certain (but not all) forms of conflict. This is not to say that agonistic processes will yield harmonious and peaceful patterns of cooperation. It is not about driving towards a middle ground of bland consensus. In other words one can compete, and one can win, but never once-and-for-all. Examples include term limits for political leaders, laws to guard against corporate monopolies, or appeals processes through environment courts. Conversely the lack of agonistic processes can result in a lack of challenge, for example, to the underlying issues of the dominant economic order, which is likely to inhibit the current trend towards unsustainability. Agonistic processes provide an approach that steers a course between token environmentalism ('plant a tree to prevent climate change') and utopian fantasies ('Save the Planet', 100% Pure, etc.). Agonistic processes are intended to provide a central role for diversity; they respect ideological conflict, and are sensitive to the complexity of power dynamics.

- **Citizenship and civic responsibility** – the concept of what is variously called active, sustainable, corporate, consumer and green citizenship, to name but a few. It is emerging as a way of bridging gaps between science, politics and practice, and empowering people to be responsive and responsible vis-à-vis sustainability. For example, it may lead to a shift away from public debate about reducing local rates and towards greater responsibility towards local environmental and social resources. In so doing it brings citizenship into the realm of post-normal science and enables people to be credited with multiple capacities and expertise that can support the co-production of knowledge about sustainability alongside professional public and private experts. It assume citizens have some expertise regarding sustainability issues in their own daily life and socio-political contexts

Collectively these three strands should take concepts of stakeholder input beyond simply broadening democratic participation to new processes of open dialogue. Or as Marco Verweij and others put it:[13]

'…we have at one extreme an unresponsive monologue and at the other a shouting match amongst the deaf. Between these extremes we occasionally find a vibrant multivocality in which each voice formulates its view as persuasively as possible, sensitive to the knowledge that others are likely to disagree, and acknowledging a responsibility to listen to what others are saying'.

Only through creating the capacity and capability for participatory decision-making and social learning, improved knowledge management and new institutional mechanisms can innovation and sustainability be delivered. And the important point here is that it is more than just social learning (discussed in detail in Chapter 22), although it builds extensively on those processes, but that it also works at a macro societal scale and not only at the level of the individual.

One of the other issues that STs may require to challenge is existing structures of power and authority in society. Managing complex and shifting social, economic and environmental issues requires thinking in post-normal terms and utilising STs. It also requires focusing on improving understanding of future governance and governing processes and governments and institutions to become much more critically reflexive, learning organisations.

FUTURES STUDIES AS A SUSTAINABILITY TECHNOLOGY

One example of a sustainability technology that has been developed in some detail in the FRST Building Capacity project has been Futures Studies (FS) (see Chapters 1 and 2).

The premise of FS is that through a better understanding of the medium to long-term future society (not to mention a historical

perspective or two) should be able to make better decisions in the present. Future scenarios are not intended to predict the future; rather they are tools for thinking about the future based on several assumptions. Firstly, the future is shaped by human choice and action. Secondly, the future cannot be foreseen, but exploring the future through plausible scenarios can inform present decisions. For example, we can create low carbon economies through redesign of the taxation regimes from income-based to resource-usage-based, especially around greenhouse gas emissions but also water and energy. Thirdly, there are many possible futures; scenarios therefore map 'possibility spaces'. Finally, scenario development involves both rational analysis and subjective judgement.

Futuring is the study of the present reality from the point of view of a special interest and knowledge about the future. Such techniques permit open discussion on contested topics and are ideally suited to the long-term issues relating to sustainability. To engage with these rich and inconclusive subtleties requires an analysis that identifies connections and general patterns that are context-specific. This means creating possibilities for technologies that involve the extended peer communities, agonistic processes and emerging forms of citizenship described above. Our experimentation with this in the Futuremakers project is described in (Chapter 1)

In other words, to achieve a futuring exercise that is meaningful and that will achieve shifts in understanding requires careful management that is as much about the process as it is the content. It requires qualitative as well as quantitative data, which means that complexity may be represented in ways other than analytical modelling. For example, managing quantitative data often requires simplifying assumptions that remove the very essence of complexity itself. An example of

this is accounting models that assume that the value of natural resources and other capital stocks will be as meaningful for future generations as they are today based on a model of indefinite growth.

The futuring approach specifically acknowledges that it is not intended to displace existing decision-making and planning processes but is intended to complement and inform them so as to increase their overall effectiveness. It should also be noted that this is an emerging area that FS researchers are grappling with globally and there is currently no easy off-the-shelf solution available. As such there is an opportunity for New Zealand to add some shine to its 100% Pure, Clean and Green image by developing these technologies as a potential export earner.

FINALLY, A WORD OF CAUTION

By introducing these three concepts and one example we have tiptoed between clarity around new ideas and an urge to flood an emerging area with a grandiose terminology only accessible to the initiated or the vain. However, the temptation to let loose with a quiver of inverted commas is considerable. As Frame and Brown noted:

As with many new knowledge forms, notably particle physics (with its charm, flavour and strangeness), post-normal science is…developing its own somewhat angular lexicon. Post Normal

Sustainability Technologies look set to be developed by researchers bristling with inverted commas in a world in which 'wicked' problems, such as 'strange' weather, are addressed through 'messy' governance to reveal 'clumsy' solutions for their 'thickly' 'cosmopolitan' citizens. These will be developed, no doubt, by 'post-disciplinary' researchers (including, perhaps, 'post-autistic' economists; see www.paecon.net) working in 'boundary' organizations and with 'polyvocal' communities.

Time will tell how pertinent such terms are and the extent to which they are fit for purpose. It is likely that they will only be temporary signposts on a long and complex path to build capacity for sustainable development. Yet, if so, they will still have served their function.

It is tempting to categorise interventions to address wicked problems in two ways. Small-scale solutions that raise awareness about issues – but not necessarily providing much more than a palliative. These are important and subtle events but they can only ever be part of the solution. Or, as David Mackay[14] puts it:

…don't be distracted by the myth that 'every little helps'. If everyone does a little, we'll achieve only a little.

However, it is going to be a brave step to take PNS from its current largely theoretical position to one where true innovation will be encouraged accompanied by successes in tackling some of the gnarliest and intractable issues of our times. Leadership is eagerly sought, with the prize of providing solutions (albeit partial) to the complexities of issues such as climate change a just reward for the courage and vision required. Large-scale solutions are needed that require institutional shifts on a scale not yet fully imagined. Practical examples of PNS are only just emerging and there is considerable opportunity for early adopters to *'make a real difference'.*

KEY PUBLICATIONS AND WEBSITES

Bebbington J, Brown J, Frame B 2007. Accounting technologies and sustainability assessment models. Ecological Economics 61: 224–236.

Bebbington J, Brown J, Frame B, Thomson I 2007. Theorizing engagement: the potential of a critical dialogic approach. Accounting, Auditing and Accountability Journal 20: 356–381.

O'Connor M, Frame B. Integration through deliberation: Sustainability of what, why and for whom? Submitted to Environmental Science and Policy

Connor M, Frame B. In a wilderness of mirrors: Complexity, confounded meta-narratives and sustainability assessment. Available as a Landcare Research Working Paper at www.landcareresearch.co.nz/publications/researchpubs/IAJ_Wilderness_of_%20mirrors_submissions.pdf

www.secondaryfutures.co.nz/matrix/2008/07/FutureMakers.php

REFERENCES

1 Camillus JC 2008. Strategy as a wicked problem. Harvard Business Review (May): 98–101.

2 Rittel HJ, Webber MM 1973 Dilemmas in a general theory of planning. Policy Sciences, vol. 4

3 Rayner S 2006. Wicked problems: clumsy solutions – diagnoses and prescriptions for environmental ills. Available at www.martininstitute.ox.ac.uk/NR/rdonlyres/C3EDD045-9E3B-4053-9229-9CF76660AAC6/645/JackBealeLectureWickedproblems.pdf

4 Conklin J 2005. Dialogue mapping: Building shared understanding of wicked problems. 1st edn. John Wiley.

5 Frame B 2008. 'Wicked', 'messy' and 'clumsy': Long-term frameworks for sustainability. Environment and Planning C: Government and Policy 26: 1113–1128.

6 Lazarus RJ 2009. Super wicked problems and climate change: Restraining the present to liberate the future. Cornell Law Review 94.

7 Kelly Levin K, Bernstein S, Cashore B, Auld G. Playing it forward: Path dependency, progressive incrementalism, and the 'super wicked' problem of global climate change. Unpublished manuscript available at http://environment.yale.edu/files/biblio/YaleFES-00000143.pdf

8 Funtowicz SO, Ravetz JR 1993. Science for the post-normal age. Futures 25: 739–755.

9 Ravetz JR 2006, Post-normal science and the complexity of transitions towards sustainability. Ecological Complexity 3: 275–284.

10 Fewer emitters, lower emissions, less cost.

11 Satterthwaite D 2009. The implications of population growth and urbanization for climate change. Environment and Urbanization Vol: 545–567.

12 Frame B, Brown J 2008. Developing post-normal sustainability technologies. Ecological Economics 65: 225–241.

13 Verweij M, Douglas M, Ellis R, Engel C, Hendriks F, Lohmann S, Ney S, Rayner S, Thompson M 2006. Clumsy solutions for a complex world: the case of climate change. Public Administration 84: 817–843.

14 MacKay D 2009. Sustainable energy – without the hot air. Cambridge, UK, UIT. 366 p. Available as a pdf at http://www.withouthotair.com/

Landcare Research
Manaaki Whenua

Governmentality 101

Bob Frame and
Shona Russell

Summary

- Governmentality is a process to analyse the nature of institutions. It examines how dominant values and worldviews influence policy development and implementation.

- This analysis attempts to uncover and examine rationalities that underpin particular forms of governance or sit behind specific activities at any point in time.

- In turn this can reveal important influences on the development of government policies.

- We believe governmentality is of considerable benefit in understanding wicked problems (See Chapter 19) and supporting attempts to find acceptable and effective solutions.

WHAT DOES GOVERNMENTALITY MEAN? IT SOUNDS LIKE A MADE-UP WORD….

Governmentality, governance, government – they all stem from the verb 'to govern', which means to conduct the policy and affairs of a state, organisation, or people. **Governmentality** takes a broad meaning – encompassing not just the governance and institutions of a sovereign state but institutions found within and between organisations and within groups of people and society at large.

From this we can access *Wikipedia* to give us the definitions in Box 1.

With this in mind let's now distinguish the term *governance* from *government*. Consider that 'governance' is what a 'government' does. It might be a 'geo-political' government (nation-state), a 'corporate' government (business entity), a 'socio-political' government (tribe, family, etc.), or any number of different kinds of government. But governance is the exercise of management power and policy, while government is the instrument (usually collective) that does it.

We can now move on to see that **governmentality** can be understood as:

- The way governments try to construct policies to fulfil their goals and those goals that they attribute to be best for subjects being governed (e.g. citizens, individuals, groups)

- The organised practices (mentalities, rationalities, and techniques) through which subjects (e.g. citizens, individuals, groups) are governed

Governmentality has also been described as 'how we govern and are governed within different regimes and the conditions under which regimes emerge, continue to operate and are

---

box 1:DEFINITIONS

Governance	**Governance** relates to decisions that define *expectations*, grant power, or verify performance. It consists either of a separate process or of a specific part of management or leadership processes. Sometimes people set up a government to administer these processes and systems.
	In the case of a business or of a non-profit organization, governance relates to consistent management, cohesive policies, processes and decision-rights for a given area of responsibility. For example, managing at a corporate level might involve evolving policies on privacy, on internal investment, and on the use of data.
Government	A **government** is the body within an organization that has the authority to make and enforce rules, laws and regulations.
	Typically, the government refers to a civil government which can be local, national, or international. However, commercial, academic, religious, or other formal organizations are also governed by internal bodies. Such bodies may be called boards of directors, managers, or governors or they may be known as the administration (as in schools) or councils of elders (as in churches). The size of governments can vary by region or purpose.
	Growth of an organization advances the complexity of its government, therefore small towns or small-to-medium privately-operated enterprises will have few officials compared to larger organizations such as multinational corporations which will have multiple interlocking, hierarchical layers of administration and governance. As complexity increases and the nature of governance become more complicated, so does the need for formal policies and procedures.

Source www.wikipedia.org

transformed'.[1,2] In other words, governmentality describes the inherent structures, processes and values that underpin activities of governing by a specific government entity during a particular period of history.

WHERE DID GOVERNMENTALITY COME FROM?

Governmentality as a concept was developed by the French philosopher Michel Foucault in the later years of his life between 1977 and 1984, particularly in his lectures at the Collège de France during this time. The concept has been elaborated in the social sciences by such distinguished authors as Peter Miller, Nikolas Rose and Mitchell Dean. It is only recently being used outside the academic arena to research the underlying politics of complex issues.

WHERE IS IT RELEVANT? HOW IS THE TERM/IDEA USED?

Governmentality studies involve analyse of the following mutually dependent aspects of governing:

- How governing authority is established
- How the issues to be governed are conceived
- The forms of knowledge used and produced in governing

- The techniques and other means employed to achieve specific ends, the ends sought, and the outcomes and consequences of pursuing those ends

These analytical questions have informed studies to understand and examine climate change[3] and sustainable development.[4] The studies do not only focus on the governing activities by state government but also examine governing activities at individual, community, regional, national and international scales.

The contribution of governmentality as a concept, and associated studies, is to uncover and examine the rationalities of government that sit further behind the specific activities at any point in time. Rationalities are relatively systematic ways of thinking about governing and can incorporate theoretical knowledge, forms of practical know-how, and experience. For example, careful research will identify how institutions will govern sustainable development through adopting certain types of rationalities to inform governance practices.

To illustrate this contribution we present a framework that has informed various projects that analyse governance in the context of sustainable development (Chapter 27), climate change, and water. We draw upon the work of Mitchell Dean[1] on the Analytics of Government as a way to analyse how rationalities (including dominant values and worldviews) influence governing activities (such as policy development and implementation).

Table 1 Dimensions of an Analytics of Government framework

Problematisation	Identification of an issue to be governed
Regimes of practice	**Visibilities**: created by governance processes and by the use of particular techniques
	Knowledge: which is generated by and used within governance processes
	Techniques: used to achieve the governance (and which may create visibilities, identities and knowledge)
	Identities: which emerge from and support governance processes
Utopian ideal	The goal towards which governing activities aim to pursue or achieve as well as the belief that governance is made possible by a regime of governing

Source: Gouldson & Bebbington (2007)[5], based on Dean (1999).[1]

The Analytics of Government framework unpicks governing activities to consider three elements: the problem, the regimes by which governing activity is achieved, and the utopian ideal or goals. Regimes of practice can be disaggregated into four elements of *visibilities, knowledges, techniques* and *identities.* While Table 1 outlines the elements as discrete and bounded, and suggest linear progression, this is often not the case in practice. These are organic elements that are constantly in flux even if only slowly shifting and in practice weaving in on themselves and each other. The Analytics of Government framework is a convenient method to examine how governing activities are influenced by rationalities with reference to a range of dimensions.

CAN YOU GIVE SOME EXAMPLES?

To illustrate the contribution of the Analytics of Government framework and broader governmentality studies, we consider how sustainability is governed in New Zealand as it relates to the specific problem of climate change. This complements our examination of other forms of governing activities as exemplified in policies and strategies made by state governments (see Chapter 27 for a discussion of how national governments govern sustainable development, through an examination and comparison of New Zealand's Sustainable Development Programme of Action (SDPoA) and how it compares to Scotland's Sustainable Development Strategy).

In the realm of addressing climate change through governing activities, examples of *problematisation* are the increase in waste and in carbon emissions; and the *utopian ideals* are linked to ideas of being a 'tidy kiwi' and attaining 'carbon zero' status (see Table 2a). Here, these problematisations refer to the activities of the individual or business rather than the population of a country. In the context of problematisation and utopian ideals, we then ask what regimes of practice are undertaken to pursue, and ultimately achieve, those utopian ideals (see Table 2b, overleaf).

OK! YOU'VE CONVINCED ME. WHERE COULD I USE IT? WHY?

Governmentality, as a concept, and associated studies lead to an examination of governing activities that can relate to individuals and to communities, for example. This is reflected

Table 2a An example of the governmentality framework for sustainability in New Zealand

Element	Explanation	Examples
Problematisation	Some form of human behaviour has to be identified as a problem as this gives rise to the need for a governance response	**Anthropocentric contribution through use of fossil fuels has been identified as a problem** prompting global conferences (UNDSD, WSSD), international agreements (IPCC), and national and international reports (GEO2, OECD, IEA, etc.)
The utopian ideal	The ideal complements the ways in which current governing practices are deemed problematic and in need of reform through strategy. Utopian ideals can be created and pursued in accordance with the view that governance activity creates a better way of doing things. Utopian ideals are also the place at which the translation of the abstract into the real takes place	**Sustainability.** This is an idealised end state in contrast to the 'problem'

Table 2b Dimensions

Regimes by which governing activity is achieved:		
Visibilities	These are the ways in which certain things are made visible from governing activities while others are not, such as shifts in climate change policies when different political authority changes	• Local responses as declared by local government policies or as seen through general public concern • Interest in Triple Bottom Line reporting by businesses; educational programmes (Enviroschools)
Knowledge	This concerns what forms of thought, knowledge, expertise, strategies, means of calculation, or rationality are employed in practices of governing. Different types of knowledge may determine specific forms of truth concerning what actions are sustainable and what are not? It is possible that the legitimacy of the particular individual or group that is producing the knowledge may impact on which knowledge is deemed acceptable and used in the process of governing	• A whole new set of expertise areas and strategies emerge such as ecological economics • Measure-to-manage techniques for personal travel and energy use • Accounting for externalities • Ecological footprinting; life cycle analysis
Techniques	These require consideration of the technical aspects of government, asking by what means, mechanisms, and technologies is authority achieved	• Collaborative processes amongst stakeholder groups are increasingly used as a technique of water governance alongside the more established processes of applying for consents • New platform of technologies including carbon neutrality, environmental management systems such as EnviroMark Corporate social responsibility, and sustainability assessment methods
Identities	These are the forms of individual and collective identity through which governing operates, such as the construction of responsible/irresponsible individuals, organisations or institutions. Hence, the governance of sustainability led to new groups emerging that, for example, were responsible for developing and implementing strategies to pursue the declared goal of New Zealand being the first sustainable country	• CarboNZero becomes an acknowledged brand leader with spin-offs such as carbon neutral airports and travel options such as conferences • Establishment of expert groups and cross-agency programmes

in many governmentality studies being undertaken in public health and education sectors.

Sustainable development, natural resource management and climate change are all examples of 'wicked problems' (see Chapter 19). As individuals, communities and state governments, for example, tackle these problems, we think governmentality and the Analytics of Government framework provide research pathways to understand better how a range of technologies (again taking a wide meaning to include both 'soft' processes and 'hard' tools) such as strategy formulation are being developed and implemented. Analysis could be used to understand how technologies can and are assembled into relatively stable forms of organisation and institutional practice. It might identify the ways in which they create and depend upon particular forms of knowledge leading to pursuit of sustainability.

Health Warning: Using governmentality is not a quick-fix analysis to confirm existing assumptions. It is a complex and time-consuming analytical tool to unpick rationalities at play in complex issues. Like all research, if it is used in a poorly planned experiment it will produce false results that will lead to unsubstantiated claims and erroneous conclusions. And as it says in the irritating small print on adverts for shares: 'previous performance is no guarantee of future success'.

WANT TO FIND OUT MORE?

Contact buildingcapacity@landcareresearch.co.nz

For the Author's contact details see page ii

REFERENCES

1 Dean M 1999. Governmentality: power and rule in modern society. Sage, London.
2 Lemke T 2002. Foucault, governmentality, and critique. Available at: www.thomaslemkeweb.de/publikationen/Foucault,%20Governmentality,%20and%20Critique%20IV-2.pdf
3 Oels A 2005. Rendering climate change governable: From biopower to advanced liberal government? Journal of Environmental Policy and Planning 7: 185–208.
4 Frame B, Bebbington J, (Forthcoming), Towards governmentalities for sustainable development. Available from: www.landcareresearch.co.nz/research/research_pibs.asp?Research_Content_ID=136
Russell S, Frame B., 2009, Post-normal sustainability technologies: Some early evidence. Available from: www.landcareresearch.co.nz/research/research_pibs.asp?Research_Content_ID=136
5 Gouldson A, Bebbington J 2007. Corporations and the governance of environmental risk. Environment and Planning C: Governance and Policy 25: 4–20.

Published January 2010

Water Allocation: Canterbury's Wicked Problem

Bob Frame and
Shona Russell

Summary

- Water allocation in Canterbury is a deeply complex issue which we consider to fulfil all the defined qualities of a wicked problem.

- This was examined in detail through a series of interviews across many stakeholder groups.

- Our analysis supported the concept that it was indeed a wicked problem – solutions cannot, it is proposed, solely take hierarchical, egalitarian or competitive strategies to effectively manage resources but will need hybrid solutions that are complex and messy.

- To be successful this will need a far better understanding of the underlying governmentality.

ISSUE

Water is critical for the economic, social, cultural and environmental well-being of Canterbury and of New Zealand (see Box 1).[1] Complex and numerous water issues are bubbling to the surface as the region grapples with tensions around the drive for economic development, development of land and water resources, recognition of social and cultural values of water resources, and for protection of the natural environment. A broader concern was expressed about the viability of the Resource Management Act (RMA) (which has established a particular legislative process) to promote the sustainable management of natural resources when the resources are becoming increasingly scarce.

Here, we discuss the issue of water allocation as part of a wider 'wicked problem' (see Chapter 19) of water governance facing Canterbury and other regions in New Zealand. Initial debates about water allocation are highlighting broader concerns about the capacity of the current governance regime to manage water resources sustainably. Canterbury's economy, society, environment and culture, now and in the future, are intertwined with governance of water.

box 1: CONTEXT

Water is essential to New Zealand's social, cultural and economic well-being. It is also a focal point for recreational activities and our outdoor-focused way of life…However, demand for water is increasing. At the same time, some aspects of water quality are getting worse in areas that are dominated by intensive land use.

(Source: Ministry for the Environment 2007: 261)

HAS CANTERBURY REACHED SUSTAINABLE LIMITS?

The region has 70% of the country's irrigated land; generates 24% of the nation's power through hydroelectricity; has 65% of the country's hydro storage; and provides untreated high quality water supply to Christchurch. The regional council,

box 2: EVIDENCE

• Land use in Canterbury has changed substantially in part to increased dairying, which has increased its share of the Canterbury irrigated land from 34% in 1999 to 42% in 2004.

• The use of water for irrigation has increased substantially (at a rate of about 55% each decade since 1965.

• The volume of water allocated increased by 50% between 1999 and 2006 driven mainly by an increase in land under irrigation.

(Source: Ministry for the Environment 2007: 262)

Environment Canterbury (ECan), is responsible for allocating 58% of the region's water (see Box 2).[1]

Competition for Canterbury's water (ground and surface) resources is growing amidst intensification of land use, growth in dairying and viticulture, and increased use of water for irrigation. Demand for water and concerns about availability and reliability of supply have led to proposals for water storage and irrigation schemes (e.g. Central Plains Water).

Juxtaposed to competition are lively debates about diminishing river flows, threats to groundwater quality, over-abstraction of groundwater, and degradation of water quality associated with the use of nitrogen fertilisers and stock effluent; concerns about loss of recreational opportunities and conservation values; and other impacts of water abstraction on Canterbury's iconic braided rivers.

Other factors identified span lack of information about the volume of water abstracted; the suspicions about the political motivations of regional councils and councillors; (non)-participation by different stakeholders in allocation processes; and confusion about the responsibilities of a range of organisations (local, regional and national) in the allocation and management of water.

The complex economic, environmental, social and cultural tensions linked to water allocation indicate a broader concern

about water governance for sustainability. Thus, reforming water allocation processes are a small part of an ongoing process of change in water governance to offer solutions for Canterbury, and other regions, now and in the future. Given the problems outlined above, how do we understand water allocation problems and broader questions of water governance? What can be done and how?

EXAMINING CANTERBURY'S WICKED WATER PROBLEM

Between August 2005 and June 2006 we interviewed a wide range of stakeholders in the water sector in Canterbury to understand the complexity of water governance, initially linked to water allocation. These interview transcripts were rigorously analysed and the results are presented here using a characterisation of 'wicked problems' as outlined by Rayner[2] in Chapter 19 offering an understanding of the complexity of the problem, and to map some of the processes and solutions underway alongside comments emerging from interviews.

Symptomatic of deeper problems

In the process of asking about water allocation, broader questions emerged about the adequacy of the water governance regime: when resources are reaching sustainability limits; the need to plan for future land and water use in the region; the role of scientific knowledge about water resources (including the relationship between ground and surface water resources); and the participation by interested and affected groups in the governance regime.

We have identified these deeper problems asking the following questions:

- Should water allocation decisions, and associated consents, be decided through legal processes?
- Should long-term consents[3] be issued?
- What resources and capacity is required to ensure participation is possible for interests and affected groups?
- What information is required on ground and water resources to make water allocation decisions in line with

sustainable management of resources?

- Who should pay for research associated with water governance?
- How does changing and/or intensification of land use affect water resources?
- What is the relationship between land rights and water rights?
- Can market mechanisms be used to determine values for water resources?
- How can social, environmental and cultural values of water resources be identified, measured and monitored? What types of regional planning is required around water and land use?
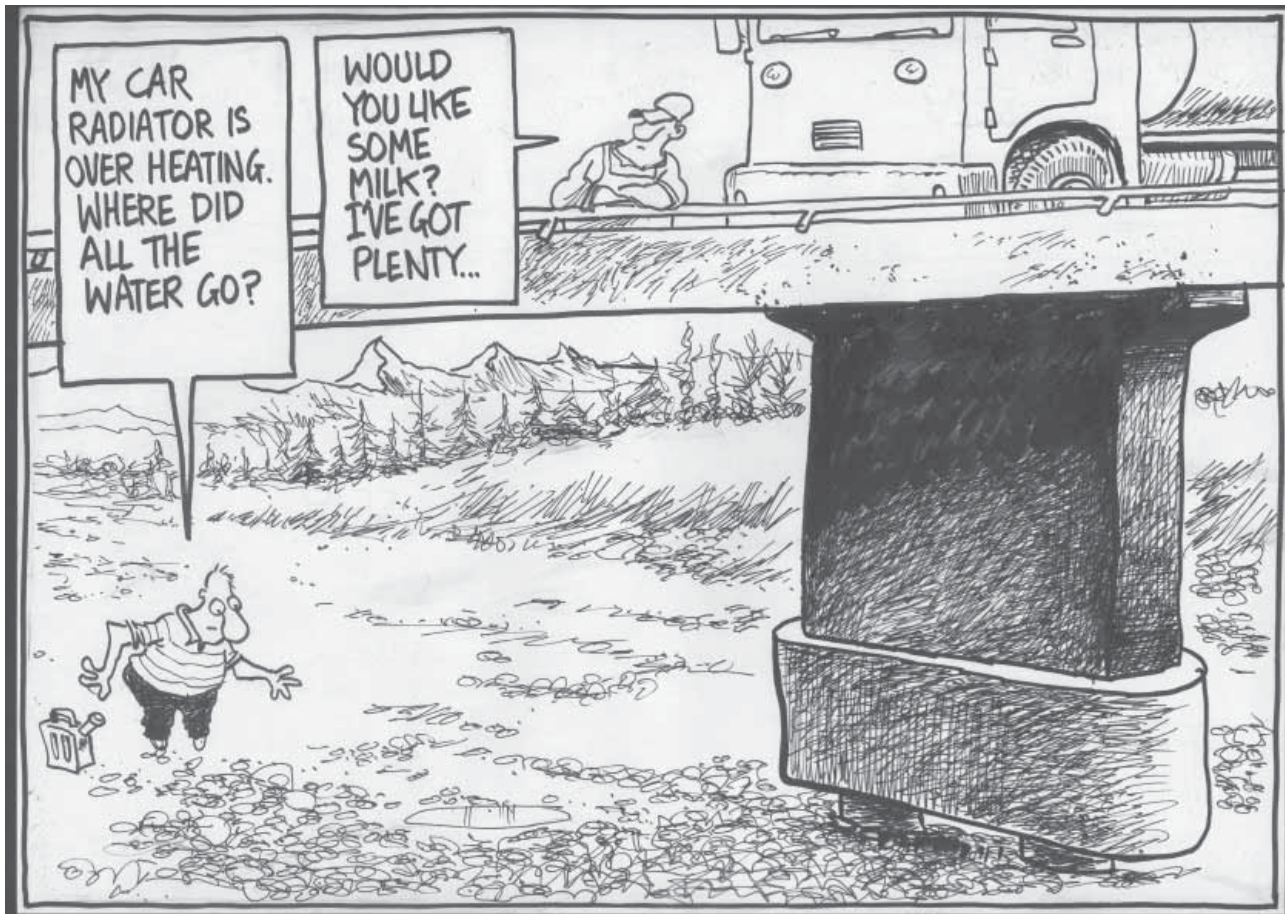
Many interviewees expressed the need for plans to frame development in Canterbury at regional, district and catchment scales illustrating the emergence of a vision of water governance of which water allocation decisions would be part. The need to measure and monitor water resources was identified to complement the development plans. Often plans and strategies were aligned to the current and future economic development of the region. Moreover, water management and more recently water storage are viewed by many as essential for Canterbury's economic development in the context of changing land use. For some, such a view is associated with a particular group of interests and the concern is that this view will be more powerful and persuasive in the governance regime. This discussion prompts consideration of how regions and countries use their natural resources along the path of development, and the longer term implications for the environment; alongside how to enable (equal?) opportunities for participation by various interests groups

Unique opportunities that cannot be easily reversed

Can we reverse decisions linked to current practices? Interviewees expressed concerns about the implications of water allocation decisions that were made without reference to how the water is used; the time frame and political implications of addressing water resource governance in the electoral cycle[2]; and the different ways emerging to manage water resources.

Cartoon by Tom Scott published in the Dominion Post, 20 April 2006, expressing concern about water issues in Canterbury"

The 3-year political and electoral cycle is a factor to contend with even though governance of water resources spans a much longer time frame. Thus, there are questions about the risks and opportunities of political leadership to enact change but that these changes may not be most suitable in the longer term. Other questions about the current governance process include: Are political leaders (at national and regional levels) capable of leading discussions about how best to allocate water resources? and Who is best to show leadership on these decisions and address concerns about the implications of continuing to allocate water resources under the current regime?

Unable to offer a clear set of alternative solutions

Under the RMA, the regulatory authority has the responsibility to issue resource consents. Moreover it must commence processing applications on receipt and meet demanding criteria set out in legislation. In a science-deficient and plan-free environment this has led to over-allocation. Within this 'unsympathetic' regulatory framework Environment Canterbury has undertaken additional initiatives to address over-allocation issues but these solutions are emerging, complex, overlapping and are often associated with periods of learning. Furthermore, solutions often prompt a range of comments, which are presented here to illustrate the multifaceted nature of attempts to address wicked problems that extend beyond the activities of the regulatory authority alone.

First, possible solutions to the problems of water allocation include the designation of allocation zones, which prompted calls for Central Government coordination from some, while others suggested zones were crude and unable to tackle the problem of over-allocation as it was 'too late'. Alongside the use of zones, other mechanisms were suggested in the form of 'resource rentals' or using a 'cap and trade' mechanism, or 'grandfathering'. Grandfathering was held to support the interests of existing consent holders rather than evaluating allocation of which use of water may generate the most economic value, for example. Although ownership rights and water trading were objected to by many, – citing concerns about private individuals benefiting from a public resource - these are underway in some parts of the region. Trading using market mechanisms parallels observations that market signals may be a strong driver to change land use that relies on a greater availability and reliability of water (e.g. from sheep and beef to dairying). Market signals were often perceived to be the strongest driver for land use change despite an

acknowledgement that different land uses were possible given the water resources available. One may ask how viable these solutions are while research and science is not developing at the same pace as intensification and issuing of further consents for allocation of water. This has led to the suggestion of a moratorium of issuing consents until questions about scientific knowledge are addressed; the latter we discuss below.

Second, respondents stipulated that the need for efficient water use was linked to the issues of how change behaviour and farming practices to encourage such behaviour and how to increase the amount of water available for use by others. Metering of water use was suggested as a way to measure water use and thus address issues about the value of water. Others went further and suggested introducing water metering and charging in both rural and urban areas to encourage water efficiency. Notably, some observed that a volumetric charge for water is *highly likely* in the future and that *all* users, not solely farmers, must pay for the right to use. While those who are not applying much water would be happy, it was expected that certain farming interest groups would object. (At present water meters record water use in Christchurch City but users do not pay water charges according to use.) Objections to metering were countered by the observation: "*If it is too costly to meter, then it can't be valuable enough to use*". Some interviewees saw efficient water use as being encouraged through rising energy costs and sufficient for charging not to be required. Others thought it was unlikely that increased efficiency would be sufficient to allow the pursuit of other activities reliant on available

water resources. As such, water storage is proposed to further development, thus benefiting the region's economy and society. Water storage could also address shortages during drought periods, which are becoming more frequent in some parts of the region.

Third, respondents thought there was a need for Central Government leadership beyond just creating allocation zones. It was noted by some that Central Government has remained hands-off and that there is a reluctance to create/enforce an environmental bottom line as part of a top-down approach to water governance. Alternatively, some suggested the creation of new agencies, such as an Environmental Ombudsman, to oversee water issues rather than the current responsibilities being held with the regulatory authority. In contrast, others thought decisions about water use and associated trade-offs should be made by the Canterbury community to seek levels of consensus. This would give all parties an opportunity to participate, with awareness that individual interests may not be satisfied. These suggestions about who should make decisions indicate that scale is a factor in water governance and that a nested approach may be required incorporating various local, regional and national interests.

So far the solutions listed above are overlapping but throughout all interviews there was general recognition of the need for a common information base related to more efficient monitoring and the use of catchment-wide and strategic planning, based on a clear determination of what are the sustainable limits. Sustainable water management must draw upon knowledge from science and local people, involve many groups in partnership with the regulatory authority, and recognise that water governance is an iterative and evolving process. Some further questions subsequently emerge: can different clusters of solutions be intertwined or are they mutually exclusive and associated with a particular way of perceiving and dealing with wicked problems?

Characterised by contradictory certitudes

The clusters of solutions presented may be aligned to the different attitudes and certitudes of groups. Here we present views about the values of groups and the levels of equity in

relation to representation of views in water allocation debates. A prominent theme from the interviews was a concern about the disproportionate representation of views, which may in turn affect how the wicked problem is addressed. This was acknowledged in the context that water resources were clearly seen to be the economic driver in Canterbury especially for the primary sector and that limited access to or unreliable supply of water resources would threaten the governance regime's economic effectiveness. Concerns about representation centred a domination of the governance regime by high water users in the primary sector, such as dairy farmers, who also were attributed as having a negative impact on the environment. Furthermore, this dominance was perceived to be supported by Environment Canterbury.

box 3: INTERVIEWEE

"You'll see them come out of the woodwork if anyone talks about a dam on the Hurunui – kayakers and all those people. There are a whole range of those groups, and then there are the users – the ordinary farmers, Federated Farmers, irrigation companies, dairy cooperatives, other commercial users…We've got groups like Fish & Game and that, and Forest & Bird, and they all put a spanner in the works but they haven't actually got a financial interest in the well-being of what's going on and they just think everyone should have equal rights to everything."

In contrast, the interests of alternative water users and moreover Māori, as indigenous people and treaty partners, were and continue to not be consistently taken into account. These are specific examples of disproportionate representation while other people often noted the disconnections and frictions between different groups of interest. For example, some interviewees held that the following tensions were visible: community *vs* developer; farmer *vs*. environmental; rural *vs*. urban; and local *vs*. regional. These tensions span the both relationships between different interest groups within Canterbury and with Central Government. These observations and concerns were often noted with comments about how

stakeholder representation and engagement in governance regime needs to change to address the unbalanced representation of certain interests over others.

In contrast to economic interests dominating general debates about water allocation, other interest groups are often identified with regard to particular projects such as the development of water infrastructure. The quotein box 3 identifies some of these groups while also indicating the perceived risks posed to farmers and developers by their involvement.

Many are sceptical about the quality of scientific information available and used by the regulatory authority during its decision-making process. For some, the allocation of water and water governance were perceived as poorly managed due to a lack of available data, and for some, decisions to refuse resource consents were too late. Before farmers are likely to change their farming practices they require scientific knowledge to prove problems with water resources exist and, furthermore, that their conduct may be linked to these problems.

In addition, more abstract concerns were noted about what water is and who should be responsible for it. For some, water remains a public resource and its ownership and management should remain in the public sector rather than by business interests for private economic benefits. This issue led to comments that people in Canterbury are unlikely to let water be privatised. There is recognition that if water is a

valuable resource approaching its sustainability limits, then there needs to be a re-valuation and adaptation of the current system. As this recognition becomes more widespread, it is clear that water issues are gaining a much higher profile in the public consciousness. With this heightened awareness, attitudes are changing and the multiple values of water are being acknowledged in a variety of ways, politically, socially, and culturally. There is also a broadening of perceptions about water amongst stakeholders, with interest developing in urban as well as rural issues. With this some voices are stating their perception that water management is dominated by certain privileged groups and that others are not widely heard.

Redistributive implications for entrenched interests

In the examination of water allocation, entrenched interests emerged. Two dominant groups of interests that relate to the current system are presented here before I consider the implications of changes to the system. On the one hand, the current governance system where water is allocated on a 'first in, first served' basis is perceived to favour the interests of agriculture and development. There was concern that changes in the allocation of water would pose a risk to investment by and for farmers, which could in turn impact upon the broader economic development of the wider Canterbury Region.

On the other hand, certain groups believe their interests are jeopardised under the current regime. For example, fishermen see that farmers are making money out of the fishermen's resources (rivers) all the while diminishing the water quantity and quality. Broader non-economic interests, including environmental non-governmental organisations, more widely express concern that their interests are not given equal weight in part due to a lack of financial resources to engage in contestation of resource consents to take water. Indeed, it was suggested that the Canterbury community should resolve water governance issues rather than this being solely the role of the regulatory authority, Environment Canterbury.

The positions presented above outline highlight a variety of implications for stakeholders and the broader Canterbury community. Economic and environmental interests appear to dominate discussions about allocation of water. In light of the

RMA's assertion for the sustainable management of natural resources, it appears there is an absence of consideration of social and cultural aspects of governance of natural resources.

Persistent and insoluble

The problem of water allocation was regularly acknowledged to be persistent, with interviewees noting that water governance is a long-term issue that is likely to take longer than an electoral term to address. Many noted that water is tied to land and that therefore consideration of water management should also include how the land could be used in the future. If water allocation, and water governance, are persistent and insoluble, what are the implications for economic, environmental, social and cultural interests if the current regime changes and potentially incorporates some of the solutions outlined above?

DISCUSSION

We have examined Canterbury's wicked water problem using Rayner's characterisation to illustrate the complexity of water allocation and the broader questions around water governance. The examination of the problem's wicked characteristics using qualitative interviews has led to the identification of various opportunities and pathways to move forward.

Drawing upon Rayner, these opportunities and pathways can be characterised as being associated with the following types:

- Hierarchical strategies that simplify issues and apply routine
- Competitive strategies that rely upon expertise to control resources
- Egalitarian strategies that open the problem to more stakeholders

Following the research, we have observed a range of emerging responses to the wicked problem that align with the types described by Rayner. These responses can also be aligned to models of governance outlined by Gunningham:[5] namely, hierarchies, markets and collaboration. For example, first, new national environmental standards are being established around the measurement of water takes. Second, the NZ Business Council for Sustainable Development has proposed the development of trading mechanisms for water allocation. Third, collaborative processes are having variable degrees of success at regional and national levels with the development of the non-statutory Canterbury Water Management Strategy, which is led by the Canterbury Mayoral Forum and supported by Environment Canterbury and a Steering Group with members from a range of interest groups.

In conclusion, our results indicate that new mechanisms are emerging to deal with Canterbury's wicked water problem. There is a growing awareness that current water allocation mechanisms used in Canterbury are inadequate for the sustainable management of scarce water resources and are part of a broader concern about water governance – but there is yet to be a clear winner in the race to find a suitable replacement. It is unclear if a clear solution will emerge; rather we expect messy processes to lead to clumsy solutions as we learn about our relationship with water and how to manage it sustainably.

RESOURCES

1 Ministry for the Environment, Environment New Zealand – 2007 Published December 2007.
2 Rayner S 2006. Wicked problems: clumsy solutions – diagnoses and prescriptions for environmental ills. Available at www.martininstitute.ox.ac.uk/NR/rdonlyres/C3EDD045-9E3B-4053-9229-9CF76660AAC6/645/JackBealeLectureWickedproblems.pdf
3 Traditionally consents have been issued for 35 years.
4 In New Zealand, regional and national elections are held in independent 3-year cycles.
5 Gunningham N 2008. Innovative governance and regulatory design. Available at: http://www.landcareresearch.co.nz/publications/researchpubs/water_gunningham_LC0708137.pdf
6 Old Problems, New Solutions programme http://www.landcareresearch.co.nz/research/programme.asp?Proj_Collab_ID=94

Published January 2010

Social Learning

A basis for practice in environmental management

Margaret Kilvington
and Will Allen

Summary

Environmental agencies are increasingly being asked to formulate local, regional and national responses to environmental problems that are highly complex, made up of multiple factors, contested or unknown science, and conflicting demands. Social learning is emerging as a useful framework for understanding the human relationship, knowledge generation, and decision-making challenges posed by complex environmental problems.

A social learning approach draws attention to five areas for focusing awareness and developing practice in complex problem solving: These are:

1. How to improve the **learning** of individuals, groups and organisations

2. How to enable systems **thinking** and the integration of different information

3. How to work with and improve the **social/institutional** conditions for complex problem solving and

4. How to work-manage group participation and interaction

5. The fifth factor is **monitoring and evaluation**, which is the engine that drives continuous improvement in practice.

The social learning framework offered here can be used to understand and improve the capacity of any problem solving and management situation. It can be used in its entirety or people may select elements of the framework for specific phases of their projects.

PICKING A WAY THROUGH PROBLEMS: THE CHALLENGE FOR ENVIRONMENTAL MANAGEMENT AGENCIES

Much has been said about complex problems in the environmental arena and it is easy to see that the challenges posed by (for instance) climate change, shifting land-use demands, energy shortages and competing demands for restricted water resources test the problem-solving capacity of local and national government organisations. These problems are viewed differently by the multiple organisations, sectors and communities that are interested and affected by the situation. In fact there may be such a diversity of ways of seeing one problem that it might be more honest to regard 'the problem' as a web of interrelated problems – each defined by the responsibilities, mandates and particular interests of the various agencies and groups involved. Furthermore the solutions on offer may, when applied, fix one part of the problem only to reveal another. In fact what we are looking at trying to manage is not a problem but a problem system – subject to a high number of influencing factors and key players and with flexible boundaries that can be difficult to define.

What further characterises these complex problems is high levels of uncertainty (see, for example, Chapter 19). Information about the problem will most likely be incomplete (perhaps even some crucial factors may be undeterminable), and when available it can be disputed by different stakeholders on the basis of its relevance or meaning.

What is clear about these problem situations is that linear approaches to planning and management are inadequate. It is simply not possible to plan any great distance ahead with confidence that the predictions and premise on which the plan is based will stay valid in the future. Equally such complex situations do not lend themselves to resolution in discrete periods of time. Instead they require ongoing attention. Moreover the idea that a single agency, whether national, regional or local, might be responsible or even capable of fully resolving these issues no longer fits. These issues require multi-scale, polycentric governance that

recognises that multiple stakeholders in different institutional settings contribute to the overall management of a resource[1] In the face of such complexity, management approaches are more usefully seen as processes of ongoing learning and negotiation rather than the search for the optimal solution. The heart of a learning-oriented management approach is good communication and ways of sharing different perspectives, and the development of adaptive group strategies for problem solving. In recent times, the shorthand for this approach to problem solving has become known as social learning.[2]

In this paper we discuss social learning (see Box 1) as a practical framework for exploring the critical elements of complex environmental problem solving.

box 1: SOCIAL LEARNING

Social learning has been used to refer to: learning about social issues; learning by groups of people; and learning that results in recognisable social entities such as collective decision making procedures.[3] However, in recent times the concept has received wide attention in the field of environmental management where it is emerging as an overarching concept reflecting growing understanding about the ways in which different agencies (e.g. planners, policymakers, NGOs), and different knowledge sources (e.g. science research, landowner, indigenous peoples) can be brought together to learn about and make decisions about complex problems.

The 'learning' part of social learning is based on a well-known theory and practice known as experiential based learning. The primary writer in this field, Kolb,[4] describes a cycle of events that enables people to work together to learn and create knowledge. This starts with (1) revealing some concrete experience; (2) reflecting on that experience; (3) forming abstract concepts and generalisations about what to do next; and (4) testing the implications of these concepts in new situations, which in turn leads to new experiences and a new cycle of learning.

Figure 1 Social learning – five areas important to addressing complex situations.

MANAGEMENT APPROACHES FOR ADDRESSING COMPLEX PROBLEMS

Planning and environmental agencies are no strangers to dealing with multiple interests and have long experience in responding to competing views about how a resource should be managed. They often have a highly developed repertoire of approaches designed to identify the concerns, values and interests of different stakeholders, determining a path forward in the midst of competing demands, and developing a set of decisions that, if not ubiquitously, are at least widely accepted as reasonable. In short, what many agencies have become very good at is making judgments in situations where public views are divergent or even polarised.

Trends in public planning approaches in the last decade have moved beyond making judgments in polarised situations, to fostering consensus-based decision making between the different stakeholder groups involved. Numerous examples of this exist in New Zealand such as the Christchurch City Council public deliberation over wastewater treatment.[5] However, more complex problems call for not just agreement between people but also collaborative and coordinated responses across multiple communities and agencies. What are also needed are institutional arrangements that not only are open to the input of multiple stakeholders but are designed to contribute to their collective learning, capacity and empowerment to respond to the problem at hand. The purpose of these institutional arrangements is to foster amongst the many players and the entire problem system the capacity for adaptation and action that leads to a more resilient solution.

This is significant because it implies a shift in role for environmental management agencies from that described in the previous two paragraphs (accumulating all the information required, reconciling views and determining a course of action) to the orchestration of social learning. In this context, agencies might judge the success of their efforts to respond to a problem situation not only by reaching a *decisio*n but also through the process – *how the parties involved improved their collective capacity to act and respond*.
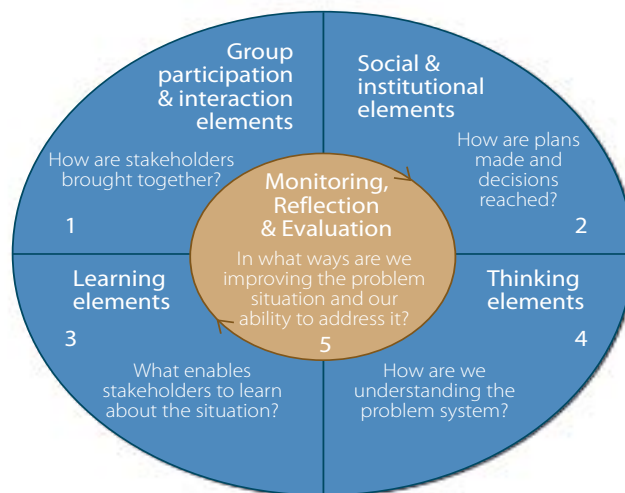
A SOCIAL LEARNING FRAMEWORK

In addition to the implications for institutional arrangements discussed above, the framework of key elements that support social learning (see Fig. 1) indicate that a number of factors require attention when designing ways to respond to complex environmental problems. These include:

- How platforms (opportunities) for interaction between stakeholders will be conceived and handled
- How the diverse forms of data and information will be collated, interpreted, shared and accessed
- How critical assumptions about the problem will be revealed and scrutinised so that understanding of the problem moves beyond superficial observations and reaches to the heart of the challenge

The social learning framework we propose provides elements to address these three factors, and is made up of five categories of elements:

1. **Group participation and interaction elements** – ways of bringing stakeholders together
2. **Social and institutional elements** – ways of making decisions and planning actions
3. **Thinking elements** – ways of understanding the problem system
4. **Learning elements** – ways of supporting learning
5. **Reflection, evaluation and monitoring** – ways of tracking progress and developing social learning practice

The use of photography to support dialogue and learning in Watershed Talk worked on many levels, enabling participants to capture their ideas visually, and present them in ways that stimulated conversation, and opened topics up to multiple viewpoints These two images were taken by participants as an expression of concerns and values they had for the catchment. Photo A (left) showing a newly posted warning about Didymo algae prompted debate on threats to waterways and what were effective ways to change people's practices; photo B (right), of a local church raised questions about how the social networks of the catchment were changing."

The last element is the engine that drives continuous improvement in practice. Another way of viewing these elements is as 'ingredients' in the design of successful approaches to complex problem solving. We now explore each category in detail.

Group participation and interaction

Forums for managing complex situations go beyond arranging meetings of stakeholder representatives to express their views. Their purpose is twofold:

- To foster diversity of input from the different communities, groups and agencies that have an understanding of the problem situation and a role to play in addressing it
- To develop the partnerships and collaboration (dependent on both willingness and ability) to work together

Creating collaborative learning platforms (shorthand for 'opportunities for working and learning together' – see examples in Box 2) includes consideration of both physical components, such as the location and timing of events, and process components, such as the way in which participants are engaged and conversation is facilitated. The relationship between the formula of an event, those who participate and the quality of the dialogue is now widely appreciated[6] and there are many examples of platforms for dialogue and learning that have made use of relatively simple low-cost strategies that shift unproductive group dynamics and foster creative input by participants. For example the Watershed Talk project in the Motueka Catchment (2007–2009)[7] made deliberate use

of photos taken by project participants because it provided a common visual language to share different types of knowledge and experiences. This acted to shift the focus of discussion from the person speaking to what it was they were saying. Also, in contrast to the different status participants in Watershed Talk might have been given in a more traditional meeting forum (as for example professional planners, expert scientists or farmers),

box 2: EXAMPLES OF NEW APPROACHES TO DEVELOPING PLATFORMS FOR COLLABORATIVE LEARNING

Christchurch City Council – *communities of practice* http:// www.landcareresearch.co.nz/research/sustainablesoc/social/ cops.asp: This was designed as an organisational-level platform to support conversations on cross-organisational issues such as sustainability or planning for the needs of the elderly[9]

Ministry of Research, Science and Technology *Dialogue projects* http://www.morst.govt.nz/current-work/science-in-society/dialogue/: These are four case studies exploring new ways to manage dialogue around contested science and technology issues at national and regional/catchment scale.[10]

Watershed Talk: This platform worked with groups of stakeholders to cultivate ideas and action around environmental challenges facing catchment communities[11] http://icm.landcareresearch.co.nz/research/research. asp?research_id=68&theme_id=4

communicating through photographic images gave equal authority to all participants in the conversation.

Collaborative platforms are not the same as meetings, although they may include them. Particularly for complex-problem-solving strategies designed to work at regional scale, collaborative platforms may be virtual, or based on networks, or based on cross-institutional or sector-based communities of practice.[8] Different scales require different forms of collaborative platforms.

Social and institutional elements

As discussed above, managing the political/decision-making context in order to support collective learning by all players requires some changes to the current way to doing business. Essentially complex environmental problem solving poses two challenges to the existing social and institutional arrangements around how plans and decisions are made. The first is the ability to integrate knowledge and foster the united efforts of the many stakeholders (see Box 3). Engagement with multiple stakeholders will often take different forms, and occur at multiple points along the decision-making timeline, and is sometimes referred to as 'structural openness'. The second is the ability to deal with the uncertainty that surrounds the situation and the need to learn through by trial and error (however unpalatable the latter might be). Building in flexibility and responsiveness to the decision-making process to deal with uncertainty can be termed 'structured unpredictability'.

Institutional arrangements can often seem immutable and there may not be easy options for doing things differently. Nevertheless if the existing approaches to addressing complex environmental situations are not providing for structural openness and structured unpredictability, then assessing of what it *is* possible to do differently is required. Questions to explore include:

- How open are institutional arrangements to input from different stakeholders? Are they able to not just incorporate different stakeholder's preferences but also use the different forms of knowledge they hold in order to build a better understanding of the situation?

- How do current institutional arrangements respond to new knowledge that changes the understanding of the problem

or changes the proposed solutions to the problem? For example, to what extent are administrative devices like plans, policies and projects able to respond to changes in understanding that consequently make existing plans or policies redundant and new actions necessary?

- If the current approaches to decision making cannot allow for the dynamism and multiple input required, is it possible to work outside standard arrangements? If so what would

box 3: SUPPORTING ADAPTIVE AND INCLUSIVE MANAGEMENT[12]

There is no simple recipe for changing institutional arrangements to become more adaptive and inclusive as this evolves in different ways suitable to the context of the problem situation, and the experience, resources and abilities of those involved. One successful example has been the long-term work developing an adaptive approach in the high country (1994–2000). The most significant of the programme's high country successes revolve around capacity building and information sharing, and represent a mix of first- and second-order outcomes. For example the programme clearly supported improvements in relationships between conservation managers and farming interests resulting from conflict management exercises.[13] In the same exercise new ground was broken, by the community inviting a scientist to play a mediating role in supporting better communication and relationships. The Tussock Grasslands Management Information System represents one of the first Internet-based systems to link local and science knowledge.[14] Beyond the high country, the programme can also point to other areas where the Integrated System for Knowledge Management (ISKM) approach has been used to support community-based learning initiatives. These areas include pest management in New Zealand,[15] learning about issues related to oil and gas in British Columbia, Canada,[16] and understanding the links between land use practices and livelihoods around Lake Victoria in Africa.[17] The ISKM approach has also been used as an evaluation framework to look at an environmental health surveillance system in California.[18]

be needed to ensure these alternative efforts are able to make a genuine contribution?

Successful examples of doing things using social learning include community-based catchment management programmes (http://icm.landcareresearch.co.nz/) However, while these programmes have often included good processes for tapping into knowledge, ideas and energy that were not reached through normal planning processes, they have not been compatible with statutory decision-making arrangements – which has led to frustration for those involved who have seen their efforts undermined.

Lastly consideration has to be given to whether there are power imbalances between stakeholders and where these need to be addressed in order to create an effective process and effective solutions. Stakeholder analysis (see Chapter 25) provides an approach for analysing needs, barriers and opportunities for real participation by critical stakeholders.

Thinking elements

No structured response to complex problem solving can be developed without a facilitated approach to understanding the problem system (systems thinking) and from this determining the core components open to intervention or leverage.[19] Without this, complex problem solving can be hampered by incorrect or incomplete assumptions about the problem definition, or may miss critical knowledge about the problem (e.g. transport planning is connecting people with jobs, goods and services rather than roads).

In recent years there are many structured approaches to systems thinking developed by theorists and practitioners (e.g. Checkland's soft systems methodology.[20]) These approaches first include a means for capturing information from different sources. This information may be interpreted by different stakeholders in varying ways, in terms of what they think is important or what conclusions they draw from it, so a second core ingredient of systems thinking is a process to enable people to collectively make sense of the information that will build a picture of the important components of the problem system.

Techniques for using a systems approach to problem solving do not have to be highly technical.. Frameworks, pictures

and representations are powerful aids to help people unlock the knowledge they have and discuss this with others. Using such techniques can be described as a form of participatory modelling.[21] In systems thinking approaches, collective model building is regarded as important (if not more important) as attaining precision in the data and outcomes. Managing dialogue and debate and enabling the participants in the process to incorporate new information into their own context are critical. Proponents argue that following a participatory modelling approach will in itself affect change, as the participants alter their views and become aware of the assumptions and values that are influencing their and their organisation's actions.

Learning elements

Building knowledge about complex problems amongst a collective of different stakeholders is an incremental process.

box 4: MANAGING CONFLICT IS IMPORTANT

A good example of how important it is to understand the underlying causes of conflict was provided by Department of Conservation (DOC) staff as part of their ongoing efforts to protect the black stilt (kakī), a rare New Zealand wading bird. The agency was concerned to gain better access to bird habitat on private land, and to increase private landholder involvement in recovery efforts. However, when landholders were canvassed to ascertain their support for a meeting to resolve these issues, it became apparent that they saw issues over the black stilt as symptoms of a wider problem of 'lack of trust' between farming families and DOC. In response, addressing the issue of access to the black stilt was postponed, and a series of workshops were held to improve relationships between local DOC staff and landholders.[22] Common ground was reached during these workshops and a number of positive steps to improve working relationships were identified and implemented. Building trust in this way is one of the main reasons why successful participation processes take time. Importantly, in this case, both parties regarded this exercise as being a first step in a much longer process.[23]

It is less a situation of passing on information (common in tech-transfer schemes) than of creating the right environment for participants to actively interpret new ideas to make them relevant to their own situation. In this active meaning-making process, dialogue and even conflict are likely to occur and should be planned for in the process design (see Box 4). This can be addressed by something as simple as changing the venue of a meeting to one less familiar to people and therefore less likely to result in people falling into old habits of interaction, but in some cases it may mean first spending time addressing the root causes of existing conflict.

Researchers who have looked at the different kinds of learning required for addressing complex problems observe a number of critical aspects that can be grouped into three key points:

- First, the learning that takes place must go beyond just revealing the basic social, environmental or physical facts of the problem system. Rather it needs to explore the attitudes, values and relationships that have a critical influence on the situation. This has been termed the 'soft relational and hard factual aspects of analyzing and managing a human-environment system'.[24] Another way of putting this is that social learning is about both content (views, ideas, values, information, and data) and process (group interactions, relationships, networks, and ways of problem solving).[25]

- Second, processes must include learning that challenges fundamental assumptions about the system and consequently contributes to building knowledge about the system as a whole. This is referred to as 'double loop' learning and draws on the organisational psychology work of Argyris and Schön.[26]

- Lastly, the approach taken should allow for building knowledge through practice and experience. This means treating problem solving as an active experiment – trial and error – 'suck it and see!' This does mean some steps have to be built into the problem-solving process: (1) clarifying what it is that people are trying to learn; (2) identifying markers – i.e. things that will be observed or monitored that will indicate what changes are happening; and (3) establishing a regular process for assessing these markers,

interpreting their meaning and deciding what to do about this. Again this does not have to be a highly sophisticated research approach. Action research methodologies have

box 5: DOUBLE-LOOP LEARNING

Argyris and Schön[27] made a distinction between what they termed 'double and single loop' learning which has been widely recognised as making a substantive contribution to understanding how organisations learn and change. In summary; single-loop learning is a simple 'error detection' level of learning that has no implications for the wider overall policies or structures of an organisation. Double-loop learning occurs when the new information results in modification of an organisation's underlying norms, policies and objectives.

For example if a land manager views her enterprise solely in terms of sheep production and notes that the vegetation condition of the land is deteriorating, the action strategy will likely be to try a different grazing regime. In such a case when new strategies are used to support the same governing variable (i.e. the land as a sheep production system) this is called single-loop learning. Another example of single-loop learning might be when funders of research notice that stakeholders are not taking up the research generated from a science research programme. The response might be for the scientists to find a 'friendly' group of people to work with, i.e. those who are happy to acknowledge the scientist as the unquestioned expert.

An alternative response to detection of error is to question the governing variables themselves (double-loop learning). For example rather than try a new grazing strategy, the land manager may choose to take a wider look and question whether the land can continued to be grazed and whether her enterprise could better function as a tourism or forestry system. Equally the scientist may choose to involve appropriate stakeholder groups in a more collaborative approach, changing their role to one of a co-researcher and recognising that the role of 'expert' is more a matter of perspective. These cases are called double-loop learning, and involve more fundamental shifts in people's belief systems and values. [28]

evolved specifically to enable those who are engaged in some form of work or practice to learn from their experience.

A resource site on Action Research is provided by Bob Dick, Southern Cross University, Australia http://www.scu.edu.au/schools/gcm/ar/arhome.html

Reflection, monitoring and evaluation

In this chapter we have focused on understanding social learning as a composite of elements to support complex environmental problem solving, each with a theoretical basis and experience in practice . However, central to the engine of social learning is *'reflection, monitoring and evaluation'.* This means more than simply 'tracking progress'. Addressing complex environmental problems is reliant on in-depth reflection on what is known about the problem system and the implications for action that stem from this, monitoring to uncover what is happening, and evaluation to compare this to desired objectives and outcomes. All three are fundamental to an experimental and adaptive approach to environmental management.

Keen and colleagues[29] observe:
Reflectivity in environmental management is an important lever for social change because it can reveal how theoretical, cultural, institutional and political contexts affect our learning processes, actions and values.

They go onto describe the process of reflection as a series of learning cycles – diagnosing what matters, designing what could be, doing what can be done, and developing a deeper understanding of what has worked, what has not, and the significance of this, through evaluation. This process of reflection needs to occur at a range of levels, for instance at a personal and interpersonal level (e.g. between people and groups); at a community level (e.g. in the process of identifying shared visions with a geographic community); and at a social level (e.g. through evaluation of the impacts of laws and regulations by central government).

Building reflection, monitoring and evaluation opportunities into the four design aspects of responding to complex problem

solving outlined in the framework is critical, and there are many options for how to achieve this. For instance in designing and implementing collaborative platforms, stakeholder analysis techniques are useful to both plan for and assess the participation of different stakeholders (see Chapter 25). Also evaluation based on a checklist approach can support group learning about their processes of working together (see Chapter 26).

Further, the framework of key elements in social learning (see Figs 1 and 2) can itself be used to prompt appropriate questioning about how well the process has been designed and implemented. Using evaluation processes that build knowledge about how to improve a programme or situation (rather than evaluation based on accountability and delivery) will advance environmental management/problem solving process as a whole.

SOCIAL LEARNING – ORIGINS AND VALUE TO PRACTITIONERS

Every social theory facilitates the pursuit of some, but not all, courses of action and thus, encourages us to change or accept the world as it is, to say yea or nay to it.[30]

In this chapter we have deliberately left comments on social learning – its origins and underlying theory – to last. 'Social learning' is a concept with a long history, with divergent theoretical roots, and which appears in widely different contexts. For instance behavioural psychology uses the term social learning to refer to the kind of learning by individuals that happens through observation or interaction with others around them – a form of mimicry.[31] In contrast, in the fields of planning, policy making and development, social learning has often been used to refer to 'learning about social issues' or 'learning by groups'. In recent times social learning has become a popular term in the literature on natural resource management where it has been used essentially to describe processes of learning and change that involve multiple stakeholders.

As a comprehensive concept, social learning can be a useful framework for maintaining critical observation not
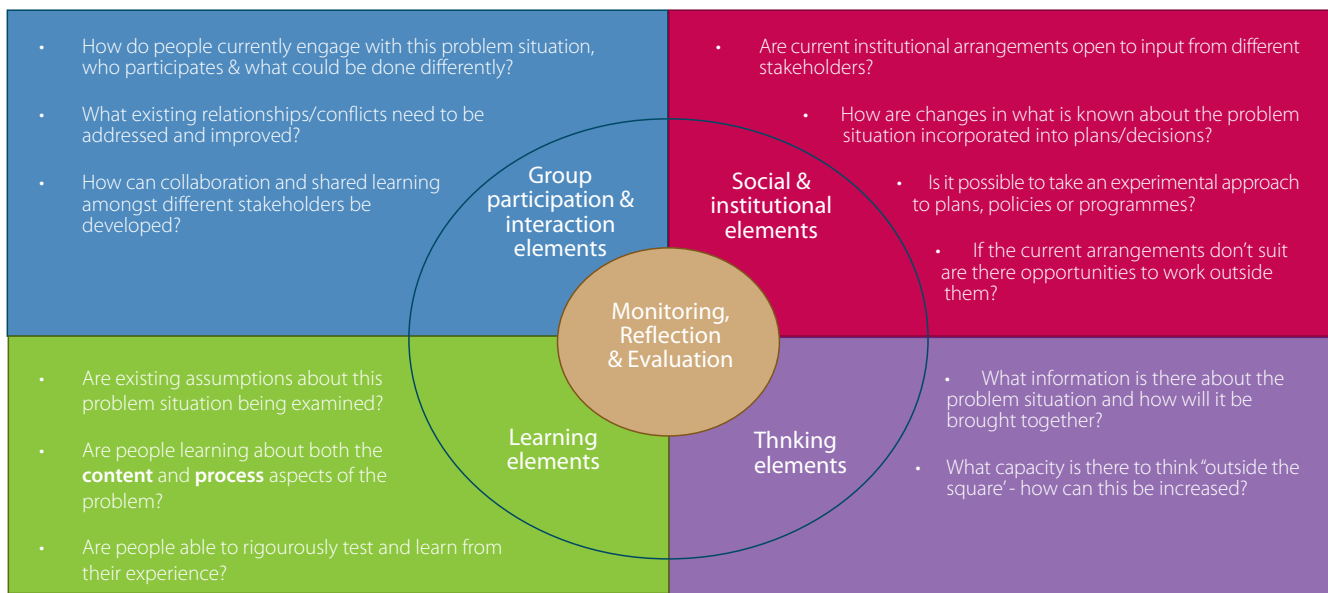
Figure 2 Question prompts to support development of an improved social learning capacity in a problem system.

Group participation & interaction elements
- How do people currently engage with this problem situation, who participates & what could be done differently?
- What existing relationships/conflicts need to be addressed and improved?
- How can collaboration and shared learning amongst different stakeholders be developed?

Social & institutional elements
- Are current institutional arrangements open to input from different stakeholders?
- How are changes in what is known about the problem situation incorporated into plans/decisions?
- Is it possible to take an experimental approach to plans, policies or programmes?
- If the current arrangements don't suit are there opportunities to work outside them?

Monitoring, Reflection & Evaluation

Learning elements
- Are existing assumptions about this problem situation being examined?
- Are people learning about both the **content** and **process** aspects of the problem?
- Are people able to rigourously test and learn from their experience?

Thnking elements
- What information is there about the problem situation and how will it be brought together?
- What capacity is there to think "outside the square' - how can this be increased?

only on the immediate problem-solving task, but also on the learning and social interchange processes that enable problem situations to be continuously addressed. However, the social learning framework presented here is not a recipe, but rather, as suggested before, a set of ingredients that can be put together in many different ways. Having a better understanding of the critical elements and their relationship to one another is helpful, but the way programmes, or activities, are designed to improve the social learning capacity to address a complex situation is largely a creative one. Moreover, since no problem situation is likely to be the same, this relies on maintaining a watchful eye for what is working and what is not. This watchfulness is the central monitoring, reflection and evaluation element in the diagram, and Fig. 32outlines some

Presenting ideas from the Watershed Talk project to a group of Tasman District Council staff, ICM scientists, and people from the Motueka catchment community. Photographs were also used in this session to open up discussion.

basic prompt questions that might be used to support an active process of developing and improving the social learning capacity in any given situation.

It is also important to keep in mind the practical limitations that most people actively involved in addressing complex problem situations might face. While it is helpful to think across all the elements of social learning, it may not be possible to work on all at once. In practice, practitioners, planners, policy analysts and environmental managers may choose to use resources at their disposal to improve the social learning potential of any given situation by focusing efforts on one or more of the core elements. For example, they may examine how to improve the structural openness of the decision-making situation or to foster collective learning skills of the key stakeholders in the problem.

Picking the areas that are most amenable to influence and change is a valid strategy in a resource-constrained reality – particularly if the selection of areas is based upon where there are skills that could be used and developed, where there are resources to enable a successful project or change in practice, and where any changes initiated are deemed important to improving the problem situation. Moreover there is still much that can be learnt about each of the component areas individually; the last word has certainly not been written on building collaborative opportunities for new and unfamiliar stakeholders to work together, or how to improve and deepen learning about complex problem systems.

WANT TO FIND OUT MORE?

ACKNOWLEDGEMENTS

KEY PUBLICATIONS AND WEBSITES

Allen WJ, Kilvington M 2005. Getting technical environmental information into watershed decision making. In: Hatfield JL ed. The farmers' decision: balancing economic successful agriculture production with environmental quality. Soil and Water Conservation Society. Pp. 45–61 Available at http://www.landcareresearch.co.nz/research/sustainablesoc/social/documents/AllenKilvington2005.pdf

Allen WJ, Apgar JM 2007. An introduction to Communities of Practice. Landcare Research webpage Available at http://www.landcareresearch.co.nz/research/sustainablesoc/social/cops.asp

Kilvington M 2007. Social learning as a framework for building capacity to work on complex environmental problems. Available at http://www.landcareresearch.co.nz/publications/researchpubs/Social_learning_review.pdf

REFERENCES

1 Pahl-Wostl C, Craps M, Dewulf A, Mostert E, Tabara D, Tailliue T 2007. Social learning and water resources management. Ecology and Society 12(2): 5 [0nline]. Available at http://www.ecologyandsociety.org/vol12/iss2/art5/
2 Kilvington M 2007. Social learning as a framework for building capacity to work on complex environmental problems. Available at: http://www.landcareresearch.co.nz/publications/researchpubs/Social_learning_review.pdf
3 Maarleveld M, Dangbégnon C 1999. Managing natural resources: A social learning perspective. Agriculture and Human Values 16: 267–280.
4 Kolb DA, Rubin IM, McIntyre JM 1979. Organisational psychology: An experiential approach (3rd ed.). Englewood Cliffs, NJ, USA, Prentice Hall.
5 Hayward B 2000. Beyond consensus: Social learning in urban planning. PhD thesis, Lincoln University, Canterbury, New Zealand.
6 Reed MS 2008. Stakeholder participation for environmental management: A literature review. Biological Conservation 141: 2417–2431.
7 Atkinson, M, Kilvington, M, Fenemor, A. 2009. Watershed Talk; the cultivation of ideas and action. A project about processes for building community resilience. Manaaki Whenua Press, Landcare Research, New Zealand
8 Allen WJ, Apgar JM 2007. An introduction to Communities of Practice. Landcare Research webpage Available at: http://www.landcareresearch.co.nz/research/sustainablesoc/social/cops.asp
9 Allen W, Apgar M 2007. Supporting sustainability-policy uptake across council activities: A scoping report. Landcare Research Contract Report LC0607/173, Lincoln, New Zealand. Prepared for Christchurch City Council. Available at: http://www.landcareresearch.co.nz/publications/researchpubs/0607-173_Allen_CCC.pdf
10 Winstanley A, Tipene-Matua B, Kilvington M, Du Plessis R, Allen W 2005. From dialogue to engagement. Final report of the MoRST Dialogue Fund Cross-Case Study Learning Group, Produced for the Ministry of Research, Science and Technology. Available at: http://www.morst.govt.nz/Documents/work/sis/Cross-Case-Study-Learning-Group.pdf
11 Atkinson M, Kilvington M, Fenemor A 2009. Watershed Talk: The cultivation of ideas and action. Lincoln, Manaaki Whenua Press.
12 Allen W, Jacobson C 2009. Lessons from adaptive management in the New Zealand high country. In: Allan C, Stansky G eds Adaptive environmental management: A practitioner's guide. Springer and CSIRO. Pp. 95–114. Available at http://www.learningforsustainability.net/pubs/Allen&Jacobson_AM_%20ch6.pdf
13 Allen W, Brown K, Gloag T, Morris J, Simpson K, Thomas J, Young R 1998. Building partnerships for conservation in the Waitaki/Mackenzie basins. Landcare Research Contract Report LC9899/033, Lincoln, New Zealand. Available at http://www.landcareresearch.co.nz/research/sustainablesoc/social/partnerships.asp
14 Allen WJ, Bosch OJH, Kilvington MJ, Harley D, Brown I 2001a. Monitoring and adaptive management: addressing social and organisational issues to improve information sharing. Natural Resources Forum 25: 225–233 Available at: http://www.landcareresearch.co.nz/research/sustainablesoc/social/nrf_pap.asp
15 Allen W, Bosch O, Kilvington M, Oliver J, Gilbert M 2001b. Benefits of collaborative learning for environmental management: Applying the Integrated Systems for Knowledge Management approach to support animal pest control. Environmental Management 27: 215–223.
16 Booth J, Layard N, Dale N 2004. A strategy for a community information, knowledge and learning system. Prepared for The University of Northen British Columbia's Northern Land Use institute, Northern Coastal and Research Programme.
17 Albinus MP, Makalle JO, Yazidhi B 2008. Effects of land use practices on livelihoods in the transboundary sub-catchments of the Lake Victoria Basin. African Journal of Environmental Science and Technology 2: 309–317. Available at: http://www.academicjournals.org/AJEST/PDF/pdf%202008/Oct/Albinus%20et%20al.pdf
18 Abinander S and associates 2004. Evaluation report of the Senate Bill 702 Expert Working Group process and initial outcomes. Available at: http://www.catracking.com/resources/ewg/sb702_evaluation_report.pdf [accessed 2 December 2008]
19 Bosch OJH, King CA, Herbohn JL, Russell IW, Smith CS 2007. Getting the big picture in natural resource management—Systems thinking as 'method' for scientists, policy makers and other stakeholders. Systems Research and Behavioral Science 24: 217–232. Available at: http://www3.interscience.wiley.com/cgi-bin/fulltext/114236874/PDFSTART?CRETRY=1&SRETRY=0
20 Checkland, P. (1999) Systems thinking, Systems practice. Chichester, UK: John Wiley and sons.
21 See Allen & Jacobson 2009.[12]
22 Allen W, Brown K, Gloag T, Morris J, Simpson K, Thomas J, Young R 1998. Building partnerships for conservation in the Waitaki/Mackenzie basins. Landcare Research Contract Report LC9899/033, Lincoln, New Zealand. Available at: http://www.landcareresearch.co.nz/research/sustainablesoc/social/partnerships.asp
23 Allen WJ, Kilvington MJ 2005. Getting technical environmental information into watershed decision making. In: Hatfield JL ed. The farmers' decision: Balancing economic successful agriculture production with environmental quality. Soil and Water Conservation Society. Pp. 45–61. http://www.landcareresearch.co.nz/publications/researchpubs/AllenKilvington2005.pdf
24 Pahl-Wostl C, Hare M 2004. Processes of social learning in integrated resources management. Community and Applied Social Pyschology 14: 195.
25 Craps M. Social learning in river basin management. Report of work package 2 of the HARMONICOP project. Available at: www.harmonicop.info
26 Smith MK 2005. Chris Argyris: theories of action, double-loop learning and organisational learning. Available at: www.infed.org/thinkers/argyris.htm.
27 Argyris C, Schön D 1978. Organizational learning: A theory of action perceptive. Reading, MA, USA, Addison-Wesley. Pp. 2–3.
28 Allen WJ 2001. Working together for environmental management: the role of information sharing and collaborative learning. PhD (Development Studies), Massey University, Palmerston North, New Zealand. Available at: http://learningforsustainability.net/research/thesis/thesis_contents.php
29 Keen M, Brown VA, Dyball R 2005. Social learning: a new approach to environmental management. In: Social learning in environmental management. UK, USA, Earthscan Press. Pp. 1–21.
30 Gouldner (1970) cited in Cooperrider DL, Srivastva S 2001. Appreciative inquiry in organizational life. In: Cooperrider DL, Sorensen PF, Yaeger TF, Whitney D eds Appreciative inquiry: An emerging direction for organization development. Champaign, IL, USA, Stipes. Available at: http://www.stipes.com/aichap3.htm
31 A Bandura (1977) cited in Webler, T., H. Kastenholz, and O. Renn 1995. Public Participation in Impact Assessment: A Social Learning Perspective, Environmental impact Assessment Review, 15, 5, 443-63(21).

Sustainability Appraisal

Evaluating proposals for sustainability assurance

Martin Ward and
Barry Sadler

Summary

- While the principles of sustainable development are established in international and New Zealand law and policy, their implementation remains a major challenge.

- Determining progress regarding sustainability is a critical issue for government agencies when evaluating proposed options. This area – sustainability appraisal – has a large and disparate body of research with many proposed methodologies.

- Here we introduce a framework approach for sustainability appraisal and describe its New Zealand policy application, which brings together information and individuals from the four pillars of sustainability aligned with the four well-beings of the Local Government Act 2002 – social, economic, environmental and cultural.

- The paper briefly outlines some key principles and elements of process before describing a recent application in Canterbury to illustrate stages in that adaptation of the framework. The process is sufficiently robust to merit further use and has potential for wider institutional take-up.

CONTEXT

Landcare Research has been examining various ways of undertaking sustainability assessment since 2001. A wide range of techniques have been explored with varying degrees of success, drawing on accounting frameworks (see Chapter 24), ecological economics and other decision-making processes and as discussed in papers referenced at the end of this chapter. This chapter describes a Sustainability Appraisal Framework developed by Barry Sadler and Martin Ward supported by Landcare Research as applied to a case study in Canterbury.

INTRODUCTION

Sustainable development is difficult to implement in practice (see Chapter 27). A major challenge is how to evaluate progress toward or away from sustainability. This has been the focus of much theoretical and empirical inquiry with a large and disparate body of research and experimentation. Put simply, this work centres on three issues encapsulated as sustainability: of what, for whom, and why?

Policymakers and advisors must confront questions such as how does the policymaker determine whether or not a proposed set of activities will take the target sector towards a more sustainable state? What approaches and tools can be used to demonstrate a contribution to sustainable development?

These questions lie at the heart of delivering on legal and policy obligations. The Local Government Act 2002 (LGA) requires taking a sustainable development approach to promote the social, economic and cultural well-being of communities. Furthermore, land transport planning and funding decisions must contribute to 'assisting economic development and safety and personal security, improving access and mobility, protecting and promoting public health, and ensuring environmental sustainability' (Land Transport Management Amendment Act 2008).

Central to the challenge is how to develop:

- Practical approaches to integrated analysis that bridge the policy silos (the art of sustainability appraisal), and

- Conceptual frameworks that bridge the underlying disciplinary paradigms (the science of sustainability appraisal)

In central government, there have been few attempts to formally evaluate policies or programmes to gain a measure of sustainability assurance regarding their outcome, though this is less the case in local government.

Sustainability evaluation, particularly without a legal mandate, is constrained by factors embedded in the structured process of policymaking. Policy advisers have limited experience with sustainability assessment procedures and methods at the policy and programme level (see Chapter 24). Although there are many tools available there are few proven practical frameworks for applying them.

We present a framework for sustainability appraisal and assurance and provide guidance on its use to address policy options.

SUSTAINABILITY APPRAISAL FRAMEWORK

A Sustainability Appraisal Framework approach has been developed for generic application and adaptation to different policy regimes and contexts. It is relevant to New Zealand and enables different entry points and implementation paths for sustainability appraisal. The approach recognises that sustainability appraisal must be adapted to purpose, reflecting the prevailing realities of decision-making including available time. The New Zealand adaptation is the introduction of the cultural pillar recognising the Treaty of Waitangi as a fourth pillar of sustainability (in addition to social, environmental, economic), which corresponds to the four well-beings of the Local Government Act.

It has two characteristics that distinguish it from other forms of impact assessment such as social impact assessment and environmental impact assessment that are commonly restricted to a single pillar and involve a baseline test relating to the current situation. The first is *integrate*d decision-making in which social, economic, environmental, and cultural factors

box 1: SUSTAINABILITY AND THE TESTS OF INTERGENERATIONAL AND INTRAGENERATIONAL EQUITY

Intergenerational equity or maintaining development options and opportunities for those who follow requires that the next generation receive a stock of assets (resource potentials, created wealth, human capabilities) that is at least equivalent to our own or preferably greater, taking into account population growth. This is the overall test of whether or not development is sustainable.

Intragenerational equity or improving the well-being of all people, particularly the poor and disadvantaged, requires that they receive an increasingly larger share of available capital assets. Strictly interpreted, this is a contingent principle and a subsidiary distributive test that must be met within the overall test of sustainability.

the *opportunities* that are available to meet present and future human needs in accordance with the principles of intragenerational and intergenerational equity (see Box 1). In this concept, development at the macro or aggregate level is considered to be non-sustainable if net per capita capital wealth is being depleted or eroded, but sustainable if it is being maintained or is increasing (while also reducing intragenerational inequity).

Additionally, the notion of sustainability as a non-declining stock of capital also requires consideration of the mix of different forms of capital or asset categories to be passed on to the next generation. The crux of this issue depends on the extent to which economic, environmental (natural) and social (including cultural) capital are considered to be substitutes or complements to each other in determining future opportunities. This interpretation yields reference levels of sustainability against which development trends or actions may be evaluated (Box 2).

are addressed simultaneously, and the second is evaluation against a *sustainability framework* derived from international or national policy or strategies.

The application of a sustainability test is undertaken against both or either a *top line* of social, economic, environmental and cultural objectives and targets or norms to aim for, or a *bottom line* of key thresholds or warning signs of things to avoid.

The approach is based on three cornerstones:

- A **'compass' of sustainability aims and principles** for guiding policy options and against which progress can be evaluated
- A **systematic procedure for assessing** the economic, environmental, social and cultural impacts of proposed actions
- A **set of 'rules of the game'** for integrating and weighing different objectives in appraisal and decision making in support of sustainable development

'Compass' of sustainability aims and principles

Building on the 'Brundtland Commission' definition of sustainable development, the sustainability compass uses the concept of capital stocks as a proxy representation of

box 2: REFERENCE LEVELS FOR SUSTAINABILITY APPRAISAL

Levels of sustainability that offer a choice of frameworks for evaluating development trends or actions are:

Weak sustainability involves maintaining total capital without regard to its composition and allows natural capital to be freely converted into economic capital and output (governed only by existing environmental policies, regulations and guidelines)

Moderate sustainability requires that attention is also given to the mix of capital stocks with natural capital considered substitutable only up to certain critical limits or thresholds (which if not yet known can be formulated using the precautionary principle)

Strong sustainability means maintaining natural capital more or less at current levels (no net loss) so that losses and damages from development must be replaced or offset in kind (which represents a stringent interpretation of the precautionary and polluter-pays principles)

Moderate sustainability corresponds to the defining principles adopted by Statistics New Zealand for its 2009 report[1] 'Measuring New Zealand's progress using a sustainable development approach'.

To apply these ideas in New Zealand we use capital stock inventories for the policy or activity subject to the sustainability assessment, and identify aspects with intergenerational and intragenerational equity dimensions. To these we assign top and bottom lines. Capital stocks, or assets, are identified under each of the four pillars by drawing on the knowledge and information arising from the analysis of stakeholders' involvement. This process supports collaboration and integration and provides a foundation for practical assessment.

A systematic procedure for assessing proposed actions

A formal procedure is necessary to facilitate systematic analysis of the economic, environmental and social effects of proposed actions and options. Internationally and nationally, there are well-established arrangements and practices for assessing all three forms of impact separately at all levels from projects to policies. So far, however, there is no widely accepted approach to integrated assessment. Instead there are a number of entry points available for undertaking such a process, including:

- Use an established process such as Environmental Impact Assessment (EIA) or Strategic Environmental Assessment (SEA)and integrate specialised tools for economic, cultural and social analysis

- Conduct parallel streams of economic, cultural, environmental and social assessment, binding together findings at key stages (preliminary integration in scoping, and full integration in final decision-making)

- Rely on an integrative and interdisciplinary methodology such as multi-criteria analysis

Table 1 Illustrative steps in sustainability assessment – what, why, how to evaluate

Assessment step	Procedural focus	Indicative questions
Screening	• Establish/confirm need for and level of assessment • Preliminary scan of orientation to and implications for sustainability	• What is the prima facie relationship to Environment Social and Environmental (ESE) goal maxima or safe minima? • Does the proposal include opportunities for contributing to sustainability goals or threats to bottom lines?
Scoping	• Scope of issues and alternatives to be considered • Identification of effects on and distance to/from sustainability targets	• How does the proposal measure up against key objectives and bottom lines? • What major effects and ESE linkages require further analysis?
Impact analysis	• Significance of impact • Statement of findings on whether or not the proposal passes the sustainability test and subject to what trade-offs	• What are the likely positive and adverse residual impacts of each alternative? • How significant are these when measured against sustainability criteria? • What trade-offs are still to be resolved?
Decision making	• Approval of proposal and terms and conditions • Undertaking ESE trade-offs and weighing gains and losses	• What is the configuration and net balance of gains and losses? • How acceptable are any losses that exceed bottom lines?
Monitoring and evaluation	• Monitoring impacts of concern • Evaluating outcomes against sustainability balance sheet	• Are positive and adverse impacts as expected? • Have there been significant unanticipated effects or outcomes?

These approaches are not mutually exclusive and can be combined or modified to the circumstances. Initially to get started on integrative assessment, much can be drawn from EIA or SEA[2] experience and good-practice guidance for these approaches. The main steps and activities that characterise impact assessment (screening, scoping, impact analysis, decision making and monitoring) can be followed to identify potentially significant adverse social, economic, environmental and cultural impacts using a checklist of questions to gain preliminary insight on their sustainability implications (Table 1).

RULES FOR EVALUATION, TRADE-OFF AND DECISION MAKING

Objectives-led and effects-based criteria are necessary to assist with the determination of significance as the basis for sustainability assurance, i.e. making a policy judgement that the effects of proposals, at a minimum, 'do no harm' or, better still, 'achieve improvements'. Both objectives-led or quadruple top line (QTL) and effects-based or quadruple bottom line (QBL; see Box 3) significance criteria are critical to any assessment consistent with integrated decision-making. These represent the 'high' and 'low' roads to sustainability. For strong sustainability, a stringent version of the precautionary

approach should be applied to assess major proposals with potentially significant impacts.

In any operational form, applying the sustainability test and determining the eligibility of a proposal will be a subjective, qualified exercise. It will depend, in part, on the level of sustainability that is elected as a reference standard (i.e. weak, moderate or strong as in Box 2). Guidance for both top and bottom lines for environmental capital at national level may be found in National Policy Statements and National Environmental Standards prepared under the Resource Management Act 1991. At regional and district level, policy statements and plans offer guidance, and iwi management plans where they exist may assist with aspects of cultural capital. For social and economic top and bottom lines, Community Outcomes documents and long term council community plans give guidance.

For sustainability appraisal to work in this way a number of basic criteria and rules should be followed:

1. At all stages of decision making, **priority should be given to options and actions that do the most 'good'** than to those that do no harm, and finally to those that have some adverse effects (but which still fall within acceptable levels). This protocol is implicit in the work of the World Bank and UNEP, amongst others, and describes how goal optimisation (top lines) and safe-minima standards (bottom lines) can be applied. In order of choice, first seek 'quadruple win' packages that will have lasting benefit, second look for options that maximise net gains without any major adverse effects, and third accept options that have modest net gains but that avoid potentially serious adverse effects.

2. In principle, **all other configurations of choice would be unacceptable** within a sustainability framework. In reality, to adhere strictly to this principle is not possible, politically and analytically. The process of identifying and tallying gains and losses, and undertaking the necessary trade-offs, is much messier and far more indeterminate than implied here. A 'best practicable sustainability option' is therefore sought to satisfy important objectives in all categories while avoiding critical thresholds or bottom lines.

box 3: THE QUADRUPLE BOTTOM LINE

In New Zealand the term quadruple bottom (top) line has been developed to accommodate cultural issues and the notion of cultural capital especially as it pertains to the Treaty of Waitangi. In particular it includes the principles of Kotahitanga (Partnership), Kaitiakitanga (Protection) and Urunga-Tu (Participation), which provide guidance, not only for government but also for business, about the potential for a profitable partnership with the indigenous culture.

In Australia the fourth capital is taken to be corporate governance; while elsewhere it has been interpreted as a spiritual dimension.

In the present case, we are taking the New Zealand definition.

3. On some level, **hard choices and trade-offs are an inevitable part of decision making**. This task must be confronted rather than assumed away. A key to do so is to place the burden of proof on the proponent for all trade-offs that assume potentially major or significant adverse effects can be mitigated. This presumes that such effects are unacceptable unless their remedy can be substantiated.

CASE STUDY

During 2008 and 2009 the Sustainability Appraisal Framework approach was tested in relation to policy and planning issues under a series of ad hoc arrangements and opportunities. The initial test was with a policymaking and planning group drawn largely from central government (Wellington) and planners and stakeholders at local government level (Nelson). It took the form of a 'retrospective' sustainability appraisal of alternative transport corridor routes. With some modifications, it was applied to the Canterbury Water Management Strategy to support its development and to assist in the choice of a preferred option from four selected strategies (see also Chapter 21). These tests identified four aspects of the approach to take account of when designing an application:

1. Importance of identifying the regional asset base for the proposed development as an anchor point for the process and participants

2. Need for participants to understand capital theory and relate it to levels of sustainability

3. Availability of principles for sustainability direction in policies and plans across all pillars, and

4. Necessity of strong participation and information from sectors representing all pillars of sustainability

The Canterbury case study

The objective was to identify the option or combination of options that was the best fit with a sustainable development objective. Participants included the Mayor of Ashburton representing the Canterbury Mayoral Forum, councillors and senior technical staff from district and regional councils, and senior representatives from Ngāi Tahu, the Chair of the District Health Board, the farming community and recreation and conservation NGOs. Social planners were included. This group, numbering 22 in total, included rural and urban perspectives and a range of views on water use, most firmly held.

The sustainability appraisal was undertaken over two days in workshop format comprising a series of linked activities involving all the participants, set out below (Box 4). Participants were presented with provisional lists of capital assets organised under economic, environmental, social and cultural pillars of sustainability (Table 2). This was prepared in advance with assistance from key informants including resource management professionals from the local iwi, Ngāi Tahu. While the LGA recognises Māori values as part of cultural well-being, the Ngāi Tahu resource professional advised that Māori assets should be recognised across all four pillars of sustainability

box 4: SUMMARY OF CANTERBURY WATER MANAGEMENT STRATEGY SUSTAINABILITY APPRAISAL PROCESS

1. Selecting a level of sustainability to reference trade-off decisions between stocks of capital assets

2. Compiling, annotating and prioritising the capital assets involved in the management of water resources in Canterbury

3. Preparing time–space analyses to record sub-regional and short- and long-term (intergenerational) impacts

4. Reviewing and revising a set of evaluation criteria in four sustainability pillar groupings previously developed by a group of experts and officials

5. Agreeing and recording safe minima and desirable objectives (quadruple top and bottom lines)

6. Scoring each option using evaluation criteria

7. Considering options on a sub-regional basis for the best overall outcome

The majority of the work was done in four small groups established to ensure a good representation of technical, regional and subject knowledge in each group

and that an opportunity for non-Māori cultural assets to be included in the culture pillar list should be provided.

Where the approach is applied in less time constrained circumstances the asset list would be compiled by participants from scratch. An effective approach to this phase of the work is to divide the participants into four groups each allocated the list of capital associated with one pillar and charged with

Table 2 Provisional 'asset' list for water management in Canterbury
(in strict terms this list includes some processes and outcomes in addition to assets)

Social (human and social)	Economic (produced and financial)
Trust in institutions/processes	Schools, community halls, etc.
Sense of community/place	Roads, bridges
Whanaungatanga	Dams and impoundments
Informal communication networks	Electricity generation plant & lines
Local knowledge	Irrigation infrastructure
Physical health of people	Water treatment & distribution infrastructure
Mental health of people	Farms (+ stock & machinery)
Skills in communities	Irrigated
Manaakitanga	Irrigatable
Arable farming knowledge/skill	Public finance
Dry stock farming knowledge/skill	Private finance
Dairy farming knowledge/skill	Ngāi Tahu finance
Communal decision-making	River-based tourism business
Environmental (natural)	**Cultural**
Air	Regional identity
Groundwater free from contaminants	Tastes (music, art, food, dress)
Surface water (at ecosystem sustaining flows)	Whakapapa
Mauri	Sense of belonging
Reserve land (DOC estate)	Attitudes and dispositions
Native bush in sustainable state	Customary rights
Native birds in sustainable populations	Sense of time
Native bird habitat	Culture and traditions
Native fish in sustainable habitat	Ahi kaa
Introduced fish	Language and linguistics/te reo
Coastal sediment budget	Tikanga and kawa
Whenua	Mana and rangatiratanga
Soils	Monuments and significant historical sites

amending the list as necessary. They then identify any assets that are particularly important for intergenerational and/or intragenerational equity. The groups rotate to review and amend the capital asset lists prepared by the others. Finally, individual participants choose the most important assets under each pillar for sustainability evaluation.

For a rapid examination of intergenerational dimensions a simple time and space matrix can be used such as the Netherlands sustainable development strategy model in Table 3. Participants record the anticipated impacts of the proposal on the assets in each of the four pillars in the short and long term and for future generations. While quite subjective in parts these questions challenge assumptions and knowledge to at least identify uncertainties in a way that other assessment approaches seldom do.

The next step is to assemble a set of sustainability evaluation criteria. In the time-constrained CWMS workshop this step was accelerated by producing a comprehensive draft in advance and using the workshop time to amend it based on the preceding stages of the workshop. A five-point scale was adopted: −2, −1, 0, +1, +2, with detailed scale descriptors.

The next and most critical stage is to identify the safe base-minima (quadruple bottom line/QBL) and objective maxima (quadruple top-line/QTL) for each criterion. These are the sustainable scale limits for each criterion for this sustainability appraisal. Capital substitutability is a critical concern at this stage and the irreversibility of environmental capital needs to be at the forefront of the participants' thinking for this work. Where information is lacking, a more precautionary position is selected.

Table 4 illustrates the scale descriptors for this particular work and the position selected for the base minima (oval) and top line (oblong).

Table 3 Space and time matrix

SCENARIO	Economic	Environmental	Social	Cultural
Sub-regionally & short-term				
Regionally & long-term				
Later, to safeguard future generations				

Table 4 Example of quadruple bottom and top lines

| Criteria	Brief description	Scale descriptors for impacts (vis-à-vis current state)				
		Strong negative impact	Moderate negative impact	Neutral impact	Moderate positive impact	Strong positive impact
		−2	−1	0	1	2
Aquatic and Riparian Biodiversity	Aquatic and riparian indigenous biodiversity, including key species	Rapid or extensive reduction of biodiversity including loss of key species	Reduction of biodiversity in some areas and/or loss of key species	Biodiversity and key species maintained at current levels	Recovery of biodiversity in key areas and for key species	Extensive and sustained recovery of biodiversity and survival of all key species ensured
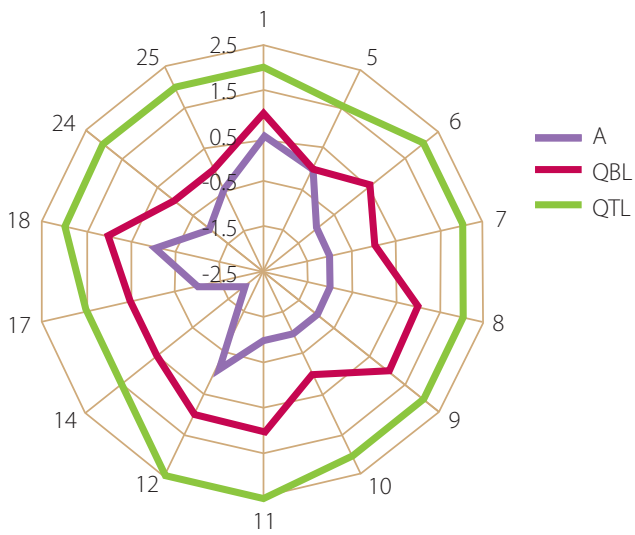
Figure 1 Option A – scored criteria
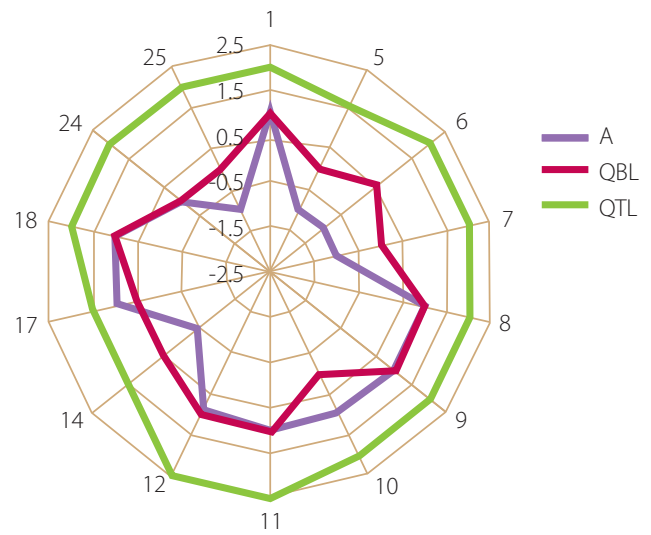
Figure 2 Option B – scored criteria

The final step in the CWMS sustainability appraisal workshop was the scoring of scenario options. Based on the evaluation criteria scale, each completed criterion had a top line position number, a bottom line position number and a score. Spider diagrams illustrate the scoring of options with reference to the bottom and top lines. Figures 1–2 illustrate results for two scenarios. Score positions are shown as a black line in relation to the bottom (red) and top (green) lines.

The Sustainability Appraisal of the Canterbury Regional Water Strategy delivered a clear result in as much as one option (A) did not meet the sustainability criteria adopted for the work and one option (C) scored much better than the other two. This was a considerable achievement for a very compressed process, and was judged a success by the participants whose independent evaluations commented positively about the process.

NEXT STEPS

The formative use in New Zealand of the Sustainability Appraisal Framework approach suggests it could be adaptable and effective for regional-level application on complex public policy proposals with sharply contrasting dimensions. The use of multidisciplinary teams to identify and agree sustainability safe minima for maintaining capital stocks anchors the work and is particularly effective for achieving consensus around sustainability objectives.

The successful application in a two-day workshop setting demonstrates the opportunity to involve time-constrained senior officials and decision-makers in practical sustainability appraisal. The effective application of the Sustainability Appraisal Framework approach in less time constrained circumstances is anticipated. Furthermore testing and possible further development of trade-off tools remains to be done, while application to corporate decision-making and/or strategy development remains an untested opportunity for which modification of the approach would be anticipated.

WANT TO FIND OUT MORE?

ACKNOWLEDGEMENTS

KEY PUBLICATIONS AND WEBSITES

Dalal-Clayton B, Sadler B 2009. Sustainability appraisal: an international sourcebook and reference guide to international experience. London, Earthscan, ISBN 9781844073573.

Frame B, Cavanagh J 2009. Experiences of applying a sustainability assessment: An awkward adolescence. Accounting Forum 33: 195–208

O'Connor M, Frame B 2009, Integration through deliberation: sustainability of what, why and for whom? Forthcoming in Environmental Science and Policy special edition on Integrated Assessment

O'Connor M, Frame B 2009, In a wilderness of mirrors: complexity, confounded meta-narratives and sustainability assessment. Available as a Working Paper at: www.landcareresearch.co.nz_publications?researchpubs?IAJ_Wilderness_of_%20Mirrors_Submission.pdf

Office of the Deputy Prime Minister (ODPM) 2005. Sustainability appraisal of regional spatial strategies and local development documents: Guidance to regional planning bodies and local authorities. London, Office of the Deputy Prime Minister (available at www.communities.gov.uk).

Russell S, Frame B, Forthcoming, Post-normal sustainability technologies: some early evidence.

Russell S, Ward M Forthcoming. Sustainability appraisal: Application to the Canterbury Water Management Strategy. Landcare Research Contract Report.

Ward M, Wilson J, Sadler B 2005. Application of strategic environmental assessment to regional land transport strategies. Land Transport New Zealand Research Report No. 275. Wellington, Land Transport New Zealand. http://www.landtransport.govt.nz/research/reports/275.pdf

REFERENCES

1 Statistics New Zealand 2009. Defining principles for measuring sustainable development.
Available at http://www.stats.govt.nz/Publications/NationalAccounts/sustainable-development.aspx
2 Wilson J, Ward M (Forthcoming). SEA in New Zealand. In: Sadler B, Aschemann R, Dusik J, Fischer T, Partidario M, Verheem R eds Handbook of strategic environmental assessment. London, Earthscan.

Getting under the bonnet

How accounting can help embed sustainability thinking into organisational decision making

Michael Fraser

Landcare Research
Manaaki Whenua

Summary

Sustainability Accounting can:

- Assist organisations 'to get under the bonnet' and explore the wider impact of their decision making on the different dimensions of sustainability

- Facilitate the inclusion of a broader group of people in the decision-making process by including numerical, textual and pictorial material

- Facilitate debate as to what 'sustainability' means and generate ideas and discussion that might otherwise have been left out of the decision-making process

- Operationalise what sustainability means to the organisation. This can be rewarding in terms of new ideas generated, but challenging because sustainability may be in tension with existing organisational practices

INTRODUCTION

There is widespread recognition that change is needed to address unsustainable organisational practices that cause social and environmental harm. For many people the idea of accounting is not synonymous with facilitating change because it elicits images of a technical, value-free, and at times dry business activity. However, closer exploration of accounting yields a field of study and practice that performs an unseen but powerful role in the way people think and act. For example, the way an organisation uses its resources has social, environmental and economic consequences that exist far beyond the immediate business.[1]

Understanding the relationship between the use of organisational resources and social, environmental and economic consequences is crucial.[1] Sustainability accounting is the use of accounting tools to provide the linkage between organisational activities and the pursuit of sustainability by using accounting tools. The effective use of accounting tools would ideally help people to better understand the wider impacts of their decisions and to have more accountability for the way resources are used.

Examples of new accounting tools developed over the last 15 years include full cost accounting, sustainable cost calculations, ecological footprint calculations, corporate social responsibility, sustainable development, and triple bottom line reporting. One of the most recent sustainability accounting tools trialled within a UK and New Zealand content is the sustainability assessment model (SAM).

The SAM was developed by Professor Jan Bebbington, in conjunction with British Petroleum (BP) and Genesis as a tool to incorporate sustainability considerations into organisational decision-making (within a UK setting).[2] In the BP and Genesis project, it was suggested that the SAM made the sustainability impacts of various projects' decision-making visible.[3]

This bridgepiece follows the application of the SAM within a New Zealand context and reports on the findings. These findings are particularly relevant for other organisations who are considering sustainability initiatives.

WHAT IS THE SUSTAINABILITY ASSESSMENT MODEL (SAM)?

The SAM was derived from a body of work known as full cost accounting. The idea of full cost accounting is to consider a broader range of impacts that are a result of a particular action being taken (or in some cases, not taken). Broader accounting aims to make previously external costs (i.e. costs imposed on people, society and the environment) more visible to decision-making and thereby change organisations' decision making approach. Full cost accounting calculations may, for example, include employee stress and environmentally harmful emissions in the production of a product.

The following example of a SAM was developed by BP, Genesis Oil and Gas and the University of Aberdeen as a way of including costs not previously considered in decision making and highlighting the interrelationships between them. The example is an oil field development where the SAM was applied by following four generic steps.

FOUR GENERIC STEPS IN CONSTRUCTING A SAM:

- Identify the directly controllable activities for the scope of the project (in this case oil field development)
- Identifyi the full life-cycle of the activities recognised in the project defined above (this might include exploration drilling, installation, production and decommissioning)
- Collect activity data and categorising into economic, resource use, environmental and social
- Monetise the activities and externalities in each of the categories

The results can be graphed to produce a 'SAM profile' indicating the positive and negative impacts resulting from carrying out a project (Figure 1, overleaf). Anything graphed above the line is considered to have a positive impact and anything below the line is considered to have a negative impact. A SAM profile requires those constructing it to think about what a sustainable project might look like when profiled. Some teams constructing
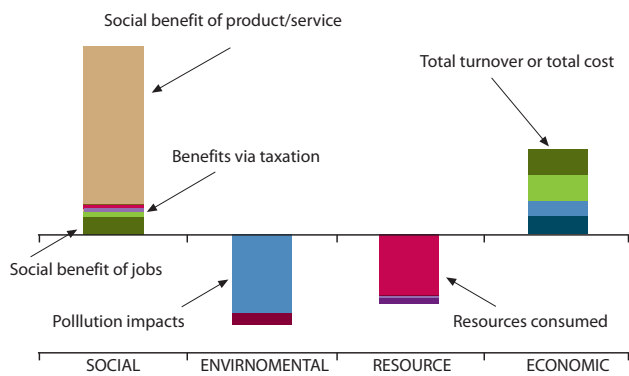
Figure 1 A SAM profile.

SAMs for their projects suggest that if the net difference of all the categories (i.e. economic, social, environmental and resource) is positive then the project is sustainable. However, some project teams may define a project as unsustainable if any of the categories fall below the line. For a full discussion of SAM terminology see Bebbington.[1]

The SAM has been applied in a number of organisations across a wide variety of projects.[4] The projects in New Zealand include new social housing developments, Māori welfare initiatives, waste assessment and several applications in a city council. The SAM has been applied both internationally and nationally and within private and public organisations. This study focuses on the application within a New Zealand city council[5] to demonstrate the practical operation of the SAM.

SAM: A NEW ZEALAND CITY COUNCIL

The SAM was applied to the New Zealand city council as part of the 'Building Capacity for Sustainable Development' Foundation for Research, Science and Technology (FRST) project. The objective of the collaborative research project was to explore the issues faced by society in transitioning to a more sustainable way of living. More specifically, the SAM was applied to satisfy the sub-objective of developing new sustainability assessment tools within organisational settings.

A city council was the first site of six within the FRST project where the SAM was applied largely to infrastructure projects. The council consumes significant resources, employs in excess of 2000 people and undertakes large infrastructure and social services projects. A key motivation in applying the SAM within

the council was the amendment of the Local Government Act (LGA 2002[6]). Under this legislation councils must promote (and report) the social, economic, environmental and cultural well-being of their communities. Such a legal undertaking meant that the term 'sustainability' had to be operationalised rather than keeping it as a high-level policy objective. The SAM was identified as a mechanism capable of assisting with the new legal requirements and embedding sustainability in organisational activities.

One of the early applications of the SAM was a community gardens project in which the council was deciding whether or not to sell a piece of land. The council property unit had performed a cost–benefit analysis and recommended selling the piece of land based on revenue that would be acquired from selling the land. A SAM was applied (see Figure 2), which took into account benefits derived from the garden that had remained unquantified under the cost–benefit evaluation. These benefits were primarily 'social benefit' and employment. The social benefit category included items such as a reduction in health costs (cost of obesity, mental health, etc.), educational benefit, (e.g. after-school holiday programmes), culture and identity, and crime prevention. The jobs category included the council's staff to maintain the grounds.

After presenting the SAM to the elected representatives, a decision was made to retain the community garden. The SAM, as an account that provided a more holistic picture of the community garden, was credited by a number of staff as being crucial in retaining the site. A view typical of many of the staff involved was voiced by a council operations manager:

"What you have done with the SAM is said 'no it does have a value and this is the value of it' and you really did turn around the decision. It really would have been developed if it had not been put through a SAM because there is no other way of defending it."

The process of constructing and representing the SAM to the elected representatives had impacted the decision-making
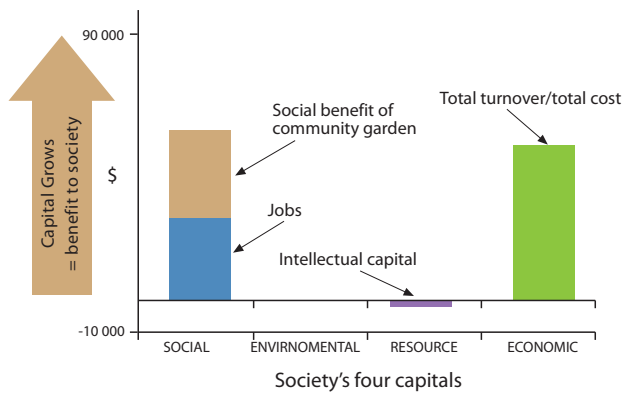
Figure 2 Community gardens' SAM profile.

process within the council community gardens project. To understand how this occurred it is necessary to explore the SAM beyond a merely technical description of its components."

HOW DID SAM MAKE A DIFFERENCE?

The application of the SAM to a community gardens project changed the decision-making process by bringing sustainability *onto the balance sheet or bring[ing] it in a way that can be assessed, discussed and looked at* (Project Manager). The first step in applying the SAM involved the project team discussing what elements should be included. Employment was one of the first elements raised for inclusion in the community gardens SAM and discussion turned to the type of jobs created. As a site for community composting the type of jobs that might arise involved unsociable hours, hazardous activities and low pay. This in-depth discussion was not considered likely to arise under previous evaluative models and provided a greater understanding in the decision-making process. The act of thinking about what should be included in an account was viewed favourably by those involved because it gave greater insight into the decision being made.

The process of raising the various elements that were to be included was assisted by the SAM acting as a frame of reference. Many of the elements included in the SAM were proposed over several meetings where the SAM was drafted and represented. This ongoing presentation meant that the discussions from the previous meeting were not lost and could be further developed in the following meeting. The time between meetings gave people a space to reflect on the issues raised and think about how they interrelated.

Using the SAM as a point of reference also facilitated the involvement of a broader group of people. Instead of restricting conversation to accountants and members of the council project team, additional people were included (e.g. people who worked in the garden, waste managers and the sustainability co-ordinator) because they were needed to assist in understanding elements typically outside the accounting area of expertise. Using the SAM as a framework facilitated this broader group of people to have a conversation where everyone could engage in a common language.

The multiple presentation of data enabled a broader group of people to participate in the decision-making process. The community gardens SAM was presented in pictorial, numerical and general language forms. The pictorial presentation was viewed most favourably because participants felt this provided the best way to understand the interrelationship between the various elements. For example, the inclusion of composting waste activities meant that employment was considered a positive benefit. However, the low-quality jobs and hazardous nature meant that negative aspects such as injury must also be included.

The pictorial nature of the SAM profile enabled the two options (keep the garden or sell the land) in the community gardens project to be visually compared. In other applications of SAM where project decisions could have taken several directions, it was possible to model each scenario simultaneously. Applying the SAM over two or more scenarios provided the opportunity to ask 'what if' questions.

During the course of the discussions, viewpoints of what the term 'sustainability' meant were frequently referred to. It was discovered that council operational staff typically held different views on what sustainability was and how it should be operationalised within the council in comparison to senior managers. Operational staff thought that sustainability initiatives should focus on social and environmental impact whereas senior staff exhibited more of an economic view. As a result, senior staff believed that sustainability initiatives were good things to do, but social and environmental aspects should not detract from the financial position of the council.

The discussions that arose during the application of the SAM within the council led to questions about the angle SAM was approached from. The SAM differed from previous accounting tools in two key ways. First, it was a forward-looking account of interrelated negative and positive impacts a project decision might have.[7] Secondly, these impacts were not limited to the organisation but considered as to how they might affect wider society. For example, employee salaries were viewed favourably because this was a contribution to society. Most people had only been involved in producing an account that viewed all aspects of a project from an organisational point of view.

The SAM made assumptions about sustainability more visible and as a result highlighted the different opinions (e.g. what sustainability was and how it should be operationalised) among staff. While the SAM acted as a catalyst for surfacing what sustainability meant to the council, it also opened up a source of tension and challenged the high-level rhetoric about the council's position on sustainability. The increased ability to question aspects of performance meant that staff within the council could no longer make valid claims about

being sustainable without reference to a more detailed understanding of its meaning.

IMPLICATIONS

The implications arising from this experiment with a SAM can be considered within three broad categories:

•   Implications for policymakers

•   Implications for legislators

•   Implications for educators

IMPLICATIONS FOR POLICYMAKERS

A successful policy will be multifaceted with the SAM (or similar assessment tool) being an important tool; however, it will be insufficient on its own to embed sustainability practices within an organisation. Other tools and processes such as the inclusion of specific performance indicators within job descriptions and integration of sustainability initiatives into organisational strategy and planning activities will also be needed.

The SAM had the greatest influence in situations where there was financial support from the highest levels in the organisation. Applications of a SAM with limited resources from senior management were often viewed more as a compliance exercise and the SAM profile (as depicted in Figs 1 and 2) as an add-on. However, applications that received higher levels of financial support from senior management viewed the construction of the SAM as being the most valuable part of the process. Viewed in this light the SAM can be considered a 'conversation starter' rather than an unquestionable accounting output. People who led SAM implementations required skills to initiate and broaden these conversations. For example, effective facilitation began with ensuring team members understood both the technical requirements of the SAM (i.e. what data were required) and the overarching purpose (to broaden thinking on sustainability issues with respect to project decision making).

The most challenging aspect for organisations applying the SAM model was the emergence of unexpected results. This

THE SAM 'BROUGHT SUSTAINABILITY ONTO THE BALANCE SHEET' BY:

•   Facilitating discussion about elements that might not have otherwise been included such as education and health benefits

•   Facilitating the discussion of interrelationships between the various elements, for example increased crime and decreased access to community facilities

•   Providing a frame of reference for ongoing discussion

•   Presenting the elements of an account in different ways so that people could reconceptualise the project

•   Providing a space for people to think about and debate what sustainability was and how it related to the specific project decision

occurred in several applications and the responses were mixed. Unexpected results sometimes prompted further discussion and a reconceptualisation of the project. Other unexpected results abruptly closed conversations down.

Policymakers need to be clear from the outset as to why sustainability is an important feature and be prepared for results that highlight just how unsustainable current organisational activities might be. These can provide important insights as to where limited funding can make the biggest difference.

Policymakers must seek adequate resources to accompany any policy that makes use of sustainability assessment tools. Traditional organisational accounting is highly standardised and has been streamlined over many years of use. By contrast, tools such as the SAM are experimental and consume significant resources. Any process that involves more people will take longer and cost more.

IMPLICATIONS FOR LEGISLATORS

Despite the influence of legislation from central government serving as an important starting point in embedding sustainability into organisations, a word of caution must be raised on two grounds. First legislation is only one facet, and to rely on one mechanism is to almost guarantee failure. Secondly, legislation, despite being a widely recognised lever in inducing desired behaviour(s), does not have a direct one-to-one relationship with the intended outcome. How legislation is monitored and enforced is of significant importance because it provides a sense of legitimacy for the pursuit of sustainability initiatives.

In the case of the council, the LGA (2002) was implemented in a phased manner. Councils were given a chance to implement activities and reporting mechanisms prior to the full legislation taking effect. This phasing in of how councils would be audited occurred after this research took place. The risk is that requirements embodied in the legislation (including a high-level use of the word sustainability) may allow councils more room to evade the accountability relationships intended by the legislation.

Meeting the needs of legislation provides an essential platform from which individuals within the organisation can initiate organisational change to embed sustainability or, at the very minimum, legitimately question unsustainable practices. The capacity to do so is likely to require some external motivation, individuals who are capable of understanding the role their organisation performs within a broader context, and the mechanism(s) to bring about organisational change. Who these individuals are, the capabilities they possess and where they might be educated can be considered challenges educators are now faced with both within formally recognised education programmes and informal organisational development programmes.

IMPLICATIONS FOR EDUCATORS

A cursory glance at any number of tertiary education providers will highlight an increasing number of sustainability programmes. Accounting educators that recognise the need to provide a broader account to a wider group are no exception. Traditionally, accounting students were good technical experts who could follow a myriad of rules and produce a quantitative statement. To a large degree, this line of focus on frameworks and rules takes up a large part of an accountant's study, but it is no longer considered sufficient.

Accountants now and in the future have to recognise their role as one of providing information to help people understand the consequences of organisational activity in alignment with various societal values and concerns. Accounting programmes will need to place a greater emphasis on dealing with a higher level of uncertainty and increasingly sophisticated measures, and to reflect on how this might be communicated to a broader group of people.

Research conducted to date in the application of SAMs in New Zealand suggests that accountants do not fare well with respect to the above required attributes. Reasons cited include not being trained to deal with social and environmental concerns and not having enough resources even if they wanted to support such applications. Whilst a number of accountants were supportive and found the applications an interesting

IMPLICATIONS FOR POLICYMAKERS CONSIDERING THE USE OF SAM:

- Sustainability assessment tools are a necessary but an insufficient tool on their own to successfully implement sustainability policy
- Successful SAMs were viewed for what they added to the decision-making *process*, not the final output of 'an answer'
- Unexpected results provide a good opportunity for organisational change
- Sustainability assessment tools can be resource intensive
- SAM applications motivated by legislative requirements must have adequate monitoring/audit
- Selecting adequately skilled individuals to lead SAM applications is a significant contributor to favourable results

intellectual exercise, some did not believe the results were objective. Such an argument might be 'true', but could also be launched against accounting methods already in use, for example, measures of goodwill and depreciation might also be considered subjective.

Many of the people who led the application of the SAMs had little or no formal accounting education. With the launch of the Sustainability Special Interest Group by the New Zealand Institute of Chartered Accountants and an increase in exposure during tertiary education it is hoped that accountants might be able to provide more guidance on assessing the sustainability impacts of an organisation.

SAM AND THE FUTURE

Sustainability is inherently concerned with exploring the way people think as individuals, organisations and as communities. Future research will focus on how accounting tools may affect behaviour at different levels in the organisation. For example, in some applications the process of applying the SAM has a significant influence over the project decision (such as the

community garden application detailed above). In other applications the SAM produced a result that was unanticipated and the researchers were requested to abandon the application due to time and budget pressures exerted on the project.

Further applications of the SAM might consider different organisations and sectors (e.g. private) in order to explore the interrelationships with accounting tools and organisational change. Reflecting upon why SAMs had little or no influence in some project decisions might also be equally as worthwhile as focusing on SAMs that did appear to influence outcomes. Such a reflection might provide insight as to why some managers treat SAM as a box-ticking exercise, whereas others viewed it as an enabler to think more deeply about organisational activities as a whole.

CONCLUSIONS

Overall, the experimentation of sustainability assessment tools made possible with the *Building Capacity* FRST project suggests that sustainability assessment is a useful but challenging initiative. In the case of the council, the application of the SAM provides an example of how an accounting tool may assist in the moving towards a more sustainable (or less unsustainable[8]) way of operating. In the community gardens example the SAM highlighted factors not previously considered to enable people to be more informed about the full impact of a decision. The pictorial nature of the SAM, and the process followed, enabled this deeper understanding of the decision being made by allowing people to ask 'what if' type questions. In summary, accounting tools such as the SAM allow people to 'get under the bonnet' and explore various scenarios before the impact is irreversible. It is an accounting tool that looks forward not backward.

However, not all aspects of the SAM application went unchallenged. The resource-intensive nature, the emergence of unexpected results and the challenging of high-level rhetoric surrounding sustainability were at times met with resistance. It could be argued that discussing what sustainability is, and how it should be operationalised, is exactly what is needed. Further discussion on unexpected results produced as a consequence of applying the SAM might also provide equally useful organisational insight.

Accounting may be only one tool amongst many that can promote sustainability thinking within organisations. However, the experience of the community gardens SAM (along with others) indicates that accounting can make a powerful difference during the analysis and decision-making processes. Policymakers should also consider further how accounting tools such as the SAM might facilitate a change in the way that members of an organisation think and behave in the pursuit of more sustainable alternatives.

WANT TO FIND OUT MORE?

Contact buildingcapacity@landcareresearch.co.nz

For the Author's contact details see page ii

KEY WEBSITES AND PUBLICATIONS

http://www.accountingforsustainability.org/home/

http://www.nzica.com/AM/Template.cfm?Section=News&Template=/CM/ContentDisplay.cfm&ContentID=14633

Bebbington J 2007a. Accounting for sustainable development performance. Oxford, Elsevier, CIMA.

Bebbington J 2007b. Changing organisational attitudes and culture through sustainability accounting. Chapter 12 in Sustainability and sustainability accounting, London, Routledge.

Bebbington, J., Brown, J. and B. Frame, (2007) 'Accounting Technologies and Sustainability Assessment Models', Ecological Economics, Vol. 61(2-3), pp. 224–236

Frame B., and Brown, J., (2008), 'Developing Post-normal Sustainability technologies', Ecological Economics, 65, 225–241

ACKNOWLEDGEMENTS

REFERENCES

1 Bebbington J 2007. Accounting for sustainable development performance. Oxford, Elsevier, CIMA.
2 Baxter T, Bebbington J, Cutteridge D, Harvey G 2003. The Sustainability Assessment Model (SAM): Measuring sustainable development performance. Richardson, Texas, Society of Petroleum Engineers.
3 Bebbington J, Frame B 2003. Moving from sustainable development reporting to evaluation: The Sustainability Assessment Model. P. 11. Accessed from www.nzbcsd.org.nz.
4 Frame, B. and Cavanagh, J., (2009) Experiences of applying a sustainability assessment : An awkward adolescence, Accounting Forum, 33, 195-2085 The name of the council is withheld as part of the research agreement with the council.
6 Local Government Act (2002) New Zealand Local Government Act, Schedule 10.
7 Although cost–benefit analysis is forward looking previous applications did not considered interrelated elements between four groups outline above.
8 These two terms do not have the same meaning. The term 'less unsustainable' is more apt for this situation because it infers we are currently operating in an unsustainable manner whereas 'more sustainable' may infer we already posses a level of sustainable activity

Published January 2010

Stakeholder analysis

Will Allen and
Margaret Kilvington

Summary

- The increasing scope and ambition of many environmental and resource initiatives –– e.g. integrated coastal and catchment management – requires a commitment from management agencies to collaborate with a diverse range of stakeholders. These stakeholders will have different interests and varying expectations from any collaborative initiative.

- Stakeholder analysis is a way to identify a project's key stakeholders, assess their interests and needs, and clarify how these may affect the project's viability. From this analysis, programme managers can make plans for how these aspects will be addressed.

- Stakeholder analysis also contributes to project design by identifying the goals and roles of different stakeholder groups, and by helping to formulate appropriate forms of engagement with these groups.

- While stakeholder analysis is essential at the beginning of any multi-stakeholder initiative, it can also be used for ongoing assessment of the effectiveness of key relationships and communication strategies.

- It is therefore a simple but critical tool in managing the relationships within a long-term resource management programme.

This chapter outlines a stakeholder analysis tool to support resource management projects. The stakeholder analysis tool helps resource managers identify key stakeholders, determine their interests and establish strategies for their involvement within a project.

INTRODUCTION

Stakeholders are persons, groups or institutions with interests in a policy, programme or project. Their involvement may be critical in fully understanding the problem and implementing solutions, they may represent a possible barrier or threat, or they may simply have a democratic right to be involved because project decisions will affect them.

Stakeholders can be divided into two groups:

- Primary stakeholders who are the immediate communities of interest, for example the landowners in a water catchment.

- Secondary stakeholders (intermediaries) who are the intermediaries in the process, and may include the local authorities and other institutional bodies. Often these groups do not think of themselves as stakeholders because they feel they are in control of the problem-solving process.

A rule of thumb for ensuring that key stakeholders have been included in the process is to question whose support or lack of it might significantly influence the success of the project. This is a particularly good test for expert and activist groups, both of whom commonly claim to speak for a wider representation than may be the case, and whose capacity to articulate their concerns might easily cause other groups to be overlooked.

Stakeholder analysis looks at both the stakeholders and the relationship between them and the project. Different types of relationship need different kinds of processes; some need more input to maintain them. For example a stakeholder that most projects will have is the group (or groups) responsible for funding the work. The funding stakeholder/s may have well-articulated ways of relating to the project (e.g. through reporting procedures, or financial statements) but also may require ongoing feedback on the progress that is being made in order to ensure their continued confidence, particularly if the project is long term and aimed at broad outcomes. Stakeholders similarly can be quite specific, such as individuals or geographically identifiable groups of people (e.g. local

landowners in a catchment). Others are more 'amorphous' (e.g. 'the community') and we have to think more laterally about how we are going to establish and maintain a relationship with them. Still others may seem easy to identify in the first instance, such as the tangata whenua of an area, but may present new challenges when thinking through how to develop a relationship between them and the project. Managing all these relationships take time and skills and project managers need to determine whether the project has the capacity to build the relationships required to carry out the work, and if not how they will be built.

WHY A STAKEHOLDER ANALYSIS?

A stakeholder analysis is just one (albeit usually the first) step in building the relationships needed for the success of a participatory project or policy. The analysis provides a starting point, by establishing which individuals and groups to work with and setting out an approach so this can be achieved. In this way a stakeholder analysis also helps project-initiators to assess the social environment in which they will operate. In particular a stakeholder analysis can be used to:

- Identify and define the characteristics of key stakeholders

- Draw out the interests of stakeholders in relation to the purpose of the project or the problems that the project is seeking to address (at the project identification stage)

- Identify conflicts of interests between stakeholders, to help manage such relationships during the course of the project

- Help identify relationships between stakeholders that may enable 'coalitions' of project sponsorship, ownership and cooperation

- Assess the capacity of different stakeholders and stakeholder groups to participate

- Help assess the appropriate type of participation by different stakeholders, at successive stages of the project cycle, e.g. inform, consult, partnership – all of these have different possible models of communication.
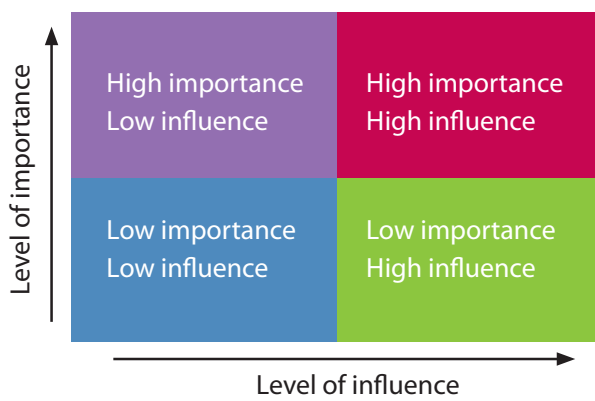
High importance
Low influence

High importance
High influence

Low importance
Low influence

Low importance
High influence

Level of importance

Level of influence

Figure 1 A stakeholder mapping matrix.

CONDUCTING A STAKEHOLDER ANALYSIS

Before conducting a stakeholder analysis, the project objectives needs to be clearly identified. With this done, more clarity can be developed around who the key stakeholders are, and how they can best be involved. This can be seen as a three-step process.

Step One: Identifying major stakeholder groups

Identify and list stakeholders. Often it is better to do this with the help of a small group of people. Stakeholders can be individuals, groups, communities, organisations, etc. Breaking stakeholder groups into smaller units (e.g. men and women, ethnic groups, locality, organisational departments) will often assist in identifying important sub-groups who may otherwise be overlooked.

Stakeholder analysis is aimed at enhancing stakeholder involvement in participatory processes **prior** to their actual involvement in decision-making activities. Thus stakeholders do not usually participate in this process. However, since stakeholder identification has consequences, analyses are likely to be bounded by the interests, current knowledge and agenda of the agency directing the exercise. It is important, therefore, to allow for the inclusion of more stakeholders later in the process as their interest comes to light.

Step Two: Determining interests, importance and influence

Draw out key interests for each stakeholder group on the initial list. Questions that can help uncover these include:

- What is the stakeholder likely to expect from the project?

- What benefits or risks are there likely to be for stakeholders?

- What resources are the stakeholders likely to commit to the project?

- What other interests does the stakeholder have that may conflict with the project?

- How does the stakeholder regard others on the list?

Next, assess the influence and importance of each stakeholder in the project. 'Influence' refers to the extent to which that a stakeholder can impact the success of the project positively or negatively; 'importance' refers to those stakeholders whose problems, needs and interests most closely coincide with the aims of the project. If the 'influential/important' stakeholders are not involved or assisted, then the project cannot be called a success.

This assessment can often best be done by getting together 4–5 people, each with a unique viewpoint on the project or issue. Stakeholders can include organisations, departments, agencies, NGOs, networks or individuals. The list does need to be comprehensive enough to ensure that groups are not being left out. Diagrams such as shown in Figure. 1 can be used as a prompt, or mapping tool, to categorise stakeholders.

Step Three: Establishing strategies for involvement

Plan some strategies for approaching and involving each person or group. How to do this will usually depend on the results of the previous analysis. Where the stakeholder is a group rather than an individual, you may need to decide whether all in the group participate or only representatives of the group. Initially, it may be that not all stakeholders will be enthusiastic to take part, but stakeholder involvement is a continuous process and stakeholders may increase or decrease their level of involvement as the project continues. Preparing for this will be part of the ongoing engagement strategy for the project. Some form of stakeholder assessment will need to be repeated at various times throughout the project, particularly when new and substantive interests emerge. Thus, partnerships should be flexible and designed to grow.

LESSONS IN STAKEHOLDER COLLABORATION

The strength of collaborative processes lies in the creative approach that multiple stakeholders can bring to problem solving. Face-to-face negotiations allow the different parties to more fully explore the issues and collectively come up with solutions that work. By being involved in the development of a solution, stakeholders are more likely to champion the management solutions and actively take part in them. This is critical for issues such as land management where support and action from many parties – and often a whole community – is required.

Over time, resource managers have learnt a number of lessons about involving stakeholders:

- Constructive discussion and planning takes time, so there is a need to build enough time into the process for people to learn about each other, overcome their differences, and begin to 'speak the same language'. Then, more time is needed to resolve problems and disagreements. Conflict can be constructive, where there is a well-facilitated process to ensure all views are heard, and to turn the diversity of ideas and the energy to 'make a difference' to good effect.

- Key points when discussing a problem situation are that ecological objectives should not be considered in isolation from community social and economic needs, and that these social and economic needs will not be identified without local involvement. Similarly, there is a need to take note of all the issues raised in these discussions, no matter how simplistic or controversial they may at first appear.

- Monitoring and evaluating the nature of the collaboration is as important as measuring specific policy or project outcomes.

There is a growing body of research and quality standards on stakeholder assessment and management. Stakeholder management and the collaborative problem solving approaches that it facilitates are increasingly recognised as primary building blocks for sustainable development.

Published January 2010

Supporting effective teamwork

A checklist for evaluating team performance

Margaret Kilvington
and Will Allen

Summary

- Teams can be instruments for achieving changes in culture and practice in organisations.

- Teams need both technical know-how and other abilities such as the skills to communicate to different audiences, and good networks and relationships.

- Teams make better progress if they are aware of their goals, skills, capabilities and resources and are able to address any deficiency.

- Presented here is a checklist approach to evaluation, designed to help teams clarify and monitor their goals, assess their strengths and limitations, and respond to the needs of their own unique circumstances.

How best to manage and foster change is a much considered topic in today's organisations. While a group approach is not always necessary, many tasks facing organisations cannot be implemented by individuals working alone. Where problems and decisions involve a degree of complexity and uncertainty, where there is potential for misunderstanding and conflict, and where widespread acceptance and commitment are critical, such situations will call for group collaboration.[1]

This is particularly true of any initiative designed to change the way an organisation works, such as when introducing waste minimisation and resource use efficiency measures across a workplace. In situations of shifting culture and practice, teams of individuals are often regarded as critical vehicles not only for successful completion of specific projects but also dissemination of the vision behind the new practices (e.g. sustainability). Teams can be expected to champion work within an organisation, communicate upwards and across the organisation, and be able to initiate changes at many levels. To achieve this, teams often require new technical knowledge – but they also need other skills such as the ability to communicate to different audiences, and good networks and relationships.

Harnessing the potential power of a group can have a dramatic effect on an organisation's ability to simultaneously meet goals and improve job satisfaction. When a group is functioning well (whether it be a work team, sports team, friendship group, orchestra, religious group, or voluntary group), the group dynamics and sense of belonging and acceptance can bring out the best in people. Groups can enhance problem solving and creativity and generate understanding, acceptance, support, and commitment. In addition groups can increase morale, improve self-esteem, and help create consensus. Most people have had at least a few experiences where participation in an effective group or team has helped us to achieve at levels we never thought possible.

However, while teams may be a necessary part of successful organisational change, their presence certainly doesn't guarantee success. As most people can testify, groups can also be inefficient, confused, and frustrated.

SUPPORTING SUCCESSFUL TEAMS

One way to influence how effective a team will be is to ensure certain factors are built into their set-up, such as ensuring the team membership comes from all parts of the organisation that have an influence on the project. However, beyond ensuring the team has a good basis for achieving its project goals, what is needed is a way to assess 'actuality against intention'. That is, are the teams operating the way they were intended, and, if not, what can be done to improve the actuality? For instance, if a management representative has been included in the team to provide links to key decision-makers, is this working? Is the team maintaining enthusiasm for their tasks? Is the team membership sufficient to manage the workload?

To do this requires a shift of focus from 'getting the right team structure' to maximising the effectiveness of the team at doing its job. What can be useful is for teams to have some way of self-monitoring their performance, not just in terms of the outcomes they are achieving but also in terms of the key ingredients that are enabling them to make progress. This requires some knowledge of groups as dynamic entities – going through phases of development with different needs at different times; and some way of enabling the team to assess how well they are going and what their changing needs might be.

EVALUATING TEAM PERFORMANCE

The following checklist has been developed to guide teams in thinking about the key elements that make teams work. This evaluation is not designed to score or rate a team's value; rather, it is to help a team critically reflect on what has been successful for them and what they would like to do differently in the future.

Rather than study a list of 'how-to's' that might seem self-evident, this approach uses a checklist of aspects critical to successful teams that participants discuss in terms of their own situation. The process begins with the range of goals that a specific team wishes to accomplish. Through a facilitated, self-reflection exercise teams decide whether an aspect of team functioning is important in their context. If they agree

it is, they then discuss how well this is going and whether any changes are needed. The strength of this process is that generic issues of team activity are covered in a way that is unique and specifically relevant to any individual team.

The checklist has been developed through a literature review of factors important to the effective management and growth of teams.[2] These factors help a team reflect on their performance in five main areas:

1. Goals
2. Results and productivity
3. Team structure
4. Team operation
5. Team skills

PROCESS

1. Begin with the team goals

Because teams are purposeful, i.e. they are there because people have come together to achieve certain tasks, each evaluation begins by asking teams to define their goals. This

review of goals includes both formal goals (the ones the team has most likely been set up to achieve) and informal goals (those that the individuals bring to the team or that the team itself has developed for its members).

2–5. Team productivity, structure, operation and skills
are addressed through a series of questions detailed in the checklist (see table). These questions are opened up for facilitated discussion by the team. As a way of getting closure on each question, the team is asked to come to a consensus on their performance in this area using colour dots according to a 'traffic light' system:

Green	*This aspect is well covered*	🟢
Yellow	*We need to think about this as it maybe a limiting factor*	🟡
Red	*This factor needs to be addressed as it is limiting team performance*	🔴

A record is kept of the comments associated with each area of team activities and at the close of the evaluation the team agrees a time and place to discuss their response to their 'red dot' and 'yellow dot' factors. Responses may arise immediately during the evaluation and team members may agree to take action.

Points to note when undertaking the evaluation
- While the checklist is designed to be used by an external evaluator, a team that has facilitation skills within its own membership can undertake its own evaluation.
- Where teams feel they were doing well, it is useful to prompt them to think about the reasons why this was so. Where teams identify that they have a weakness, they could be offered a short opportunity to work through the barriers and develop steps that could be taken to improve their performance.
- The fifth section of the checklist asks about essential skills that are required for team operation. However, because these skills underpin team performance in the above areas, they are often covered in preceding sections.

OUR EXPERIENCE WITH THE CHECKLIST APPROACH

We have used the checklist-based evaluation approach to help develop the capacity of teams involved in changing company practices around waste minimisation.[3] These teams were already receiving technical training in how to assess and address wasteful resource use in their companies. What was needed was some support that enabled them to be effective in delivering on their projects and influencing events across the company. What we found was that:

- Using the checklist in a reflection-based evaluation helped teams identify a number of factors that were holding them back. For some these were matters of leadership, or key contacts they were lacking, or limitations in their project planning.
- Facilitation was critical to the usefulness of the checklist approach. An evaluation can seem 'negative' – i.e. pointing out failures. Teams need to feel confident that this evaluation is 'by them and for them', but also teams can need to be pushed to think beyond the immediate response that 'everything is alright'.
- The more open a team's work environment was to learning and development, the more ready the team was to look for ways to improve what they are doing. Further, the more experience teams get with the core factors of effective teams, the more natural and frequent the monitoring of progress becomes.

box 1: SUMMARY TABLE: TEAM PERFORMANCE

No.	Task		Rate
1. Results and productivity			
1.1	Does the team have clearly identified actionable steps to achieve its goals?		
1.2	Does the team monitor its progress against concrete milestones?		
1.3	Does the team regularly and frequently assess how well they are working together?		
1.4	Are the team's successes, big and small, acknowledged?		
1.5	Does the team learn from its failures?		
2. Team structure			
2.1	Is the team the right size, with the right mix of players for your purpose?		
2.2	Does the team have the flexibility to bring in people and change membership to suit the current project?		
2.3	Does the team have the right resources?	• Money • Time • Resources	
2.4	Does the team meet regularly?		
3. Team operation			
3.1	Does the team have effective leadership?		
3.2	Do the team members understand their roles and are they able to carry them out effectively?		
3.3	Does the team have good networks?	• Internally • Externally • With management	
3.4	Does the team have useful meetings with clear identification of tasks?		
3.5	Does the team have effective ways of managing conflict?		
3.6	Is the team functioning in a way that people freely express ideas and share opinions?		
3.7	Does the team stay motivated?		
4. Team skills: Does your team have these?			
	- Managing meetings: setting agendas, managing time etc. - Documenting progress: keeping minutes, records etc. - Data and information gathering - Facilitation: dealing with conflict, managing constructive debates etc. - Innovation: introducing creative ideas - Presentation: summarising finds to relevant audiences - Networking: bring comment, feedback etc. to the team - Motivation: reminding team of success - Task performing: reliably doing relevant tasks		

REFERENCES

1 Wertheim EG 2000. Surviving the group project: A note on working in teams.   http://www.cba.neu.edu/~ewertheim/teams/ovrvw2.htm
2 Allen W, Kilvington M 2001. Building effective teams for resource use efficiency. Landcare Research Contract Report LC0001/60. http://www.landcareresearch.co.nz/research/social/teams_evaluation.asp
3 Kilvington M, Allen W 2001. Appendix II: A checklist for evaluating team performance. In: A participatory evaluation process to strengthen the effectiveness of industry teams in achieving resource use efficiency: The Target Zero Programme of Christchurch City Council. Landcare Research Contract Report LC0001/62. http://www.landcareresearch.co.nz/research/social/teams_evaluation.asp
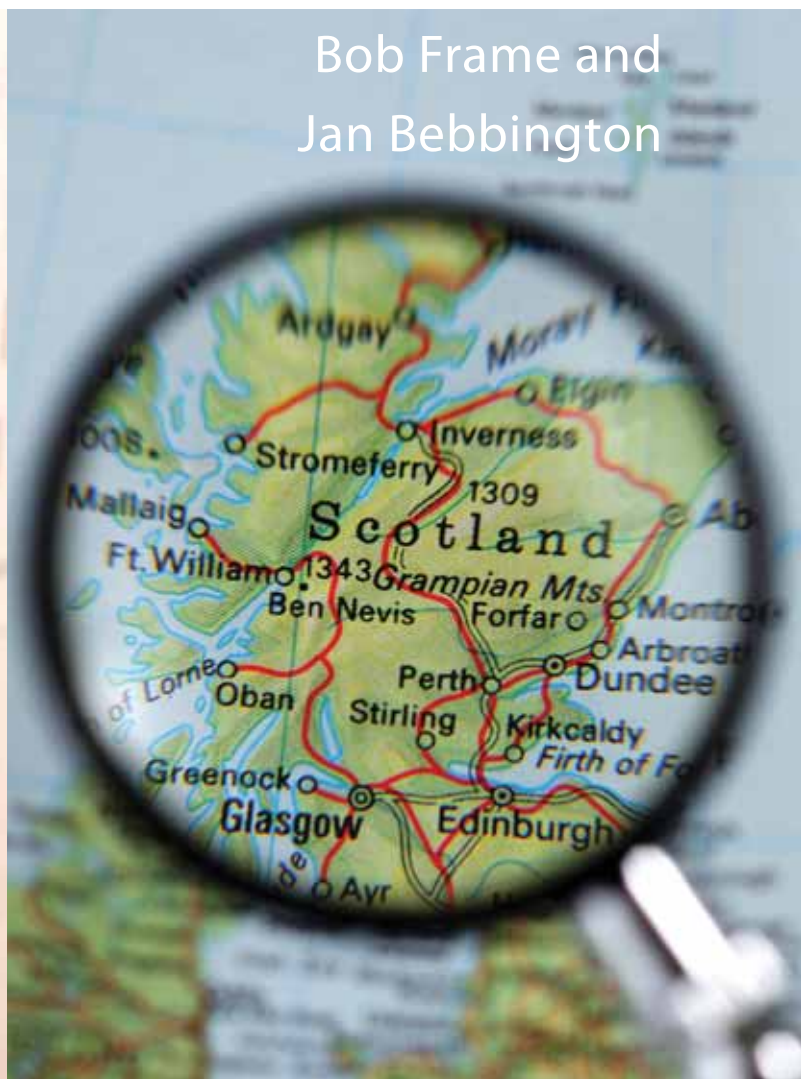
National Sustainable Development Strategies

A comparison of National Sustainable Development Strategies in New Zealand and Scotland

Bob Frame and
Jan Bebbington

Summary

- National Sustainable Development Strategies (NSDS) for Scotland and New Zealand provided an opportunity to examine the underlying assumptions regarding how governments address sustainability issues, what end points are sought and how the gap between these is bridged.

- We sought not to compare performance in the two jurisdictions but to present them side by side to identify differences.

- Adoption of sustainability principles in both countries appeared dominated by advanced liberal processes with few examples of sustainability-led governance.

- However, the two countries' strategic approaches to the task of governing differed greatly.

Parliament buildings in Scotland and New Zealand

SCOPE

Governments have a critical role to play in setting national direction and aspirations with regard to sustainable development (SD) through National Sustainable Development Strategies (NSDS) as required by the United Nations.[1] Here we explore how two governments, in New Zealand and Scotland, addressed this role from mid-2002 to mid-2007 see Fig. 1 for the process timelines). Despite points of difference, New Zealand and Scotland faced similar pressures with respect to achieving progress towards SD (in terms of demographics,[2] reliance on key sectors, levels of emissions) and operated within broadly the same model of government where both used forms of proportional representation, had unicameral legislators and share a common history by virtue of New Zealand's European settlement. We believe that presenting findings from each country together allows for a broader reflection on each individual country and its approach to formulating sustainable development scenarios. To do this, we unpacked the development of sustainability policy and constructively critiqued around issues of power and authority using a governmentality lens as described elsewhere (Chapter 20).

NATIONAL SUSTAINABLE DEVELOPMENT STRATEGIES

In 1992, 105 countries endorsed the United Nations Rio Declaration on Environment and Development and committed themselves to integrating SD principles in concrete policies and actions. This was to take place through NSDS which would harmonise various sectoral, economic, social and environmental policies to ensure socially responsible economic development for the benefit of future generations as part of *Agenda 21*. In 1997, the Special Session of the UN General Assembly set a target date of 2002 for the introduction of NSDSs. Subsequently, the WSSD Summit's Johannesburg Plan of Implementation stated that all countries should take immediate steps to make progress on NSDSs and begin their implementation by 2005. It is within this context that both New Zealand and Scotland (nested under the UK framework for SD)

prepared their strategy documents. These documents, however, did not emerge in a vacuum. Rather, they were the outcome of and shaped by the political landscape in each country. We sought not to compare performance in the two jurisdictions but to present them side by side to identify differences.

The two countries are obviously very different. New Zealand is an independent unitary state while Scotland has a devolved authority functioning not only within a UK decentralised unitary state system, but also a multi-level system of EU governance – itself possessing a sustainable development strategy; Scotland appeared more constrained while New Zealand had potentially far greater agency. As our analysis showed, Scotland focuses on the machinery of government to deliver sustainable development, perhaps because its strategy is embedded in the UK's overarching framework, and as the UK has historically tended to deal with the environmental/ sustainability issues through institutional restructuring.

Specifically, the key strategy document in each country (the *Sustainable Development Programme of Action*[3] in New Zealand and *Choosing our Future: Scotland's Sustainable Development Strategy*[4] in Scotland) and other key documents (see Key Publications and Websites below) were carefully read and re-read several times using the governmentality lens as a guiding framework. Text in each document was categorised according to whether it was seeking to problematise the situation, provide a utopian ideal, or was related to some regime of practice (Table 1, overleaf). In addition, the language used, the visual prompts and iconography in each document were explored by both researchers in order to create a richer description of each approach. This process enabled an understanding of each strategy, and the context in which they were developed.

Table 1 Priority areas of the NSDSs

New Zealand	Scotland
Quality and allocation of freshwater	Sustainable production and consumption
Energy	Climate change and energy
Sustainable cities	Natural resource protection
Child and youth development	Sustainable communities

NEW ZEALAND CASE STUDY: SUSTAINABLE DEVELOPMENT PROGRAMME OF ACTION (SDPOA)

In May 2000, the NZ government endorsed the Brundtland Report[5] definition of SD and agreed that it involves thinking broadly about objectives, considering long-term as well as short-term effects. In August 2002, the government outlined its approach to SD[6] in preparation for the World Summit in Johannesburg that year. Statistics New Zealand[7] provided a selection of economic, social and environmental information and criteria as a first cut at the task of collecting relevant information to assess whether development processes were sustainable.
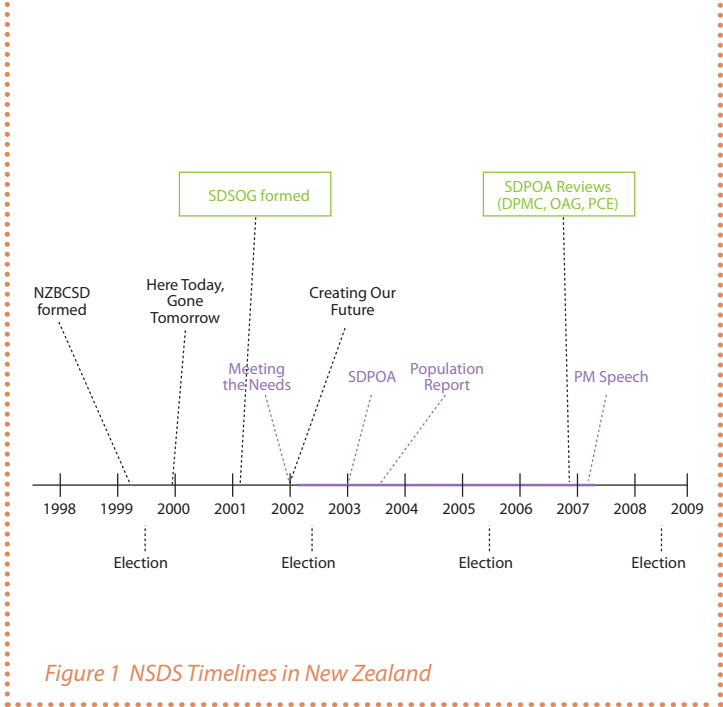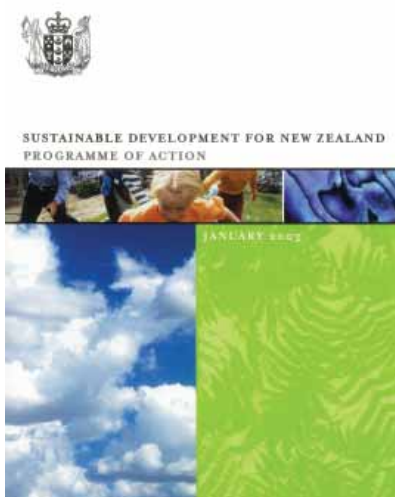

Figure 1 NSDS Timelines in New Zealand

SUSTAINABLE DEVELOPMENT PROGRAMME OF ACTION TIMELINE IN NEW ZEALAND

In January 2003, the Sustainable Development Programme of Action (SDPOA) was issued by the Department of Prime Minister and Cabinet as New Zealand's NSDS. It set out principles, four selected action areas (workstreams), and monitoring and evaluation intentions, with its overall thrust being to strengthen the way government operated by applying a set of guiding objectives and principles across the government sector. This was to be achieved through an 'action learning' approach – namely, to take action, reflecting the agreed SD principles, on areas standing out as needing urgent attention and by identifying the learning from this action for future application. Along with the principles there were a number of process expectations from the SDPOA, including leadership by chief executives; investment in capability building to ensure integrated policy development within and across departments; co-operative partnerships to encourage dialogue across government, and an integrated rather than single-purpose approach to decision making. The main purpose was 'to set directions and outline actions the government will be taking' acknowledging that government has a key leadership role of articulating outcomes and directions. Such principles reflected not only the influence of international thinking about matters, such as decoupling and precaution, but also built on the 1995 policy principle E2010,[8] which was to guide environmental priorities to find a course of development in which sharp trade-offs might be minimised and synergies and complementarities explored.

Workstreams were selected (Table 1) because they were complex; had intergenerational and potentially persistent effects; needed to be progressed urgently; required innovative solutions; cut across social, environmental, economic and cultural dimensions; and could only be progressed collaboratively. They were chosen because of their potential to offer qualitatively better solutions than other ways of developing policy. It was also anticipated that they would offer processes by which to resolve other issues across the government sector. To ensure that the practices developed were not confined to these areas, a 'quality practice' focus was developed as a cross-cutting programme to trap and disseminate lessons from the work (comprising two projects: Quality Practice, and Measuring Progress and Developing Indicators). The outcome was an ambitious set of goals that was unlikely to be fully achieved, especially in the three-year time frame for the programme.

In a review of the SDPOA[9] it was noted that an OECD expert group commended New Zealand's good practice in policy integration in the SDPOA, which 'gives equal weight to social sustainable development (in relation to the economy and environment) with special attention to demographic trends, new roles of women in society, improvements in health and housing, and better integration of Māori communities'. They also commended adoption of a broad indicator system based on 40 indicators on the themes of population changes,

Example of analysis - Foreword of the Sustainable Development Programme of Action

environmental and ecosystem resilience, economic growth and innovation, skills and knowledge, living standards and health, consumption and resource use, and social cohesion. The SDPOA has not been replaced, since its conclusion in June 2006. A suite of SD policy initiatives[10] was announced in February 2007, but these were overhauled after the 2008 General Election.

DATA ANALYSIS

We turn now to a critical reading of the SDPOA and its content – this is separate from an evaluation of the impact of the SDPOA itself.[11] This was undertaken using a specific framework known as Governmentality as explained in Chapter 20. The discussion here does not detail the specific analysis but rather summarises its key findings. A more formal report of the analysis and its linkages with the theoretical framework and the international literature is given elsewhere.[12]

Population issues played a central role in the structure and purpose of the SDPOA and it was explicitly noted that 'the sustainable development approach [has] given us a way of thinking about these [population] issues and finding solutions that give us the best outcomes' (p. 8). It is in this area of 'best outcomes' that the SDPOA made a clear utopian vision for SD, which involved 'a land where diversity is valued and reflected in our national identity'; 'a great place to live, learn, work and do business'; 'a birthplace of world-changing people and ideas… where people invest in the future' (p. 9). This was supplemented by more specific aspirations with a strong element of entrepreneurial language that linked closely to notions of success more frequently associated with commercial goals. It could also be inferred that being more innovative is a way to compensate for a small population. Having said that, there were environmental and social aspirations within the strategy, namely cherishing the natural environment and 'know[ing] that individual success contributes to stronger families and communities and that all of us have fair access to education, housing, health care and fulfilling employment' (p. 9).

In terms of what we saw as absent, it is suggested that a sense of environmental limits and the problems posed by human populations on resource use and pollution production was not

prominent. For example, in the first four pages (comprising the foreword and introduction) there were just ten mentions of environmental aspects. The most complete of these reiterated what the New Zealand Government saw the United Nations as focusing upon (namely 'makes commitments to cleaner production, the development of renewable energy sources and reductions in waste. And it highlights the reduction of biodiversity loss and the restoration of depleted fish stocks as issues for action', p. 7). The New Zealand link to this agenda was made, noting 'the progress New Zealand is already making in areas such as fisheries management, waste management, energy and biodiversity' (p. 7).

These items lacked some of the bite and urgency infused in the SD agenda from late 2006 through a new suite of policies. This could be explained by the timing of the SDPOA (published early in 2003 soon after the World Summit) and the way in which the climate change agenda developed later. Having said that, one could have expected more disclosure on climate change (there was mention of the issue but it was not given any prominence) in such a pivotal statement on SD given that the timing was coincidental with the increase in climate change rhetoric. At the same time, there was little evidence of a concern about developing world issues (except for general UN commitments, p. 7) and New Zealand's role in these debates. This was perhaps surprising given the closeness of Pacific island states and their development issues, as well as climate-change-induced issues for those countries (most pertinently sea level rise).

In summary, the apparent New Zealand conceptualisation of SD in the foreword of the SDPOA was one where the

government wanted to 'build an innovative and productive New Zealand. The sustainable development approach will help us find solutions that provide the best outcomes for the environment, the economy and our increasingly diverse society. New Zealand's success in the modern world depends on this—so too does the wellbeing of future generations' (p. 5). In this conceptualisation the object to be sustained was not the earth[13] but New Zealand, with its own (commercial) interests. These motifs continued in the regimes of practice envisaged within the SDPOA.

While regimes of practice were implicit, chapter two of the SDPOA contained an explicit explanation of how the New Zealand government was going to pursue the vision it had created. Here a moulding of techniques, identities, forms of knowledge and visibilities was apparent. The SDPOA principles accounted for 'economic, social, economic [sic], environmental, and cultural consequences of its decisions' (p. 10) including those often associated with SD work such as long-term perspectives, precautionary principle, participatory processes, and global as well as local perspectives. In addition, desires to avoid trade-offs and create mutually reinforcing outcomes – decoupling economic growth from pressures on the environment; respecting environmental limits; and promoting integrated management of land, water and living resources – were evident.

Intertwined around these principles, and infusing the SDPOA, was a sense of national identity that contained traditional Māori elements and multicultural aspects. New Zealand was seen as a society that sees itself as world class in terms of

innovation and having a larger impact upon the world than it could expect given its small population (as was implicit in the aspiration to be 'a birthplace of world-changing people and ideas', p. 9). The SDPOA did, however, contain visual (but low key) clues to identity in the layout of the document. Ferns, kids playing rugby and the paua shell were used to locate this document as being New Zealand in origin as were statements such as 'it is important that New Zealand develops solutions and approaches that reflect our unique geography, culture and way of doing things' (p. 6). The main identity projected from the document, however, was that of innovative people striving for economic success.

This economic hook was also evident in the linking of the SDPOA with two other guiding documents, the *Growing an Innovative New Zealand* [14] framework and *Key Government Goals to Guide the Public Sector in Achieving Sustainable Development.*[15] The SDPOA reiterated that the 'government has identified its most important task as building the conditions for long-term and sustainable economic growth' (p. 10) with the SD approach being highlighted as ensuring that 'connections between the various pieces of work and feedback loops are encouraged and understood' (p. 10). It was, however, not evident from the SDPOA how the government would create conditions in which business can achieve these outcomes.

With regard to the public sector, the techniques of governing that encourage action for SD were not clear either, but the aspirations for action were clear. Chief executives of public sector organisations were urged to give a 'concerted effort' (p. 10) to using the ten principles in 'policy development' (p. 10) with 'issuing a Cabinet Circular to guide the public sector' (p. 10) being specifically identified as a mechanism for this change. This seemed a little formal and not as engaging as could be anticipated for what would signal a significant cultural change for the public sector.

The other significant area of techniques and practices that was stressed was that of working in partnership to achieve common ends (with a page being devoted to partnerships, p. 11). The nature of these partnerships was not apparent from the document with the statement that 'the government expects that others will recognise the partnership approach as our normal way of doing business' (p. 11, and noting again recourse to the language of commerce inherent in the quote). In addition, this was an example of the underspecification that pervaded the document.

Overall the field of visibility created by the SDPOA was one where government will create a vibrant, economically successful future that is also focused on SD, and achieved via partnerships of some significance. The mechanisms by which the significantly underspecified vision of the future was to be achieved were equally not clear. Indeed the SDPOA was opaque on a number of key issues including the scale of the challenge inherent in the agenda; the complexity of equitable distribution, especially for future generations, and the pressing nature of environmental limits was only touched on from time to time.

Figure 2 NSDS Timelines in Scotland

SCOTLAND CASE STUDY: CHOOSING OUR FUTURE

Scotland is a devolved administration of the UK along with the Welsh and Northern Ireland assemblies and is constituted as a Parliament (re-established in July 1999 after having been dissolved in 1707). Under the devolution settlement some powers have been retained by Westminster (e.g. foreign affairs, defence, national security and abortion) with other powers being devolved, including SD policy and implementation. Until the election of a new government in May of 2007 the Government of Scotland had been referred to as the Scottish Executive and it was this body that produced Scotland's SD strategy. This strategy was developed under the umbrella of a shared UK framework *One Future – Different Paths* (http://www.defra. gov.uk/sustainable/government/publications/uk-strategy/ framework-for-sd.htm) which identified two outcomes from pursuing SD: living within environmental limits and ensuring a strong, healthy and just society. In addition, three aspects that enabled these outcomes (achieving a sustainable economy, promoting good governance and using sound science responsibly) were part of the framework. It is notable that the economy was not seen as an end in itself, rather it was an enabler. This was a departure from previous articulations of SD in the UK and elsewhere including NZ as noted above).
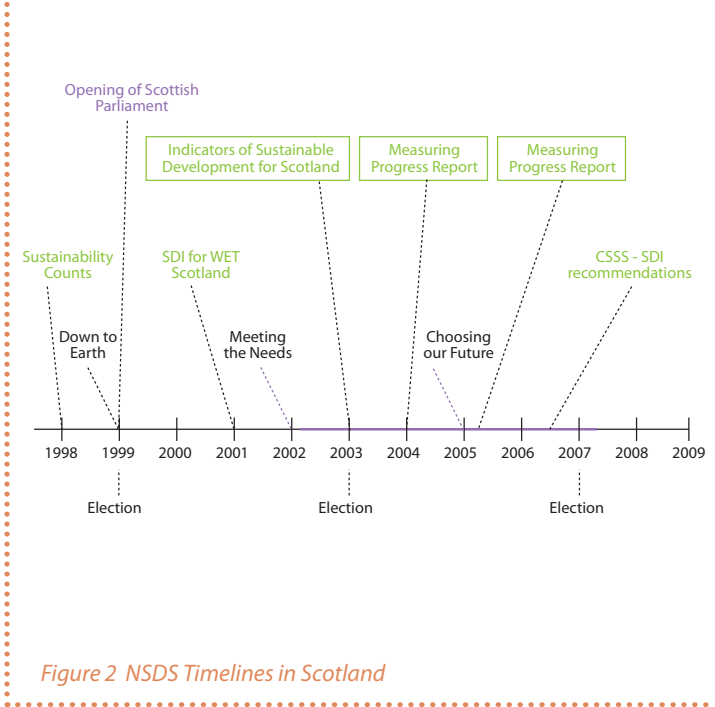
CHOOSING OUR FUTURE TIMELINE IN SCOTLAND

A number of other mechanisms substantially affected the policy context for SD in Scotland including the existence from 2000 until 2007 of the Cabinet Sub-Committee on Sustainable Scotland. This committee was chaired from 2002 by the First Minister and other ministerial membership included the portfolios of Finance, Transport, Environment, Communities and Enterprise. Moreover, within the UK the Sustainable Development Commission provides a strong external champion for SD, focusing as it does on capacity building within government, advocacy in Government and more broadly within society as well as a formal scrutiny function with respect to whether or not government action is in accordance with SD principles. These two aspects (the Cabinet Sub-Committee and the Sustainable Development Commission), along with an active NGO sector, meant that the Scottish Executive faced a possibility of being held to account for their performance.

Choosing our Future (COF) built on earlier SD priorities[16] and a reasonably well developed indicator framework. COF, however, constituted a stepwise change in terms of formality of strategy. It was supplemented by a follow-up and monitoring website indicating the extent to which action points in the strategy had been achieved. The strategy put a framework round key aspects of SD (strong economy, well-being, thriving communities, natural heritage and resources and Scotland's global contribution) with chapters that 'make the link' to particular issues (travel, food, environmental justice, waste and the built

environment). This arrangement made COF a more complex document than the SDPOA, as reflected in their relative lengths, and provided a more detailed outline of overall SD thinking. Like the SDPOA, four priorities for action were identified, as shown in Table 1.

DATA ANALYSIS

As before, we turn to a specific reading of COF and its content using the governmentality framework (Chapter 20). Again we don't detail specific analyses but summarise key findings with a complete report given elsewhere.[17]

The COF conveyed a sense of urgency about the need for action. For example, it stated that 'the planet cannot sustain human life…[and]…it is happening now' (p. 11). Likewise, there was a need 'to build, fast, on that progress and momentum if Scotland is to make the radical changes that are now urgently required' (p. 7). There was also explicit discussion of 'the kind of world we want to live in and the legacy we want to leave behind' with this vision being reiterated throughout the various chapters (e.g. 'end goal of living within environmental limits' p. 49). There was also the assertion that 'this future is within reach. We can all play a part in making it happen (p.13)'.

The COF had an action-oriented approach with, for example, the following words appearing on page 7 alone: committed, action (three times), seize, drive, transform, capitalise, deal, fast, progress, momentum, radical, urgently, priority, signed up, powerful, underpin. The problem addressed also had a clear visibility through, for example, overexploitation of resources (p. 11) noting that the ensuing damage was accelerating (pp. 12–13). The visibility of SD was largely based on environmental

rather than social impacts though the latter were identified as knock-on effects from environmental harm (pp. 12–13). This was also placed in the global context through use of photos (e.g. deforestation in Brazil, p. 10, and Bering Glacier in retreat, p. 54).A large variety of techniques and practices were highlighted as being available to government as it pursued SD. For example, the Executive committed to: 'embed sustainable development objectives into spending decisions and set out how its spending plans contribute to sustainable development objectives' (p. 73); 'require each significant capital investment to illustrate in a business case that it has considered sustainable design, incorporating green procurement strategies, resource efficiency and waste minimisation' (p. 74); ensure that 'pre-expenditure assessments…will support a more joined-up approach to policy and expenditure decisions including sustainable development outcomes' (p. 74); require 'sustainable development assessments accompanying Executive bills… [to] be published' (p. 74); create a 'revised policy makers toolkit [that] will explain how to consider sustainable development as part of the better policy making approach' (p. 75); and through the duty of Best Value in the Local Government in Scotland Act 2003 introduce 'guidance…to improve local authorities' understand[ing] of the sustainable development element of the duty' (p. 82). All of these mechanisms had the potential to bring SD thinking to the underlying machinery of decision making in government. While these were not headline-grabbing actions, they had the potential to substantially affect decision making which might accelerate SD performance. In addition, there

Example of analysis - Foreword of Choosing our Future

was a strong emphasis on partnership approaches (pp. 84–91 and chapter 16). Finally, potential for enforcing accountability on the Scottish Executive was created via the scrutiny role of the Sustainable Development Commission, the Cabinet Sub-Committee on Sustainable Scotland and through a partnership approach with the Parliament (p. 77).

In COF, the Scottish Executive demonstrated a clear position of authority through the personal statements by the First Minister and the Deputy First Minister (one from each of the coalition parties). It was not a statement of coercive power but one of a government that had been given a mandate to address these issues and was setting out a clear agenda, though this fell short of any statements of time-bound delivery against targets. There were clear links to UK government strategies and so to the wider international context, and an extensive page of references with links to websites provided access to much wider technical resources, predominantly found in Scotland but with some from the UK (p. 92). The definition of SD was articulated as enabling 'all people throughout the world to satisfy their basic needs and enjoy a better quality of life without compromising the quality of life of future generations' (p. 7). This definition and COF as a whole blended economic, environmental and social domains. The social aspects of SD were explicitly noted, for example by asserting that SD also meant 'securing environmental justice for those who suffer the worst local environments' (p. 40) and stating that SD 'cannot be seen as 'just' an environmental problem' (p. 11). Likewise, the conception of SD that was articulated was strongly embedded in environmental limits globally (noting that an 'unprecedented heat wave led to over 20,000 additional deaths in 2003' p. 11)

and nationally (noting that if 'everyone on Earth lived the same way [as the average Scot]…three planets…[would be] needed to sustain us' p. 12). In contrast to the 2003 New Zealand document this grounded COF in a global dataset.

COMPARING THE TWO STRATEGIES

The ways New Zealand and Scotland sought to govern for SD differed and the two NSDSs could be discussed side by side once their contents were translated through the lens of governmentality into a story of how and by what means each country intended to address SD challenges. In this form it was possible to understand more about the development of NSDS in general although the two countries were not directly compared.

Each NSDS expressed its overall purpose quite differently

- The SDPOA was based, at least in part, on population dynamics while COF focused on global ecosystem threats and their manifestations and how these acted to stimulate moral demands for action.

- Both were aspirational in tone and commitment yet neither stated how to progress over decades into a sustainable society. The Scottish example provided the most concrete vision, in terms of the indicators it expected to see movement in if SD was to be addressed.

- The utopian ideal in each strategy was intimately linked to the differing purposes. In New Zealand a small population, remoteness to markets and the issues these present created a vision of a place brimming with innovative ideas. In a similar vein global environmental change as the motivation for Scotland's strategy was reflected in its conception of a Scotland that lives within its ecological means articulated via an ecological footprint.

Contrasts could be seen in the practical ways in which these visions were to be translated into practice

- New Zealand motivated its strategy from a strong reiteration of national identity (clean green New Zealand, innovative, a great place to work and play) and linked that to taking a 'business-like' approach to tackling SD. Having a market focus and fostering the 'right sorts' of partnerships were presented as techniques/practices that would lead to SD, albeit that how this would happen was not well articulated. Likewise, the forms of knowledge needed for governing were underspecified, and while 'kiwi' identity was invoked within the strategy it did not seem to play a large role in the implementation of the SDPOA.

- Scotland built its COF quite firmly on techniques and practices (whether by committees, indicators, assessments, reporting or audit functions). The form of knowledge that emerged drew heavily on scientific modes of rational analysis and assessment to make the 'correct' decisions. Having said that, there was a very strong social and moral dimension demonstrated in a Scottish identity that values hard work and moral soundness in the pursuit of goals and hints (though it stopped short of such an assertion) that SD might be an opportunity for a new enlightenment for a troubled age. Likewise, Scotland as a responsible citizen of the world came through with visibility of this idea reinforced by the pictures used in the document (e.g.

Scotland from space, landfills and developed world impacts being depicted).

- In summary, two points bear reiteration. First, both New Zealand and Scotland, as would be expected, responded to SD in different ways. Second, while there were clear indications that governing activities in New Zealand and Scotland at the time of the development of these NSDSs were being (re)directed towards the aims of SD that was embedded within an advanced liberal governmentality, it was impossible to be certain from within the strategies if the proposed actions would be sufficient to create a sustainable future.

AND MOVING ON…

The case studies provide a possible process to understand SD strategies and determine how goals are being sought. While the case studies contained internal consistencies and obvious differences, a more detailed and longitudinal analysis of achievements would provide valuable evidence to support development of future policy. Through long-term international comparative studies, the finer nuances of country approaches to SD could be made clearer and enable new forms of governance to develop. If sustainability is to be 'the defining question of this century' then it needs concrete plans to achieve it. While there is no single path to SD, or a single pathway for delivery, all strategies and paths require appropriate and effective governance. At present transitions towards new forms of governance and their associated studies are in their infancy.

WANT TO FIND OUT MORE?

Contact buildingcapacity@landcareresearch.co.nz

For the Author's contact details see page ii

KEY WEBSITES AND PUBLICATIONS

Frame B, Marquardt M 2006. Implications of the Sustainable Development Programme of Action. Landcare Research Contract Report LC0607/015 for the Department of Prime Minister and Cabinet. Available at: http://www.landcareresearch.co.nz/publications/researchpubs/LCR_SDPOA_review_2006.pdf

Frame B, Bebbington J. 2009, Towards governmentalities for sustainable development. Submitted to Environment and Planning C: Government and Policy. Available as a Working Paper at: www.landcareresearch.co.nz/research/programme_pubs.asp?Proj_Collab_ID=5

Russell, S. and Thomson, I. 2009 "Analysing the Role of Sustainable Development Indicators in accounting for constructing a Sustainable Scotland: Accounting Forum, 33(3), 225–244

Russell, S and Thomson, I. 2008 "Accounting for a sustainable Scotland", Public Money and Management. November 2008, 367–374.

REFERENCES

1 UNCSD (United Nations Commission on Sustainable Development) 2002. Guidance in preparing a national sustainable development strategy: managing sustainable development in the new millennium. UNCSD Background Paper 13.

2 Ministry of Economic Development 2003. Population and sustainable development. Available at: http://www.msd.govt.nz/documents/publications/strategic-social-policy/population-sustainable-development.pdf.

3 DPMC (Department of Prime Minister and Cabinet) 2003. Sustainable development for New Zealand: Programme of Action. Wellington, DPMC.

4 Scottish Executive 2005. Choosing our Future: Scotland's sustainable development strategy. Edinburgh, Scottish Executive.

5 WCED 1987. Report of the World Commission on Environment and Development: Our common future. Transmitted to the UN General Assembly as an Annex to document A/42/427. Available at: http://www.un-documents.net/wced-ocf.htm

6 Ministry for the Environment 2002. The Government's approach to sustainable development. Wellington, New Zealand.

7 Statistics New Zealand 2002. Monitoring progress towards a sustainable New Zealand: an experimental report and analysis. Wellington, New Zealand.

8 Ministry for the Environment 1995. Environment 2010 Strategy. Wellington, New Zealand.

9 Frame B, Marquardt M 2006. Implications of the Sustainable Development Programme of Action. Landcare Research Contract Report LC0607/015 for the Department of Prime Minister and Cabinet. Available at: http://www.landcareresearch.co.nz/publications/researchpubs/LCR_SDPOA_review_2006.pdf

10 Office of the Auditor General 2007. Sustainable development: Implementing the Programme of Action. Wellington, New Zealand.

11 Frame & Marquardt (2006).[9]

12 Frame B, Bebbington J. Towards governmentalities for sustainable development. Submitted to Environment and Planning C: Government and Policy.

13 OECD 2001. Environmental strategy for the first decade of the 21st century. Paris, Organisation for Economic Co-operation and Development. Available at: www.oecd.org/dataoecd/33/40/1863539.pdf.

14 Ministry of Economic Development 2002. Growing an innovative New Zealand. Available at: www.executive.govt.nz/minister/clark/innovate/innovative.pdf.

15 DPMC (Department of Prime Minister and Cabinet) 2002. Key government goals to guide the public sector in achieving sustainable development. Wellington, DPMC.

16 See Scottish Executive (2005).[4] and Scottish Executive 2002. Meeting the needs…Priorities, actions and targets for sustainable development in Scotland. Edinburgh, Scottish Executive; Scottish Executive 2003. Indicators of sustainable development for Scotland. Edinburgh, Scottish Executive; and Scottish Executive 2004. Indicators of sustainable development for Scotland: Progress report 2004. Edinburgh, Scottish Executive.

17 Frame & Bebbington (see above).

Published January 2010