



OLD PROBLEMS

NEW SOLUTIONS

Integrative research supporting natural resource governance

Edited by: Shona Russell, Bob Frame & James Lennox



Landcare Research
Manaaki Whenua

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Preface

Water is a taonga – a treasure, essential for life. Water is a resource, a vital input for agricultural production and manufacturing. Rain, rivers and lakes are sources of inspiration and creativity. Water permeates ecosystems, jurisdictions, and communities, linking complex and emergent social, cultural, technological and economic systems. Globally, droughts, changing rainfall patterns, increasing demands for irrigation and the modification of great rivers through dams are part of a water crisis that no one individual, group, sector or state can resolve alone. In response, integrative, adaptive and participatory approaches to water resource management are increasingly suggested as solutions on the basis that water means many things to many people.

Around Aotearoa New Zealand water bodies are under growing pressure from farming, manufacturing, and urban development with declining water quality and over-allocation of water resources. The challenges facing regional councils, central government, the agriculture sector and others concern how best to manage water for current and future generations. Creative approaches are underway on properties, in catchments, and in the realms of policy making and planning to address some challenges around allocation and restoring degraded water bodies. These include changes to legislation for managing water supplies. There are likely to be many heated discussions among citizens, farmers, academics, iwi, recreational users of waterways and many more communities about how water is used and managed (and who gets to have a say in these decisions). The emerging paths of water governance weave together issues of resource management, environmental governance, and production of knowledge for sustainability.

The Old Problems New Solutions programme examined how water governance has unfolded through disciplinary lenses of law, social science and economics, providing perspectives on a range of different water challenges facing communities, industry, government agencies and the research community. Specific issues include governance arrangements, participation in decision-making processes and the contribution of research for sustainability. We have sought out spaces and places in which water governance is created and undertaken by communities, to support decision-making around water governance for sustainability. This book is a culmination of work from a number of researchers that brings together insights framed within boundaries – a somewhat difficult task in that environmental issues often permeate many aspects of society and humanity's relationship with the world. Each chapter and the book offers, first, a perspective on water governance – about practices to enable action for water, and second, conversation starters through which to engage with issues of water governance and the contribution of research to address issues of sustainability.

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Most importantly we thank all of the contributors who have crafted these chapters from research completed during the programme to engage in current debates about water governance. Thank you for your time, energy, creativity, commitment and patience.

Shona Russell, Bob Frame and James Lennox
Lincoln, New Zealand
December 2011

Contents

	Preface	iii
	Acknowledgements	iv
	List of abbreviations	vi
	Contributors	vii
	Challenges of water governance	
	<hr/>	
1	From old problems to new solutions	1
2	Governance, wicked problems and water	12
3	Māori and the courts	22
4	Regional council insights for fresh water management	30
	Insights from Canterbury	
	<hr/>	
5	Water governance in Canterbury	39
6	Sustainability limits and governance options in Canterbury water management	49
7	Quantitative economic analysis	59
8	Structuring stakeholder participation in Canterbury	70
9	Building social capital	80
10	Participating in decision-making processes	88
	Innovations in water governance	
	<hr/>	
11	Development of a collaborative governance approach	99
12	Innovations in collaborative governance	110
13	Co-governing fresh water	118
14	Concluding commentary	125

Abbreviations

CSWS	Canterbury Strategic Water Study
CWMS	Canterbury Water Management Strategy
DMCE	Deliberative Multi-Criteria Evaluation
ECan	Environment Canterbury
FRST	Foundation for Research, Science and Technology
HWP	Hurunui Water Project
ICM	Integrated Catchment Management
LAWF	Land and Water Forum
LGA	Local Government Act
MAF	Ministry of Agriculture and Forestry
MfE	Ministry for the Environment
MSI	Ministry of Science and Innovation
OPNS	Old Problems New Solutions
PCE	Parliamentary Commissioner for the Environment
RMA	Resource Management Act
TLA	Territorial Local Authority
VMO	Values, Monitoring and Outputs

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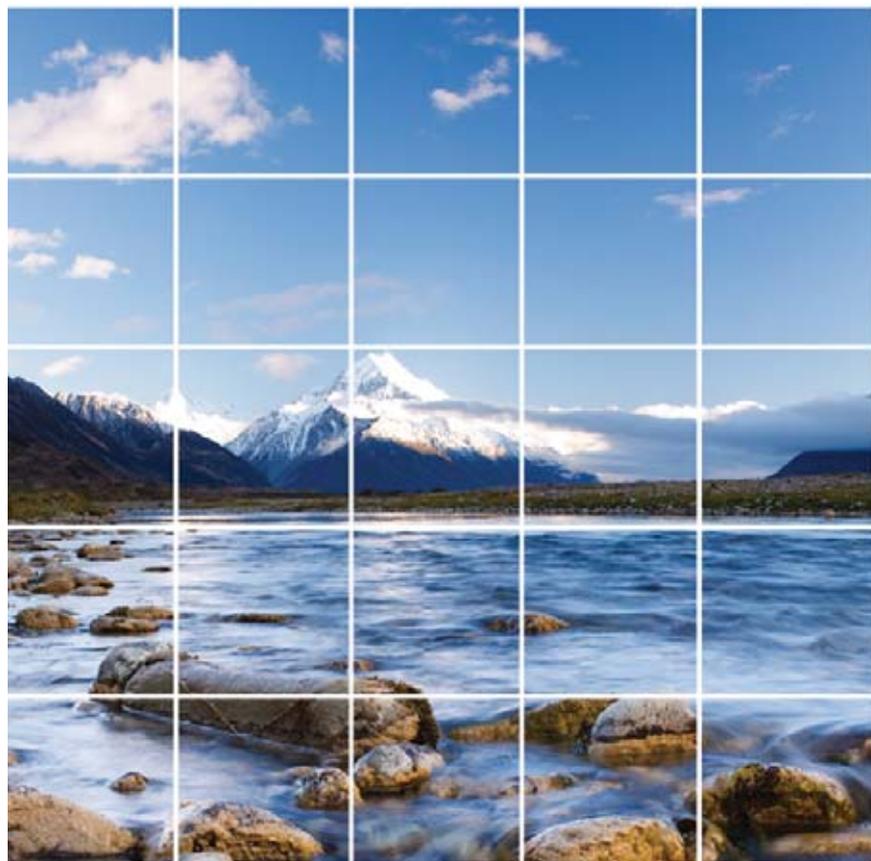
CHAPTER 1

From old problems to
new solutions ...



Shona Russell

Bob Frame



1. From old problems to new solutions ...

Shona Russell and Bob Frame

Summary

- Water is a critical issue for New Zealand's future. While it is a treasure for many and an integral part of our environment and way of life, it is also an important resource for agriculture and economic development. Yet, water quality is declining and there is increasing competition for water resources.
- Various programmes and initiatives are underway to address water management challenges. Regional councils, as the agencies responsible for water management, are developing different solutions to deal with water problems in concert with others (including iwi, central government policymakers, industries, community groups, researchers and scientists).
- The issues of water management are so complex that many assert that there is a problem with water governance and one that involves many others alongside government agencies. In the shift from government to governance various water initiatives and arrangements are underway that seek to recognise the multiple values of water and to involve various actors in the decision-making process.
- As water-related problems are embedded in social, legal, political and cultural systems, it is within those systems that solutions to these problems are developed and implemented by government agencies and others. This chapter sets the context for water governance in New Zealand, describes some of the water challenges, and introduces water management in the Canterbury Region.

Introduction

Water – a part of nature, a resource, a treasure – is part of society and culture. In New Zealand – where rivers, lakes and streams are iconic – water is part of life, essential for social, cultural, environmental and economic wellbeing. Water allocation is the main problem for water management but is intertwined with other issues such as water quality, intensification of land use and the development of water storage, alongside social and cultural concerns about control of water resources and participation in the decision-making process. Water management is often connected to issues around development of land and water resources, recognition of social and cultural values, and protection of the natural environment. Water management problems once solved by scientists and engineers are now connected to problems of water governance¹ involving lawyers and policymakers. Each discipline is likely to understand issues differently and develop their own solutions, hence water is often described as a 'wicked problem', where there may be many alternative solutions and the problems can be defined through certain solution strategies². In light of a growing interest in water governance and good governance – i.e. societal institutions (laws, policies and everyday norms) across many jurisdictions – innovations are emerging in approaches to water management that involve multiple stakeholders rather than one decision-making authority, with efforts to incorporate different types of knowledge with those of water scientists and engineers for sustainable water management.

The Old Problems New Solutions research programme³ examined how water governance has unfolded between 2007 and 2011 through disciplinary lenses of law, social science and economics, providing perspectives on a range of the different water challenges facing communities, industry, government agencies and the research community. The research programme focused mostly on developments in Canterbury due to the region's importance economically, socially, culturally, environmentally and politically. Here, we introduce the concept of water governance, describe some of the water challenges facing New Zealand, introduce the region of Canterbury as the backdrop to some of the research investigations undertaken during this research programme, and summarise the contributions from members of the research team.

Water governance

Water governance – as a concept – has been explained in a variety of ways as:

- deciding who gets what water, when and how which involves actors outside the water sector⁴;
- a range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society⁵; or
- decision-making process we follow rather than the operational approaches adopted⁶.

In each of these, water governance is assigned to a variety of people and processes for making decisions. Decision-making is described as situated in political, cultural and social contexts as well as aligned to the hydrological and geographical boundaries of catchments and watersheds. This is quite a different way of thinking about water governance than the more typical top-down system of water management, often described as the command-and-control model⁷.

We explore this re-freshing framing of water governance in this book and find that innovations in water governance are emerging through self-governing communities, collaborative institutional arrangements, deliberation, and adaptive management⁸. These examples of 'polycentric governance' reveal responsibility being distributed amongst actors, and experiments in the practices and processes of decision-making.

In a shift from 'government to governance'⁹, where responsibilities for water management are distributed amongst various actors (government, industry and community groups), questions arise concerning the norms, goals and assumptions about how society should be organised, which problems are important, how those problems should be addressed and by whom. In New Zealand, water governance is woven into economic development and the importance of agriculture – particularly dairying – and local democracy and participatory governance. How societies decide to govern, manage and allocate water resources has profound implications for the economy, communities, culture and the environment for current and future generations. Next we outline some of the problems and solutions identified in relation to the management of New Zealand's water.

New Zealand and water: problems and solutions

Water is essential to New Zealand's social, cultural and economic wellbeing. It is a focal point for recreational activities and our outdoor-focused way of life. There are 425,000 km of rivers and streams, almost 4,000 lakes larger than a hectare and about 200 aquifers¹⁰. By international standards, fresh water in New Zealand is clean and plentiful, but there is a trending deterioration in water quality and over-allocation of water. Climate change is likely to lead to increased temperatures, and higher rainfall in the west of the country and less in the north and east. There may also be more frequent extreme weather events such as droughts and floods¹¹.

Water resources are essential to the primary industries that play major roles in national and regional economies. In 2010, dairy, meat and wool accounted for 36% (\$14.7bn) of export income.¹² Hydroelectricity provides about 75% of the country's electricity. The country's unique and spectacular environment is a draw card for international tourism, which accounts for 18.5% (\$7.4bn) of exports. The success of these and other industries is connected to their access to, and use of, natural water resources.

In New Zealand responsibility for water resource management is shared between central government and local government in accordance with the Resource Management Act (1991) and Local Government Act (2002). The Resource Management Act requires those with statutory functions to 'take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi)' between Crown and Māori (RMA section 8). Iwi authorities, industry groups, community interest groups and non-government organisations are also involved. Economic and other resource uses and values are increasingly coming into conflict, with concerns about the integrity of natural systems, creating difficult problems to be addressed by those responsible. There are problems of pollution (both point-source and diffuse)¹³, about the need to restore rivers, to manage freshwater resources sustainably, and to engage with communities in freshwater management. Problems are not only associated with the water resources, they extend to the way decisions are made about water, as evidenced in the application for a conservation order on the Hurunui River in North Canterbury¹⁴ and water infrastructure developments like the Central Plains Water proposal¹⁵, which have often ended up in adversarial legal contests.

There have been various reviews of New Zealand's water management regime identifying problems and possible solutions. The New Zealand Business Council for Sustainable Development's 'Best Use Solution for New Zealand's Water Problems' was published in July 2008 and recommends managing water resources with a mixed statutory planning and market framework involving integrated catchment management planning, measuring community needs and values and allocating water available for commercial use through a voluntary market¹⁶. The Turnbull Group¹⁷ then published 'Governance of Water' in July 2009 recommending the reform of the current regime with the establishment of a Water Commission as part of determination of the role and functions of the Environmental Protection Authority¹⁸. The Land & Water Forum¹⁹ made 53 recommendations – including setting limits for quantity and quality; achieving targets; improving allocation; establishing a National Land and Water Commission on a co-governance basis with iwi and developing a

National Land and Water Strategy; seeking science and knowledge for water management – in its report to the Minister of Agriculture and Minister for the Environment in September 2010²⁰. Reviews and assessments of problems in New Zealand’s water management regime are not new. Others have identified problems associated with technocratically driven water plans²¹; voluntary initiatives²²; the development of legislation under urgency²³; and impasses around scientific understanding of groundwater systems²⁴.

In each of these reviews, ‘solutions’ were identified, including those of water allocation, setting limits for water quality and quantity, developing national strategies for water, creation of new agencies or changing the roles and responsibilities of current agencies through collaborative processes integrating water with economic, social and cultural elements. The reviews are connected to broader responses to water problems that are affecting communities, sectors, regional councils and central government agencies. This builds upon older voluntary initiatives such as the Dairying and Clean Streams Accord to achieve clean and healthy waterways (signed in May 2003 by Fonterra Co-operative Group, regional councils, the Ministry for the Environment and the Ministry of Agriculture and Forestry)²⁵ and audited self-management to develop good land management practices, which has been investigated and is supported by Irrigation New Zealand through workshops²⁶.

Central government agencies have been involved in water-related work programmes for some time. For example the Sustainable Water Programme of Action (2003–2008)²⁷ sought to develop solutions to improve freshwater management. Solutions are being developed and implemented through collaborative processes as part of a broader movement to engage in collective action for environmental management²⁸. The Fresh Start for Fresh Water (2009–present)²⁹ established a national framework for setting water quality and quantity limits to govern the allocation and use of fresh water; established a fund to support irrigation infrastructure proposals; and reprioritised funds to set up a clean-up fund to assist councils with historical pollution problems. In addition, the programme has started further work developing approaches to setting limits on quality and quantity, and making improvements to decision-making, water allocation and land use management.

Water governance in New Zealand is involving stakeholders through collaborative processes, establishing new agencies and developing strategies for integrated management of land and water. These developments are progressing solutions to water management problems often involving those not normally associated with water management (such as lawyers and policymakers)³⁰ and combining elements of hierarchical, market-based, and collaborative approaches to governance³¹. In the context of these recent events unfolding nationally, the next section describes some of the water problems facing Canterbury that are discussed in depth in later chapters.

Canterbury and its water

The Canterbury Region in the South Island of New Zealand (see Figure 1.1) is the largest by area in the country with 45,238 square kilometres. On a population basis, with over half a million people, Canterbury is both the second largest region in the South Island and in New Zealand³² with the region’s main city, Christchurch, the third largest in the country. The region features diverse landscapes, from the Canterbury Plains, with mixed livestock, dairying and cropping farmland crossed by braided alpine rivers that provide significant wildlife habitats, to the Southern Alps, which are highly valued for indigenous flora and fauna, recreational values, landscapes and as a tourism resource. The region’s economy is diversified into agriculture, industry, fishing, forestry, tourism and energy resources. The region has 65% of the national storage volume available for hydroelectric power generation, and over 70% of the country’s irrigable land that underpins the agricultural sector³³.

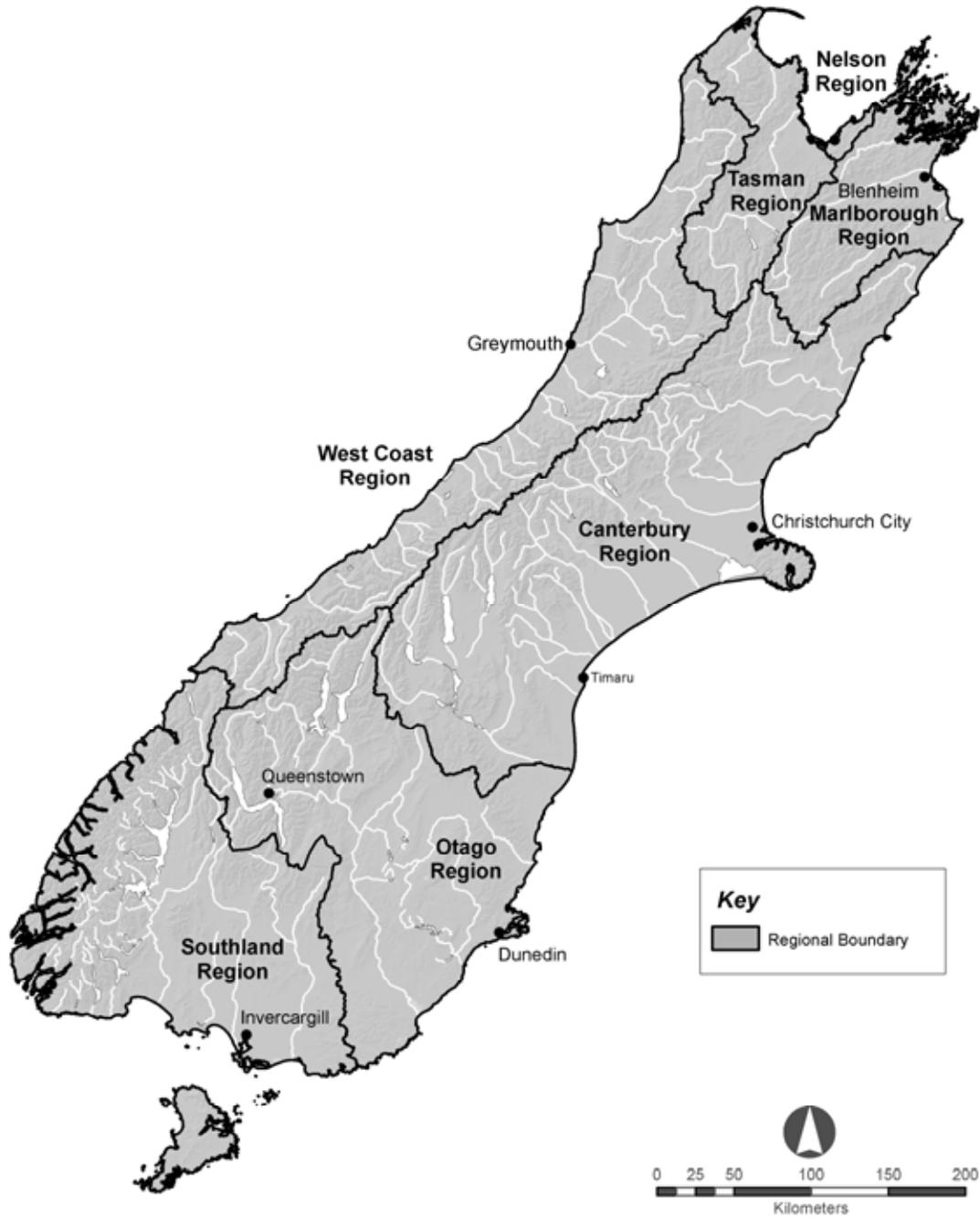


Figure 1.1: Canterbury, South Island, New Zealand.

Water resource management in Canterbury is a statutory responsibility of the regional council, Environment Canterbury. The Canterbury Region lies with the rohe (area) of Ngāi Tahu, who are tangata whenua (indigenous people of the land). The Treaty of Waitangi and legislative responsibilities under the Resource Management Act, the Local Government Act, the Te Rūnanga o Ngāi Tahu Act 1996 and the Ngāi Tahu Claims Settlement Act 1998 require the regional council and territorial authorities to consult with Te Rūnanga o Ngāi Tahu as the tribal collective of Ngāi Tahu whānui. Issues of significance to Ngāi Tahu in relation to water include the impacts on mahinga kai (customary gathering of food and natural materials), taonga (natural resources) and other indigenous species resulting from poor water quality and insufficient water quantity;

abstractive use prioritised over customary and in-stream values; over-abstraction from waterways for irrigation purposes; discharges to water (point- and non-point-source pollution and effects on water quality and other values of importance to tangata whenua); diversion and damming of waterways and effects on values of importance to tangata whenua; and effects of land use on water resources³⁴.

The management and allocation of the region's freshwater resources has been the subject of court cases, criticism and contestation, spanning concerns about land-use development and intensification, scientific modes and understanding of the region's groundwater system, and lack of opportunities for public participation in decision-making³⁵. Environment Canterbury has identified as issues the setting of environment limits; the importance of water for the regional economy; the protection of water quality; and integrated management of ground and surface water, water quality, water quantity and land use. The regional council is also concerned that there will be increased pressure on water quantity and quality from further intensification of rural and urban land uses³⁶ and due to changing climate³⁷. To meet current and projected future demands for water (availability and reliability) groups of farmers have promoted proposals for water storage and irrigation schemes and the regional council is undertaking partnership approaches to water resource management with the agricultural sector, local authorities, Ngāi Tahu, and environmental and recreational groups to address these issues to pursue desired outcomes.

Two significant events have occurred in the region's water governance since 2007, marking the trajectory of governance involving the various actors (politicians, legislators, policymakers, communities, scientists and researchers) engaged in water. First, the Canterbury Water Management Strategy (CWMS): Strategic Framework was launched in November 2009 after six years in development and numerous engagement activities with stakeholders and the public. Second, following an investigation into the performance of Environment Canterbury³⁸, the Government brought in the Environment Canterbury (Temporary Commissioners and Improved Water Management) Act 2010, appointing environment commissioners with additional powers and giving statutory authority to the vision and principles of the CWMS. Since June 2010 zone committees have been established to develop plans for water management around the region. These activities under the CWMS are being operationalised according to set targets for 2015, 2020 and 2040 as milestones reflecting a sustainable development approach.

While development plans are underway concerning the region's engagement with water issues, major unexpected events have occurred with implications for the region. A series of earthquakes have affected Canterbury and Christchurch in the year since the magnitude 7.1 earthquake on 4 September 2010. Thousands of aftershocks, including a devastating magnitude 6.3 aftershock on 22 February 2011 and a magnitude 6.3 on 13 June 2011 (see Figure 1.2), have caused extensive damage to the city. The aftershocks have displaced many people from their work and homes and caused major damage to sewer pipes and pumping stations around Christchurch, with sewage being discharged into rivers resulting in beaches being closed to the public³⁹. Despite aftershocks, individuals and communities within the Canterbury Region continue their commitment to address water challenges, along with those around earthquake recovery, through increasingly collaborative activities.

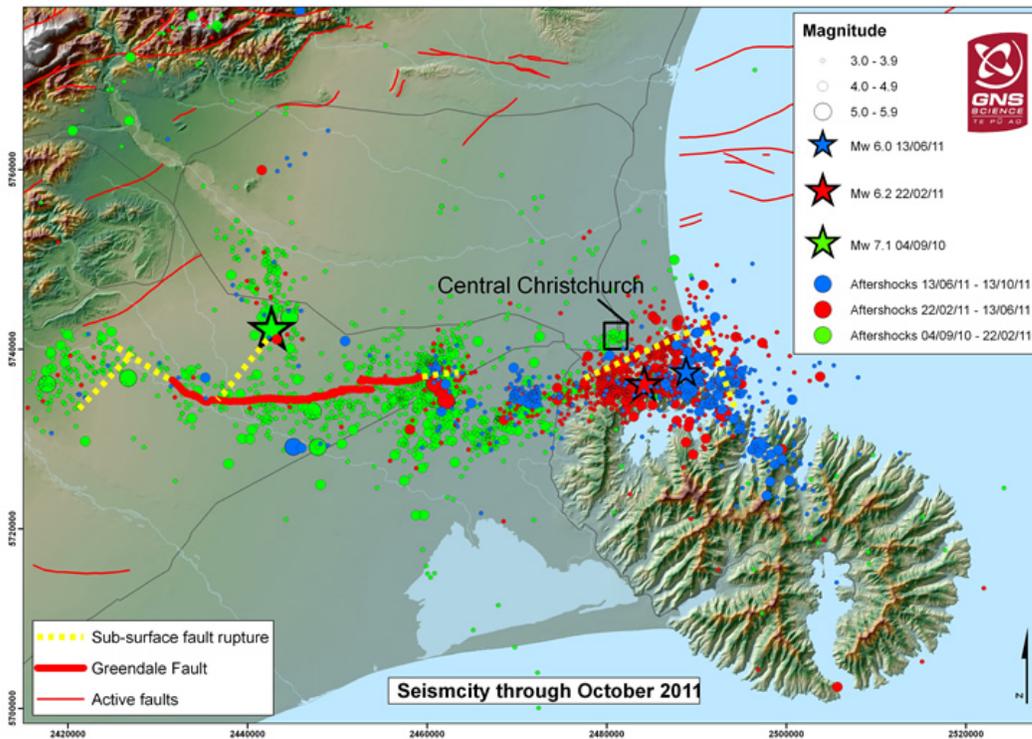


Figure 1.2: Aftershock map dated 27 September 2011, from GNS Science⁴⁰.

Progressing solutions

Each contributor to this book was asked to summarise an aspect of their research related to an examination of how water governance has shifted. What emerged are perspectives on solutions in catchments, in courtrooms and even around kitchen tables, involving policymakers, planners, lawyers, farmers and community groups. Rather than discussing specific problems and solutions relating to water quality and allocation, each chapter considers aspects of decision-making for water and identifies the actors, issues and practices through which decisions are made and innovative responses are being developed. Chapters are organised into three clusters⁴¹. First, the challenges of water governance faced by various actors in New Zealand are outlined; second, insights from Canterbury are presented tracing some of the developments towards solutions; third, innovations in water governance that are leading to a redistribution of responsibility are discussed. Thus, we move from the abstract and theoretical to consideration of how freshwater governance is emerging in specific places and spaces in Canterbury.

Setting the context: problems, engagement and decision-making

First, Neil Gunningham introduces the idea of wicked problems and outlines developments in water management in New Zealand. From this, we see emerging hybrid responses to water issues that involve both the agencies responsible and others in innovative solutions for water management (Chapter 2). The role of tikanga Māori in resource management is important to Māori and to New Zealand. Jacinta Ruru's review of the legal voice of Māori in water decision-making (Chapter 3) presents how Māori as partners with the Crown under the Treaty of Waitangi have sought to engage in decision-making through courts and legal proceedings. In Chapter 4, Suzie Greenhalgh reflects on conversations with regional council staff around New Zealand to

provide an overview of some of the responses and tools used to enable participation in decision-making, taking into account different values in decision-making and consideration of the policy cycle that regional councils undertake when managing fresh water.

Insights from Canterbury: strategies, participation and community action

The main body of the book concerns recent developments in Canterbury. In Chapter 5, Neil Gunningham examines limitations of current mechanisms to deal with Canterbury's water issues. Bryan Jenkins takes this further in his discussion of sustainability limits (Chapter 6) and ideas that have informed the region's recent actions around water. In Chapters 7 and 8, James Lennox and co-authors discuss the contribution of models and multi-criteria deliberation processes to evaluate and inform policies and proposals, particularly for irrigation developments. Shona Russell and Martin Ward then examine how groups in Canterbury and Otago are taking collective action to develop and manage water resources (Chapter 9). The final chapter of this section traces the nature of participation in decision-making for water in relation to the submissions process, development of strategies, and protests following the change in the governance of Environment Canterbury.

Innovative solutions: possibilities for collective action

In Chapters 11–13, we learn about successful innovations that have been developed and which provide at least a part-solution for water resources management. Neil Gunningham, Bryan Jenkins and Jacinta Ruru respectively discuss how hybrid arrangements, collaborative processes and legal instruments for co-governance between the Crown and iwi are creating opportunities for innovations involving government agencies, iwi and other stakeholders in developing collective responses to water challenges. From river restoration groups, committees developing catchment management plans, to new co-governance and co-management arrangements developed in the legislation, it is possible to see how responsibilities for water resource management are being redistributed with emphasis on adaptive, integrated and collaborative approaches. These developments are timely as the current water governance regimes have been reviewed and further reforms proposed under central government policy programmes and provide opportunities as to how ideas of adaptation, integration and collaboration are realised and what impact this has on water resources.

Concluding commentary

In the final chapter Bob Frame and Shona Russell discuss how water governance has unfolded through examination of two recent non-statutory initiatives alongside other developments that are underway in catchments and regions, between industry sectors and in accordance with the Treaty of Waitangi (Te Tiriti of Waitangi). In their consideration of wicked problems and clumsy solutions they discuss how solutions are developing to water problems and identify possible lines of research inquiry that may be aligned with ongoing initiatives, research needs for policy development and directions from literature. The authors end by suggesting possible lines of research inquiry to be continued into how water governance is emerging in New Zealand to address the challenges of today and in the future.

Acknowledgements

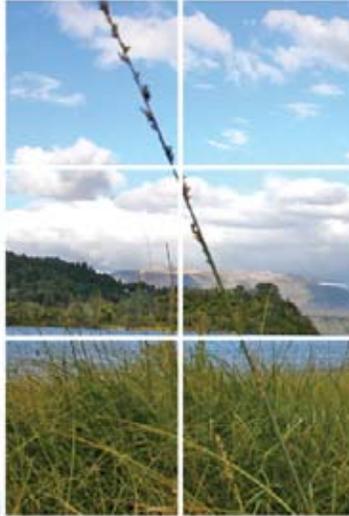
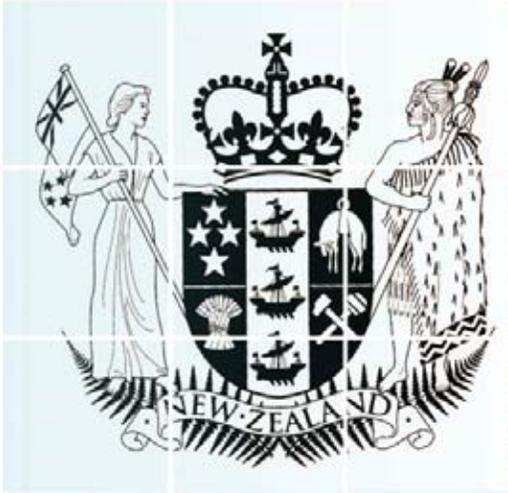
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- 1 World Water Assessment Programme 2009. The United Nations World Water Development Report 3: Water in a changing world. Paris, UNESCO, and London, Earthscan.
 - 2 Wicked problems are issues that may be addressed through a number of strategies and be defined differently. The term was first used in Rittel H, Weber M 1973. Dilemmas in a general theory of planning. *Policy Sciences* 4: 155–169. More recently it has been used in relation to water management, see for example: Ferreyra C, de Loë RC, Kreutzwiser RD 2008. Imagined communities, contested watersheds: Challenges to integrated water resources management in agricultural areas. *Journal of Rural Studies* 24: 304–321; Frame B, Russell S 2009. Water allocation: Canterbury's wicked problem. Chapter 21 in Frame B, Gordon R, Mortimer C eds 2009 *Hatched: The capacity for sustainable development*. Lincoln, Landcare Research; Freeman DM 2000. Wicked water problems: sociology and local water organisations in addressing water resources policy. *Journal of the American Water Resources Association* 36: 483–491.
 - 3 The Old Problems New Solutions programme <http://opns.landcareresearch.co.nz/> is complemented by other Landcare Research programmes – Integrated Catchment Management (2001–2010) and Values Monitoring and Outcomes (2010–2013) – funded by the Ministry of Science and Innovation (formerly the Foundation for Research, Science and Technology).
 - 4 See footnote i.
 - 5 Rogers P, Hall A 2003. Effective water governance. Global Water Partnership Technical Committee, Background Paper no.7.
 - 6 Bakker K ed. 2007. *Eau Canada: the future of Canada's water*. Vancouver, UBC Press.
 - 7 See Lankford B, Hepworth N 2010. The cathedral and the bazaar: Monocentric and polycentric river basin management. *Water Alternatives* 3: 82–101.
 - 8 For a discussion of developments in research around concepts of polycentric governance, adaptive management and water governance see: Huitema D, Mostert E, Egas W, Moellenkamp S, Pahl-wostl C, Yalcin R 2009. Adaptive water governance: assessing the institutional prescriptions of adaptive (co-) management from a governance perspective and defining a research agenda. *Ecology and Society* 14(1); and Neef A 2009. Transforming rural water governance: towards deliberative and polycentric models? *Water Alternatives* 2(1): 53–60.
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 - 10 See Ministry for the Environment 2007. State of the Environment Report.
 - 11 For New Zealand visit 'Climate Change information', <http://www.climatechange.govt.nz/> (accessed 5 September 2011).
 - 12 Statistics New Zealand 2010 *Global New Zealand: Year ended June 2010*. Wellington: Statistics New Zealand
 - 13 See footnote 10.
 - 14 The application for a Water Conservation Order on the Hurunui River was submitted to the Minister for the Environment in August 2007 and is now being heard by Environment Canterbury Commissioners. Further details can be found at: <http://ecan.govt.nz/our-responsibilities/hurunui-wco/Pages/Default.aspx> (accessed 5 September 2011).
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CHAPTER 2

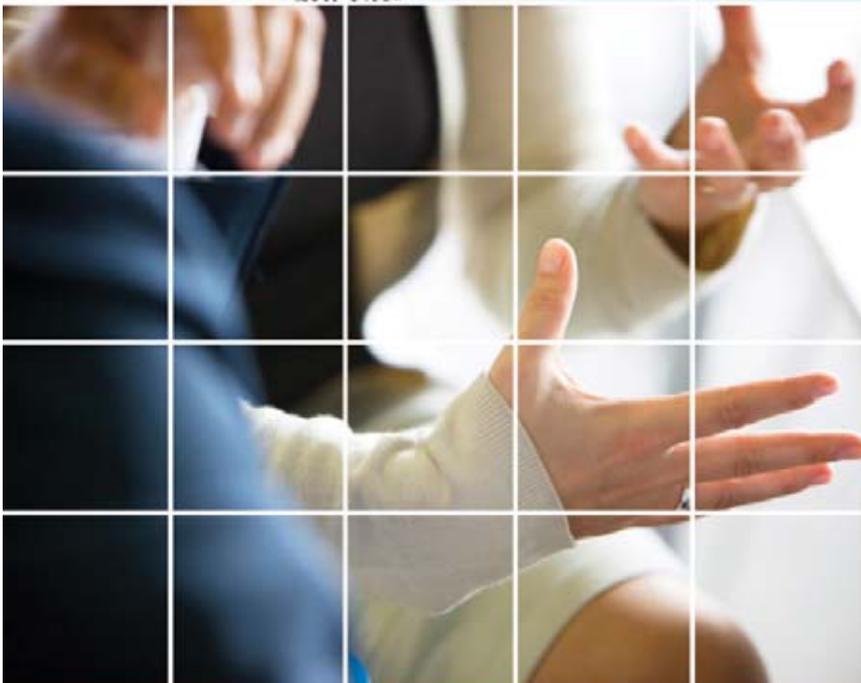
Governance, wicked problems
and water



Neil Gunningham

Resource Management Act 1991

Public Act 1991 No 69
Date of assent 22 July 1991
Commencement see section 1(2)



2. Governance, wicked problems and water

Neil Gunningham

Summary*

- Wicked problems are problems of such scale, persistency and complexity as to defy solution by a single scale of governance (e.g. national or local government level) or mode (hierarchies, markets or collaboration).
- Instead, combinations of these modes of governance offer innovative responses to wicked problems involving messy processes and clumsy solutions.
- Drawing upon research conducted in 2007, this chapter describes wicked problems and governance as a backdrop for later chapters – especially chapters 5 and 12 – that examine the innovations in water governance in Canterbury.

* This chapter draws on material published in Gunningham N 2008. [Innovative governance and regulatory design: managing water resources](#). Landcare Research Contract Report LCo708/137.

Water and wicked problems

In the language of public policy, policymakers confront a 'wicked problem', a problem of such scale, persistency and complexity as to defy solution. Attempts to solve such problems or purported solutions to one of their aspects may create other, even more complex problems because of interdependencies between various aspects of the broader problem itself¹. Wicked problems may involve:

- *Uncertainty and unpredictability* (e.g. How much of existing water allocations are actually being used? How reliable are future water use projections?)
- *Plurality of perspectives and interests* (e.g. farmers, recreationalists, environmentalists, urban householders)
- *Complex problems of scale* (e.g. a local community, a catchment, a region) and *ecology* (e.g. the dynamic, interrelated and complex relationship between groundwater and surface water extractions, the flow and habitat requirements of different species), and
- *Scientific uncertainty* (e.g. what is the connection between groundwater and surface water and between lower and upper catchments? How will climate change impact on water availability?)

While some environmental issues can be addressed at a single level of governance (e.g. national or local government level), many others cannot. Any purported 'solution' will have redistributive implications for entrenched interests, must address competing interests at different scales (local, regional, national), and is unlikely to gain widespread acceptance because different actors living in different sub-regions (and with different interests and backgrounds) have widely differing but deep-seated beliefs about the 'facts'.

Water allocation, for example, is intertwined with other issues of ensuring environmental flow (or flush) requirements, developing appropriate allocation limits for extraction, addressing cumulative effects of extraction, and establishing efficient and equitable allocation between competing uses at various interacting scales. Water does not respect jurisdictional boundaries and the extent to which it is used in one area often affects capacity in another. Where water is scarce and divergent interests and externalities are many, water resource management usually falls into the wicked problems category. Policymakers often address its multi-level character by designing governance mechanisms at different jurisdictional levels (which often do not correspond with ecological characteristics) in order 'to counteract the fragmentation that is characteristic of sectionally based decision making or decision making that is organized by territorial, social and political divisions'². In addition, policy makers try to ensure an effective interaction between these jurisdictional levels.

One of the greatest challenges is how best to allocate scarce water resources. For example:

- How can ecological services and functions be maintained while also meeting the needs of industry, agriculture, domestic users and others?
- How can water managers make 'good' decisions about water allocation when confronted by demands for access to water from different stakeholders with a diversity of interests, beliefs and values?
- How should resource managers act when the science is unclear and the future demands for water and the capacities of water resources to meet them are uncertain?

Modes of environmental governance

Governance describes the '*management of the course of events in a social system* and the use of institutions and structures of authority to allocate resources and coordinate or control societal activity'³. This 'social steering' has often been done through regulation by the state (i.e. laws and their enforcement). But today, much social steering takes place *irrespective* of whether the state is involved or what role it plays⁴. For example, governance may involve networks of social and economic actors who collaborate to achieve solutions without relying centrally on state intervention.

Hierarchies, markets and collaboration are terms used to describe the three modes of governance that might be used to address social and environmental problems. These modes are often linked to instruments and tools such as those listed in Box 2.1 below. These modes are ideal-typical constructions that are not necessarily found in their pure form in the real world.

Box 2.1: Examples of instruments & tools for water governance

- Prescriptive regulation
- Permitting regimes through economic instruments such as tradable water rights
- Soft instruments such as education, assistance and support
- Hybrid instruments such as environmental partnerships

Hierarchy

The defining characteristic of hierarchical modes of governance is that those with authority have 'power over' others and those 'at the top' have the capacity to issue commands due to the centralisation of power. These commands are passed down and enforced on those at lower points in the hierarchy. Hierarchical governance invokes prescriptive controls and favours instruments capable of directing particular forms of behaviour. Command-and-control regulation, for example, might proscribe behaviour through specific licence requirements imposed on individual enterprises, or by setting standards involving the establishment of uniform requirements on broad categories of activities to achieve specific environmental goals.

Hierarchical modes of governance are primarily concerned with only two parties: the governor/regulator (the central government agency or regional council) and the governed/regulated (groups whose water use will be constrained as a result of government edicts). Broader public interest or that of individual interest groups is handled through the legal (and to a lesser extent, the political) process. State 'commands', usually in the form of statute and regulations, are interpreted by the courts, which may play an important role both in this respect and in terms of enforcement. The legitimacy of government action is preserved in part through broad rights provided for court challenges and by virtue of the mechanisms of representative democracy.

In terms of state governance, control is usually imposed by government at national or state level (and sometimes delegated to lower levels of government) and relies heavily on centralised top-down institutional arrangements, and 'scientific management'⁵. Hierarchies may be predictable but rigid and are more suited to addressing simple rather than complex problems.

Hierarchy need not imply state control (although it usually does) but they are intimately connected. Until relatively recently hierarchy via command-and-control regulation was the state's dominant modus operandi.

This is now changing and one of the aims of this article is to explore the implications of this change and of the shift from 'rowing to steering'.

Markets

Market-based governance seeks to change behaviour by changing price signals to which rational and economically driven actors are expected to respond in their own self-interest. In this way, markets may harness the decentralised power of individual decision-makers to achieve policy objectives set by governments. Under a market model of environmental decision-making, governments design the market (including the initial allocation of property rights over resources) and regulate its subsequent operation. Individual participants (e.g. water rights holders) may then trade within the rules of the market to their mutual advantage (e.g. one person may sell water rights to another, who is able to generate more economic value from it). This model might arguably extend to 'rivalry and competition in environments where there is no identifiable market'.⁶

Collaboration

Collaborative governance (sometimes referred to as 'the new governance') recognises that complex political, economic and social systems cannot be governed only by a single actor (government) or by markets.

Collaborative governance involves participatory dialogue and deliberation, devolved decision-making, flexibility rather than uniformity, inclusiveness, transparency, institutionalised consensus-building practices, and a shift from hierarchy to heterarchy. It is distinctively polycentric and adaptive and therefore experimental and iterative in its approach. It provides for non-state actors to assume administrative, regulatory, managerial and mediating functions previously undertaken by the state. In its pure form, the state is not involved and one would find, for example, entirely self-governing communities⁷. In collaborative arrangements, power is diffuse, and sanctions, in the absence of state or market mechanisms, involve shaming and other mechanisms of informal social control.

Collaborative governance is characterised by an aspiration for the inclusion and engagement of a broad range of private and/or public actors and may extend to all who wish to engage in consultation, dialogue and decision-making. Collaborative governance gains legitimacy by direct rather than indirect democracy and in doing so aspires to engage a diversity of private, public and non-government stakeholders.

Finally, collaborative governance:

“ ...relies heavily on social coordination and control, collective sanctions, and reputations, rather than on legal and authority resources. These mechanisms are fundamentally based on the possibilities of repeated interactions (such as those provided by geographical proximity), on restricting the number of exchange actors in the network (to reduce coordination costs), and on the possibility to develop shared understandings, routines and conventions (to be able to cope with change and resolve complex tasks). ”

Duit & Galaz, 2008, p. 324

Hybrids

The development of governance arrangements and evaluation of their implementation involve navigating through a minefield of competing interests, conflicting expectations and contested science to achieve equity, efficiency, effectiveness and political acceptability.

When choosing between arrangements, policymakers should ask:

- What governance arrangements are likely to work best in terms of effectiveness, efficiency, equity and political acceptability?
- Are hierarchies, markets or collaboration (or some hybrid incorporating elements of each) likely to produce better outcomes?

In the real world these ideal types can often be found operating in combination rather than in their pure forms, the particular combinations determining their degree of effectiveness and legitimacy. For example, it is common to find hybrids involving hierarchy and collaboration (co-management and community-government partnerships), between market actors and state agencies (public-private partnerships) and between collaboration and market actors (social-public partnerships). Individual policy tools equally involve such hybrids. This is particularly the case with some market-based instruments, such as tradable emission rights, which, on closer examination, involve a combination of markets and hierarchies (since although trading is a market mechanism, governments design the trading scheme, impose caps on emissions, and police compliance).

Combining hierarchy and collaboration is likely to be the most effective in balancing the economic needs of various stakeholders with the need for environmental sustainability. This hybrid approach involves doing much of the collaborative 'rowing' at local level while leaving the 'steering' to the state – the hierarchy. This is an example of 'collaboration in the shadow of hierarchy' with the state underpinning community-based initiatives. For example, developing and implementing 'on the ground' water governance initiatives may be devolved to collaborative decision-making by local communities with a state agency providing the ground rules, resources, and enforcement mechanisms in the event of default (see Table 2.1). In this combination collaboration provides local knowledge, ownership and legitimacy while the state provides essential steering functions and resources. Moreover, the adaptive nature of collaboration best takes account of the fact that the science is unclear and the future demands for water and the capacities of water resources to meet them are uncertain.

All of these conditions for collaboration are more likely to be met at local (i.e. catchment and sub-catchment) than at regional level, and collaborative initiatives have far greater prospects of success the lower the scale at which they are located. Allowing communities to identify their own means of allocating water within a local area, albeit under the ultimate control of the regional council (a form of private self-regulation and supplementary steering in the shadow of hierarchy), is an entirely credible approach (though much will still depend on the specific design, the incentives and default penalties provided, and mechanisms for achieving collaboration). However, whether collaborative governance can function effectively on a larger scale remains an open question.

Governance for wicked problems

Current governance arrangements are widely perceived to be seriously inadequate, prompting a search for innovative alternatives. Individuals, groups and segments of society differ markedly in how they perceive the challenges of water resource governance. Among the major challenges that policymakers confront are:

- Identifying how best to approach the allocation of scarce water resources
- Deciding whether to rely on traditional hierarchical systems, such as command-and-control regulation, place greater faith in market mechanisms such as water trading, or shift to much more collaborative, community-oriented forms of decision making, and
- Identifying ways to resolve the differences between the interests and values of different stakeholders and to overcome conflicts between them⁸

Hierarchy, and specifically command-and-control regulation, has had some significant victories in halting, or at least slowing, 'first-generation' environmental problems such as air and water pollution. But it is one thing to apply command and control to one-dimensional problems amenable to a 'technical fix' (mandate the use of best-available technology) and quite another to apply the same approach to complex environmental problems such as those of managing scarce natural resources involving multiple users and where there is limited scientific understanding of the implications of particular actions (often referred to as 'second-generation' problems).

For second-generation problems, command and control appears to be inherently cumbersome, unresponsive and unable to generate sufficient knowledge to address such problems efficiently. For example, local landholders and communities often know far more about the particular water resource problems that confront their locality than do government agencies, which have difficulty amassing the necessary knowledge on which to base policy and action. In these circumstances it is arguable that the state has very limited ability to achieve its objectives directly, and only by enlisting non-state actors with local capacities and local knowledge are substantial gains likely to be achieved.

Where hierarchical government agencies do seek to address complex problems directly (as through regulation and regulatory bureaucracies), there is a tendency to focus on the construction of large infrastructure rather than on more efficient solutions at local level that require local knowledge to develop and implement. Hierarchical approaches also lack the flexibility and responsiveness to accommodate to changing circumstances. These limitations are particularly exposed in circumstances where scientific knowledge is limited, where the answers are unclear and gradually evolving, and where experimentation and adaptation are paramount. In contrast, hierarchy tends to perform well where change is slow and predictability high. Indeed, the major strength of command-and-control regulation is its consistency (provided there is adequate monitoring and enforcement). Where the behaviour expected of regulated enterprises can be specified with considerable clarity (e.g. through the provision of national minimum standards) then it is relatively straightforward to identify breaches of the legal standard and to enforce the law. This provides regulators with defined operational parameters and, in turn, regulated enterprises themselves have a clearer understanding of their regulatory obligations.

At the other end of the continuum of interventionism, *market-based governance* has its own, very different strengths and limitations⁸. One promising market-based instrument involves the establishment of property rights (enabling rights to water to be distinguished from rights to land use) in conjunction with creation of a market in which such rights can be traded. A number of initiatives using this approach have been developed internationally, some with significant success. Nevertheless, common problems include:

- Clearly defining and enforcing property-rights
- Ensuring market participants have access to appropriate information and an ongoing dependency on the viability of the resource
- Preventing 'thin markets' with limited trading possibilities and uncompetitive behaviour (e.g. permit hoarding), which undermine economic efficiency
- Monitoring and enforcing permits when there is a large number of small, disparate permit holders, and
- Accounting for (often complex and uncertain) differences in the hydrologic and environmental effects of taking water from different locations, when defining trading rules

The fact that water allocation policy involves complex multi-level governance challenges, multiple stakeholders, public good problems, and variable geographical scale compounds these problems as does the fact that water trades may be potentially inconsistent with catchment or regional water plans. The considerable attraction of market-based governance in the context of water resource management is that there would be no need for direct government intervention beyond putting in place these necessary mechanisms to enable the market to function efficiently (albeit not necessarily equitably).

In the case of market-based water governance, it is only those who have the capacity and interest to trade water in the market (i.e. those who either own water rights or wish to purchase them) that will be directly engaged in water allocation decision-making. This does not directly exclude any group, but in practice those who do not have the necessary financial resources (which commonly includes 'the environment' and environmentalists) will effectively be excluded from the market.

Even in the absence of water trading, a number of other incentive-based approaches also have considerable merit but cannot be invoked under current governance arrangements. While other approaches are unlikely to be taken without economic incentives, gains in water use efficiency could be achieved by improving irrigation systems and scheme design, matching water application to soil moisture demand to reduce water use for existing allocations, or introducing water efficiency management plans (see Box 2.2).

Box 2.2: Water efficiency management plans

Water Efficiency Management Plans (WEMPS) are business-specific plans that will demonstrate that a business is already at best practice in water efficiency or is planning to become water efficient in the near future. This water-efficiency planning process includes three key activities for water users:

- Accounting for water use
- Identifying water saving measures, and
- Preparing a plan to implement the identified measures

Proponents of *collaborative governance* claim that collaboration in its multiple forms is more effective and more responsive and legitimate than either hierarchical approaches or the market because deliberation, cooperation and learning at local level may lead to responses that better take account of local circumstances, build on local knowledge and capacities, and result in greater stakeholder ownership and 'buy in'.

Collaborative governance also provides considerable scope for 'adaptive management', an experimental style of governance that is capable of reflecting on the success or otherwise of particular initiatives and of modifying them as evidence comes in as to their relative efficacy. Similarly it encourages reflexivity as a result of involving all stakeholders, and use of all available sources and types of information – leading to further policy learning and adaptation. Moreover, dialogue helps stakeholders consider the environmental impact of their actions and to learn from shared knowledge and experience.

However, collaborative governance involves high transaction costs, primarily as a consequence of protracted dialogue and negotiations, and has little attraction in addressing problems that hierarchies or markets are capable of addressing at substantially lower cost, and in a shorter time frame. Indeed, it is no coincidence that collaborative governance mechanisms are very largely applied to complex environmental problems, particularly those that are multi-level and involve multiple stakeholders, commonly in circumstances where previous policy initiatives, whether hierarchical or market based, have failed.

There are a significant number of cases where the early results show considerable promise and seem likely to achieve more than their hierarchical or market-based predecessors. There are others, internationally, that have had variable success due to issues such as:

- Being developed at a geographic scale too large to engage with any genuine community
- Insufficient resources having been provided to prevent problems such as volunteer burnout and disengagement, and
- Particular power-groups dominating the process to the effective disempowerment and exclusion of others

Concluding comments

Purported solutions to wicked problems are likely to be 'clumsy', involving policies that creatively combine all opposing perspectives on what the problems are and how they should be resolved⁹. Any purported 'solution' will have redistributive implications for entrenched interests, must address competing interests at different scales (local, regional, national), and is unlikely to gain widespread acceptance because different actors living in different sub-regions (and with different interests and backgrounds) have widely differing but deep-seated beliefs about the 'facts'. Nevertheless, some pathways, processes and policy options hold out more promise than others. As will be seen from Ch 6, hybrid solutions involving a judicious combination of hierarchy and collaborative governance are already reaping significant dividends in New Zealand (in the Canterbury Region).

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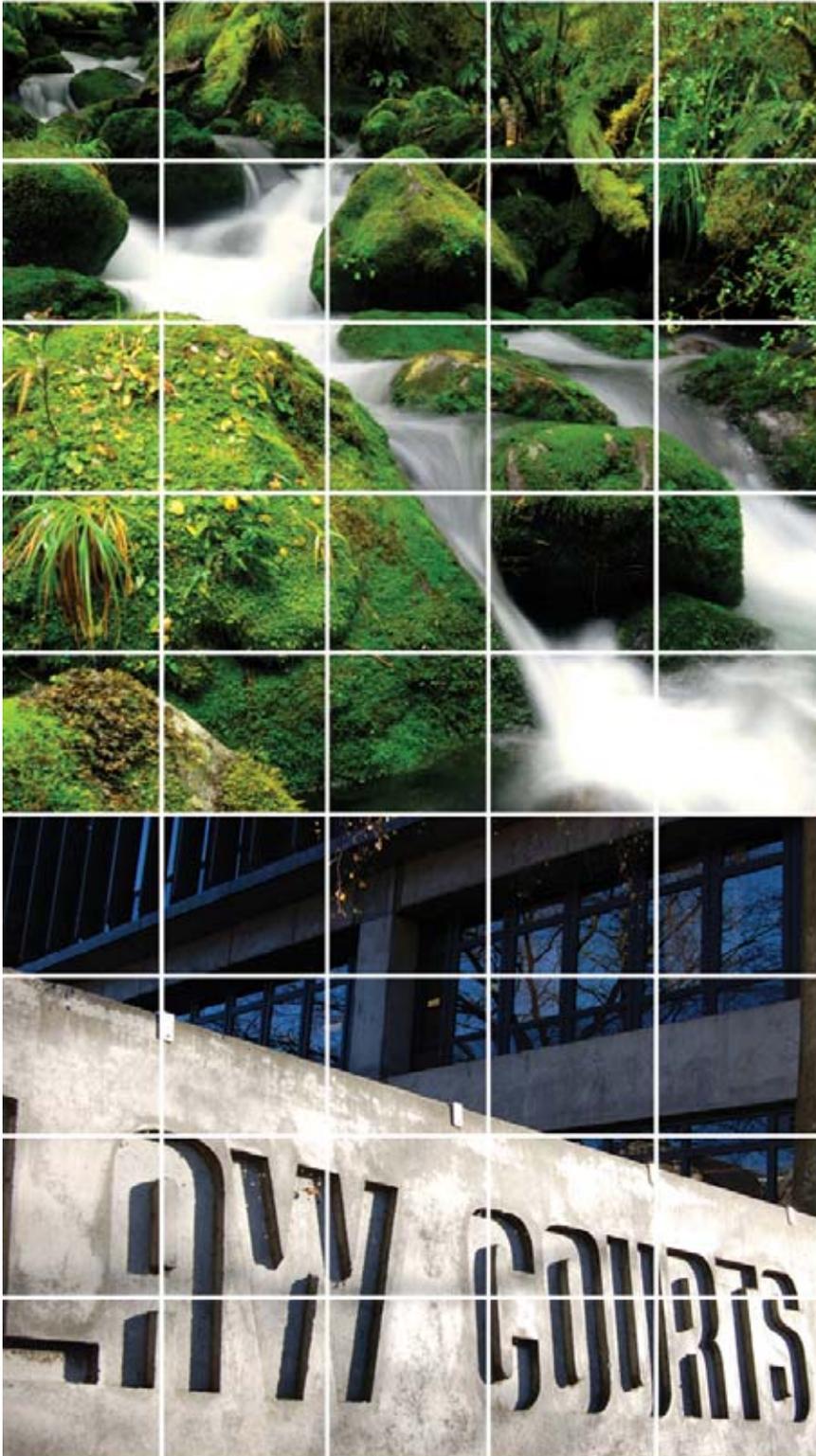
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CHAPTER 3

Māori and the courts



Jacinta Ruru



3. Māori and the courts

Jacinta Ruru

Summary*

- The Resource Management Act (RMA) provides opportunities for Māori to be involved in decision-making for the use of land, air and water. It requires decision-makers to recognise and provide for the relationship of Māori with land and water as a matter of national importance, to have particular regard to the importance of Māori exercising kaitiakitanga, and to take into account the principles of the Treaty of Waitangi.
- With the 20th anniversary of the RMA approaching, many Māori claim to be battle weary from protesting resource consent applications for the take of fresh water. For the most part, the RMA does not work for Māori because their voice is often trumped by other public and commercial interests.
- This article describes the current legislative framework and the opportunities it provides for Māori concerns to be heard in resource consent decision-making; it then summarises the outcomes of court decisions where Māori voiced their concerns about resource applications to take and use water.
- Of the 19 court cases surveyed, only two produced clear wins for Māori with resource consents being adjusted or revoked in accordance with Māori wishes. The remaining 17 cases resulted in partial or outright losses where Māori concerns could not be accommodated.
- The government recognises that Māori involvement in freshwater governance needs to be addressed. While policy directions are being developed, co-management and co-governance arrangements are emerging to better involve Māori in decision-making.

* This article draws on published material by [Jacinta Ruru: The legal voice of Maori in freshwater governance. A literature review \(Landcare Research, 2009\)](#) and ['Undefined and unresolved: exploring Indigenous rights in Aotearoa New Zealand's freshwater legal regime' \(2010\) The Journal of Water Law 20: 236–242.](#)

Introduction

Since the British presumption of sovereignty over Aotearoa New Zealand in 1840, tension between iwi and the government has ensued over how best to own, manage and govern the country. Fresh water has always been pivotal to these debates but has become even more so in recent years. The unresolved issue is now a significant political and legal problem. This article outlines the current legislative framework and then highlights the results of Māori involvement in court decisions to consider how successful this framework is in enabling involvement for the management of fresh water.

The legislation

The Resource Management Act 1991 (RMA) is Aotearoa New Zealand's pre-eminent natural resources statute¹. It puts forward an all-encompassing regime for the sustainable management of land, air and water. Central government retains some responsibility to influence this regime, primarily through setting national environmental standards, national policy standards and New Zealand coastal policy statements. However, day-to-day control is vested in regional government and territorial authorities, which operate in accordance with the Local Government Act 2002 (LGA). Local authorities prepare plans that contain rules concerning the use of land, air and water where appropriate, and stipulate when and where proposed activities may require resource consents to permit activity.

The common starting point in the RMA regime is that no person may do anything with land (including their privately owned land), air or water that contravenes a rule in a district plan unless the activity is expressly allowed by a resource consent, or coastal permit, granted by the territorial authority responsible for the plan, or a rule in a regional, or regional coastal, plan². The RMA gives regional and local councils the power to assert rules and guidelines for the take, use, damming, and diversion of fresh water. Regional councils have specific duties in regard to water. These include controlling the use of land for the purpose of maintaining and enhancing the quality and quantity of water in water bodies. The functions also include controlling the taking, use, damming and diversion of water for the purposes of setting maximum and minimum, and controlling the range of change, of water levels and flows. Regional councils need to control discharges of contaminants into water, and discharges of water into water. Regional councils can also, if appropriate, establish rules in a regional plan to allocate the taking or use of water, as long as the allocation does not affect the activities authorised in the Act.

The legislative directives

The LGA has at its core the directive that local authorities should provide opportunities for Māori to contribute to its decision-making processes. In formulating district and regional plan rules, and issuing resource consents, the RMA directs local authorities to recognise the Māori relationship with water. Section 6(e) of the RMA mandates that all persons exercising functions and powers in relation to managing the use, development, and protection of natural and physical resources must recognise and provide for matters of national importance, including the relationship of Māori and their culture and traditions with water. Other matters of national importance include preservation of the natural character of the coastal environment and protection of outstanding natural features and landscape from inappropriate subdivision, use and development (s6 (a), (b)).

Additionally, section 7(a) of the RMA directs that all persons exercising functions and powers in relation to managing the use, development, and protection of natural and physical resources shall have particular regard to kaitiakitanga (the exercise of guardianship by Māori). Again, it is one of several factors that must be

Court decisions

There are several instances where Māori, as objectors, have appealed council decisions that approved resource consents to take water, discharge wastewater into water, or dam water. In all of these cases Māori speak of the importance of the water to them culturally, including the belief that water has its own mauri (life force), and the importance of these places for food gathering, namely fishing. In a survey of RMA cases concerning Māori and water, only two of the identified 19 relevant cases resulted in clear wins for Māori and both do not concern the typical water-take facts of most of the other cases⁵.

The wins

The RMA was enacted in 1991 but the first clear win for Māori did not occur until 2002. That case concerned an argument posed by Federated Farmers of New Zealand (North Canterbury Province Inc.) that a man-made drainage channel was not subject to minimum flow requirements⁶. The Environment Court accepted Te Rūnanga o Ngāi Tahu's counter-argument that the drain is subject to the requirements because it is linked to the Cust River and has capacity to support traditional use and values.

The second case involved Ngāti Tamaoho Trust's concern that the decision to grant resource consent to the Papakura District Council to construct and operate tidal gates on a specific tidal estuary inlet for the purposes of creating recreational opportunities would interfere with the natural flow of the tide⁷. The Court agreed that if the water was interfered with, then to Ngāti Tamaoho the wairoa (spirit) of the water would decay. The resource consent was revoked.

The partial wins

Several of the identified cases did result in partial wins for Māori. The most recent one concerned the Bay of Plenty Regional Council reissuing to the Rotorua District Council a resource consent to take up to 3500 cubic metres of water per day over the summer months from the Taniwha Springs⁸. Ngāti Rangiwewehi appealed the decision, relying on section 6(e), stating that their relationship with this water was a matter of national importance. The Court partially agreed by reducing the term of the resource consent from 25 to 10 years. The maximum daily volume and rate were not reduced.

Another case, decided in 1996, involved the Mangakahia Māori Komiti challenging the resource consents issued to 17 dairy farmers to take water from the Opouteke River for irrigation⁹. The Komiti contended that the water permits would adversely affect their right to catch fish in the river. The Court found a middle ground where the consents in most cases were slightly increased by one year, but the total level of water take permitted was reduced.

Ngāi Tahu were partially successful in a case where they argued that the issuing of resource consent to a particular jetboat company to operate 10 additional trips on the Dart River for tourism purposes would adversely impact on their relationship with the river. The Court reduced the number of jetboat trips to four¹⁰.

In another couple of cases, Māori were successful in protecting part of a lake from an aerial spray of weedkiller¹¹ and a fish passage where consent had been granted for flashboards to be replaced by hydraulically controlled gates to manage a dam's water levels¹².

The losses

However, in some cases Māori lost their appeals outright. For example, Tautari lost their challenge of a resource consent that had been granted for the construction of a farm irrigation dam on the Waioipitotoi Stream. The consent also allowed the applicant to take up to 2700 cubic metres of water per day. Tautari appealed on behalf of the interests of the Māori people living only 6 km downstream of the proposed dam. Tautari argued that they had not been adequately consulted and that the terms of the consent meant the migration of traditional fish species would be disrupted and there would be a general ill effect on fish life as traditional sources of food. The Court disagreed.

In a case where Contact Energy appealed the Waikato Regional Council's refusal to grant it resource consents for a proposed geothermal power station, Tauhara Middle Trust argued that the geothermal resource is a taonga (treasure) and that the power station should not proceed because consultation had been inadequate. The Environment Court found in favour of Contact Energy, permitting the power station to be built. In another appeal against the granting of resource consent, Tainui argued that building an 86-ha engineered landfill would have potentially adverse effects on tributaries of the Waikato River, particularly on Clune Stream. The Court concluded that the existing conditions that the design is subject to 'will adequately protect the Māori interests'¹³.

In another set of cases, Carter Holt Harvey was issued resource consent to discharge-to-water from its pulp and paper plant for 21 years. Ngāti Tuwharetoa did not agree with that term. The Environment Court had some sympathy for the tribe and held that they must be given more of a participatory role by reporting to them issues arising¹⁴. However, the High Court disagreed and held that Tuwharetoa had no consultation interests in the resource consent¹⁵.

In a more recent case on water where an iwi opposed the issuing of consents to Genesis Power to enable the Tongariro hydroelectric power development scheme to continue operating, the Māori tribe lost. The Ngāti Rangi Trust opposed the consents primarily because, in diverting water from the Whangāehu, Whanganui and Moawhango rivers into Lake Taupo and then into the Waikato River, the scheme inhibits their cultural traditions because the reduced flow and water levels, degraded water quality and change to the ecological system affect the aquatic food chain. While the Environment Court restricted the consents from 35 years to 10 years¹⁶, the High Court overruled that decision¹⁷, and the Court of Appeal has since endorsed the High Court's judgment¹⁸.

Court precedents

Thus, while the RMA does provide a platform for Māori to air their concerns, these concerns constitute just one of several factors that the decision-makers and the courts have to consider. The fact that Māori often lose in the courts is not because the courts lack awareness of the importance of the RMA protections to Māori. For example, Aotearoa New Zealand's then top appeal court, the Privy Council in the United Kingdom, stated in 2002, that sections 6(e), 7(a) and 8 provide 'strong directions to be borne in mind at every stage of the planning process'¹⁹, and that if alternative proposals exist that do not significantly affect Māori, then preference should be given to those alternatives even if they are not ideal. However, in that case, which concerned the laying of roads and not the take of water, Māori still lost.

Moreover, the courts have been clear in stipulating that section 6(e) 'does not create a right of veto'²⁰ for Māori and that it does not trump other matters²¹. In a more recent case, however, the Environment Court directed that section 6(e) 'should not be [just] given lip service to'²². Nonetheless, overall the case law

illustrates that while it is definitely a strong starting point to have legislative rights, those rights remain vulnerable and it requires significant time and resources on the part of Māori to pursue these rights.

Emergent pathways

New Zealand's parliamentarians, politicians and policymakers have been aware for some time of the critical issue of how ought the law provide and recognise for Māori interests in fresh water? In 2003, the Labour-led government established the Sustainable Water Programme of Action as part of the wider Sustainable Development Programme of Action, to ensure that the country's freshwater resources are managed wisely to provide for the present and future environmental, cultural, social and economic well-being of New Zealand. A discussion document was released in December 2004, outlining the key issues with water management and a proposed package of actions. In early 2005, 17 hui were held with Māori around the country to discuss the issues raised in the discussion document. In July 2005, the Ministry for the Environment published *Wai Ora: Report of the Sustainable Water Programme of Action Consultation Hui*²³.

The current National-led government is equally aware of the issue for Māori. For instance, in a 2009 Cabinet paper it states²⁴:

“ The rights and interests of Maori in New Zealand's freshwater resources remain undefined and unresolved, which is both a challenge and an opportunity in developing new water management and allocation models. ”

Most recently, the Land and Water Forum – a stakeholder group convened to examine freshwater governance – acknowledged in its report that '[f]or iwi, the contemporary discussion of fresh water evokes legacies of loss and exclusion and the denial of rights and responsibilities'²⁵. However, the Forum did not attempt to define iwi rights and interests in water. The ongoing questions about rights, interests and responsibilities in the management and governance of fresh water are located amidst questions about the relationship between Māori and the Crown. Around the country, innovative arrangements are being made for co-management and co-governance for rivers and lakes, offering alternatives to court battles and it is these responses that will be examined in Chapter 13.

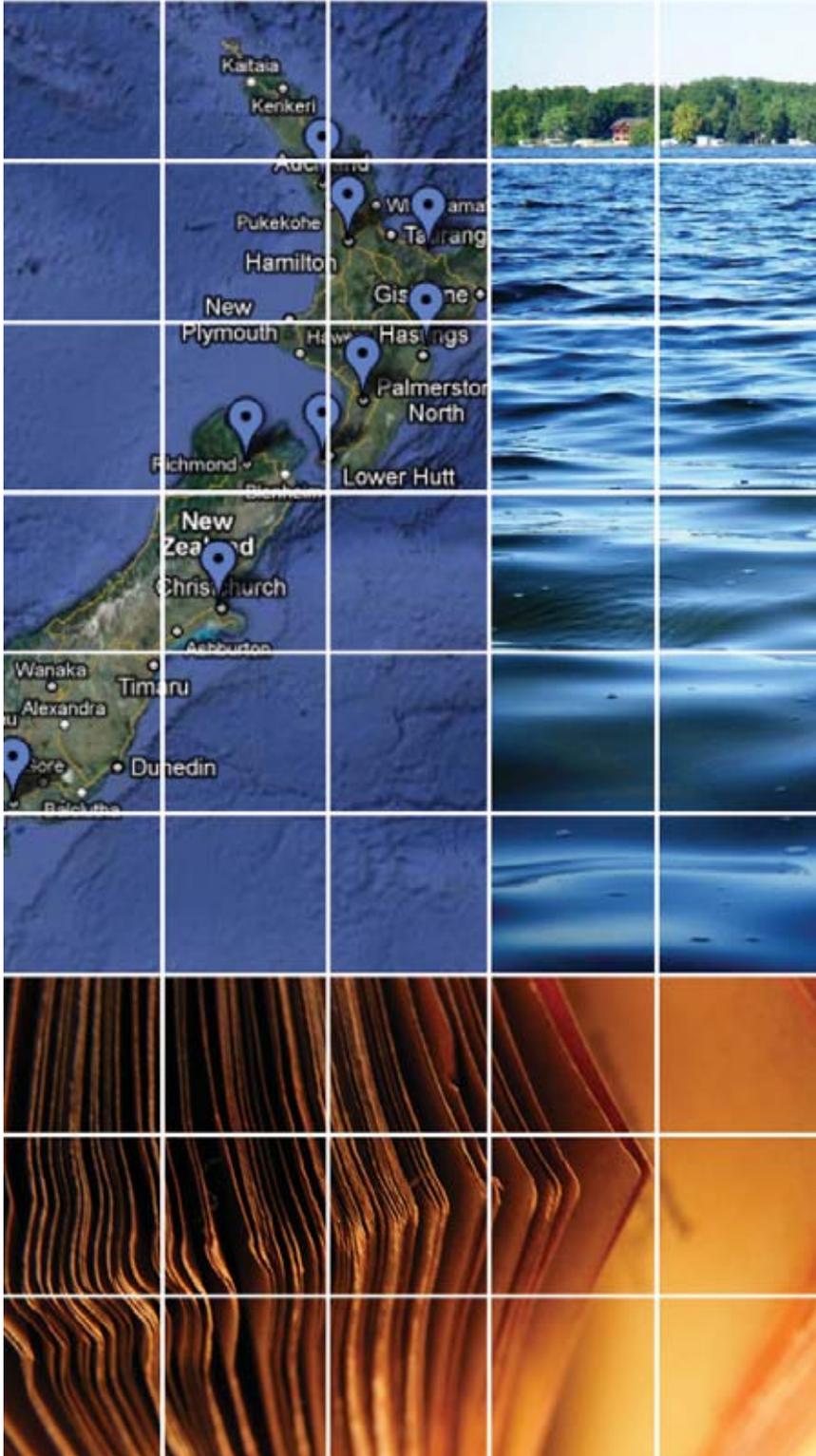
Acknowledgments

I thank Rosemary Clucas, Naomi Johnstone and Joshua Williams for their research assistance in preparing this report. This research was funded by the Foundation for Research, Science and Technology under Contract C09X0702.

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 - 2 See ss 9-23.
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 - 4 Section 36B. See also ss 36C–36E. Note also that the Local Government Act 2002 similarly requires local authorities to have a certain level of regard to Māori and the Treaty of Waitangi.
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 - 7 Ngataki, Ted and Ngati Tamaoho Trust v Auckland Regional Council [2004] 9 NZED 725.
 - 8 Te Maru o Ngati Rangiwewehi v Bay of Plenty Regional Council [2008] ELRNZ 331.
 - 9 Mangakahia Maori Komiti v Northland Regional Council [1996] NZRMA 193.
 - 10 See G R Kemp and E A Billoud v Queenstown Lakes District Council [2000] 7 NZRMA 289 and Dart River Safaris Ltd v Kemp and Anor [2000] NZRMA 440.
 - 11 Walker v Hawke’s Bay Regional Council [2003] NZRMA 97.
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 - 22 Te Maru o Ngati Rangiwewehi v Bay of Plenty Regional Council 25 August 2008 Environment Court Auckland A095/08 – (2008) 14 ELRNZ 331, [132]. For more discussion of this case see Bangma W 2009 [April]. The decision in Te Maru o Ngati Rangiwewehi and the consideration of alternatives under the RMA. RMJ 7.
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CHAPTER 4

Regional council insights for
fresh water management



Suzie Greenhalgh

4. Regional Council insights for fresh water management

Suzie Greenhalgh

Summary

- The Resource Management Act (RMA) in 1991 places management of New Zealand's freshwater resources with regional councils and unitary authorities. As the limits of freshwater resources are reached, these decisions are becoming more contentious, more expensive and more time consuming. Overarching guidance on the management of our freshwater resources did not occur until the national policy statement of 2011. There was, however, prior legislation for the management of water, rivers and soil for which councils or catchment boards had responsibility.
- Significant differences exist in how the various councils manage these resources for various reasons: historical management approaches, state of and the risks to the freshwater resources in a region, council science and policy capacity, land use trends and the resulting environmental impacts, and community awareness and engagement in freshwater decisions. The lack of a national management framework and reporting regimes also led to regional differences on the monitoring of and reporting on freshwater resources, to the point where there is no clear national picture of the quality of fresh water in New Zealand or the quantity of fresh water used. This presents a challenge for national and international reporting on the state of New Zealand's freshwater resources.
- This chapter outlines some of the challenges faced by regional councils in New Zealand, then summarises the decision-making process from a regional council perspective, and finally offers some learning from practitioners and tools that are being explored to address some of these challenges. It is not an exhaustive list of challenges but aims to raise awareness about some of the issues that regional councils, as primary government decision-makers on fresh water, contend with and some of the solutions and approaches that are being explored to overcome them or support councils.

Challenges and issues

The following précis of challenges and issues was derived from conversations with regional council and central government staff, industry, environmental NGOs and researchers involved in freshwater decision-making in New Zealand between 2007 and 2011. These conversations led to the development of a Ministry of Science and Innovation funded research programme 'Values, Monitoring and Outcomes'¹ to address some of them.

Points of difference

As with any issue, there are varying points of views about, for example, the severity of the problem, the supporting science, economic impact, etc. It is these differences in opinions and the values a person or organisation holds for a freshwater resource that will drive their level of engagement in the issue and the position(s) they take. It is the job of the regional councils and unitary authorities (hereafter referred to as 'councils') to weigh up community values, economic impacts, environmental damage and the actions that are needed when making a decision and defining the desired outcome for freshwater resources. It is also up to councils to monitor the effects of activities that have been authorised (especially including the cumulative effects of the permitted and the consented activities) and to respond to the results. Of course, the effects of activities are not always immediate in time or space, providing further complications for managing these resources. In reality, where competing values exist it is not always possible to find a 'win-win' solution.

National consistency

It was envisaged that national standards, guidance and methodologies (e.g. around setting limits) would be developed to support the RMA and promote national consistency. In the absence of national standards and guidance, councils have largely developed their own approaches and interpretations of the RMA for freshwater decisions. While councils have, to a certain extent, shared their experiences, this has not resulted in consistent approaches to issues across the country. This has led to differences in approaches and methodologies to policy development being used and has often involved contentious hearings and environmental court cases to justify the approaches used. This is costly for councils and also stakeholders who need to develop a new rationale for each new situation.

The Resource Management Act (1991) and legal precedence

During hearings and Environmental Court cases stakeholders frequently turn to the use of the non-specific terminology used in the RMA (e.g. about setting objectives). This has led to relatively vague objectives and policies being crafted within regional plans as submitters propose the use of RMA terminology that has been approved in previous Environment Court processes. This, of course, proposes challenges for resource consent staff within councils, who subsequently have to interpret these objectives and policies in the development and implementation of plans. .

Regional councils

The RMA does not require councils to set standards for freshwater resources, just to manage the adverse effects of activities. Therefore, if standards are being considered then local government politicians have to have the fortitude to make the decision to set a limit, which is likely to be controversial and costly. This is especially the case where resource use is already at or above its capacity. This poses challenges for processes that take longer than 3 years (an electoral cycle) as changes in the composition of the council may affect the willingness of a council to set and then enforce limits.

Engagement

Engagement is a key ingredient of any successful freshwater decision-making process. While we would like to think that there is a recipe that can be followed, that is not the case. In reality, no one size fits all. The type and nature of engagement will depend on:

- Type and the scale of the community
- Previous experiences with a council (e.g. at Environment Court, council hearings, etc.), which may undermine trust between the various parties
- Degree of industry or community leadership to prompt engagement
- Degree and type of change required as result of a plan/policy change. For example, if land use change is required rather than changes in management then the extent of engagement is usually greater because of expected economic impacts on landholders.
- Number of existing versus new users/uses (both new entrants with the same resource uses and new uses for the resource in a catchment). It is often easier to get feedback on existing uses/users and understand their impacts on water resources while new uses/users often exacerbate the resource issue and their reactions will be governed more by potential economic benefits or perceptions related to issues such as the rural–urban divide or environmental vs economic interests. There is also the perception that existing users are in “the club” and have some protections that enable continued use of a resource, despite others not in the club perhaps having a better case for the resource use in terms of environmental effects, or economic return or efficiency of use, for example.

There are a number of stumbling blocks that councils have encountered with engagement processes. While a council may have led successful engagement processes to identify the key values for a freshwater resource, the interpretation and translation of them into outcomes and how they are accounted for during policy implementation is often seen as being less successful. This highlights the importance of councils needing to be quite clear about their engagement process, their expectations of the engagement and how stakeholder views are incorporated in the decision process.

In all likelihood, it will not be possible to eradicate all conflict within a decision-making process. However, it is possible to shift where the conflict occurs and level of debate that arises. If and how this occurs depends on the nature of stakeholder relationships and the form of engagement. Therefore, getting the process right doesn't mean that conflict is avoided.

The policy choices

With setting a limit on freshwater resources, perhaps the most controversial of all issues is allocating the now limited resource use between users, whether for quantity or quality. When a council sets a limit on a resource, this limit is often allocated between affected users, uses or land types in order to manage and achieve the specified limit – and there is rarely, if ever, likely to be a situation where all affected parties believe the allocation process provides them with an equitable and efficient allocation. For instance, ‘grandfathering’ existing users is likely to disadvantage those currently in ‘less-intensive’ uses and curtail future growth, ‘averaging’ will penalise existing users above the average and reward those below, ‘land carrying capacity’ will penalise those whose current operations don’t match the specified land capacity while rewarding those low-intensive users in areas with high limits. Regardless, there is always likely to be an adversely affected person or group.

Linkages between water quality and water quantity can be challenging for some stakeholders and planners to make. This may lead to separate treatment of the two issues with potentially conflicting goals, which may make it difficult to achieve the specified outcomes for the resource.

The decision-making cycle – a regional council perspective

The decision-making cycle for councils is, by its very nature, iterative and much broader than many would realise. In coordination with a group of council policy staff, we describe in Figure 4.1 what that cycle is and the key points in each phase of the cycle. The purpose of this cycle is to illustrate the many places where science, governance, engagement and analysis take place and interact in freshwater decisions.

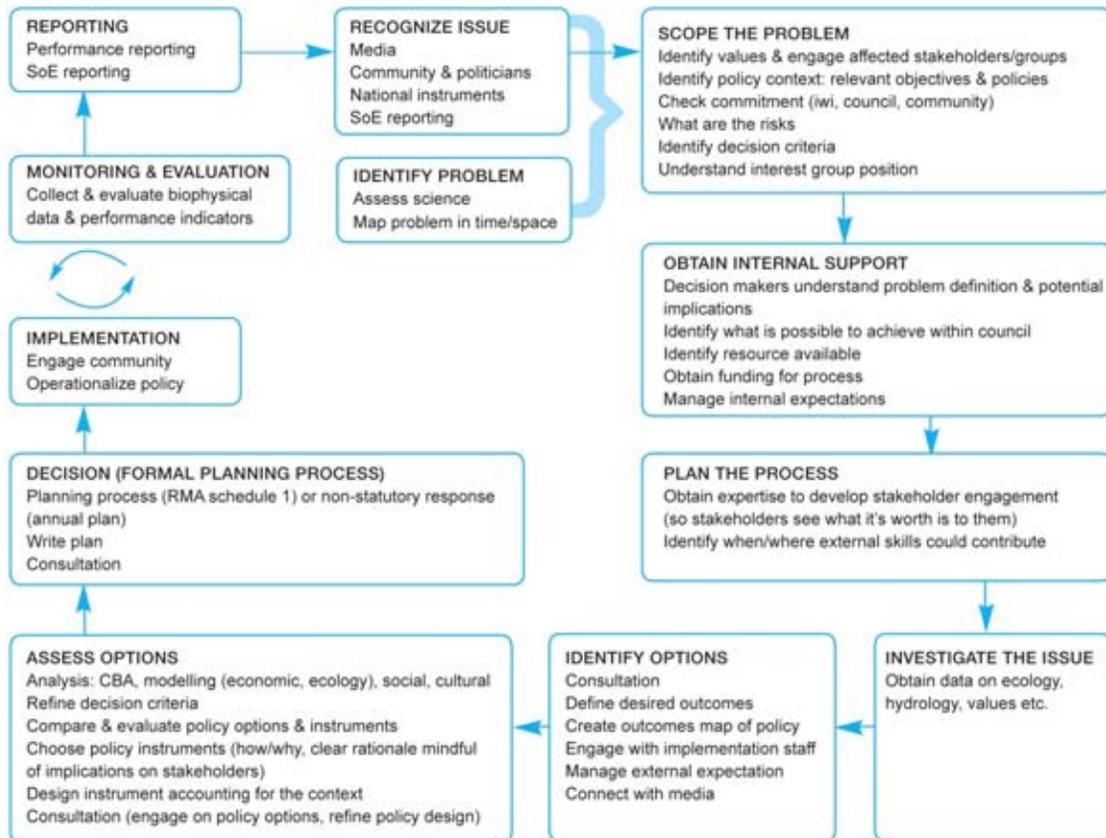


Figure 4.1: Policy cycle for decision-making.

Tools and approaches

There is no simple way to solve freshwater resource management decisions. However, advice from those engaged in these decisions and potential tools being explored to support and assist these decisions can be summarised as follows.

Some learning for improving the process

- **Communication.** Public perceptions and understanding of the issue and process often affect the type and level of conflict. Clever and innovative communication can help allay fears, build understanding and trust, and clarify processes and engagement opportunities.
- **Community.** Given the profile and prominence of industry and some environmental NGOs, they are often the most vocal group in any process, not the local community. Designing processes that provide clear opportunities for local community engagement and responses can build greater trust of a process and acceptance of the outcome.
- **Analysis.** Frequently it is the landowners that are most affected (at least economically) from a change in freshwater management. Thorough analysis of the impacts on landowners and the alternatives and solutions available to them can provide a level of assurance that the council has a clear understanding of the potential impacts and challenges with the proposed management change. Similarly, robust analysis and communication of the science that underpins a decision by councils and stakeholders is necessary so that environmental effects and the rationale for action are understood.
- **Managing expectations.** Being clear at the outset about the expectation of an engagement process and what influence stakeholders can exert over the final decision can assist to alleviate any false expectations groups may acquire. This could include what is going to be promised to each group, how the engagement will happen and how their desires may influence a decision.
- **Time.** This is a delicate balance. There should be sufficient time for stakeholders to feed into a decision-making process but it shouldn't be too long that stakeholders become 'bored' with the process. In many instances, getting the early part of a process right is what takes the time.
- **Policy.** In all likelihood a mixed policy approach will be more palatable to stakeholders. For example, regulation could be proposed as a backstop, education and awareness programmes to demonstrate what the needs are, and staged implementation where existing users may have a longer time frame to meet a proposed limit while new users are required to immediately meet the limit.
- **Relationships.** Good relationships are important throughout the whole process, including those between council staff and councillors, council and stakeholders, and between different groups within a council (e.g. between policy, implementation, science and planning groups).
- **Process.** There is a growing recognition that decisions must be made to enable sustainable resource use. It is better that the decisions are made in collaborative process than a court process that has less flexibility and is more costly. This will not avoid all contention but will likely reduce the extent of conflict as issues are worked through.

Some potential tools to address these challenges

Challenges are faced in many parts of the decision-making cycle. To help resolve some issues, research is being undertaken to identify and test a set of potential tools that councils can use to support and assist with their decision-making processes. These tools are currently being tested for their applicability and usefulness in freshwater management decisions, or are being developed. Some are described below.

- Identifying values: River Values Assessment System (RiVAS)

RiVAS² is a methodology that has been developed to determine the relative significance, i.e. local, regional and national significance of rivers for various uses. This is important for RMA planning and, more broadly, for understanding which water bodies are likely to have contentious processes. This methodology, developed in conjunction with councils, has been successfully tested for a small set of values in a few regions. Further refinements are being made to enhance the tools' use and ability to consistently compare values and value thresholds.

- Monitoring Māori values: Cultural Health Index (CHI)

CHI³ is a tool that Māori can use to assess and manage freshwater resources. It allows iwi/hapū to assess the cultural and biological health of a resource and communicate this information to water managers in a way that can be understood and integrated into resource management processes. Work is underway to customise the Cultural Health Index to a number of iwi/hapū across New Zealand. This largely involves adapting the CHI to iwi/hapū beliefs and aspirations in an area, and building capacity for iwi to undertake their own assessments.

- Principled decisions: Governance principles

There are no universal principles that underpin freshwater decision-making that guides regional council decision-making. Having an overarching set of principles will help improve consistency in decision-making processes and how decisions are made as well as how various parts of the decision-making cycle are put into operation. A set of principles is under development to assist with decision-making and will consider the various contexts where decisions are made (regional/national planning, resource consents and water conservation orders) and would support new institutional arrangements (e.g. co-management), decision-processes on management, and the implementation of decisions⁴.

- Policy choices: Policy Choice Framework (PCF)

The PCF⁵ is a framework to assist decision-makers to choose policy instruments and interventions to meet defined outcomes. It was designed for use where outcomes involve the behaviour change of primary producers, which is highly relevant to most freshwater decisions in New Zealand. The framework has also been applied in Victoria, Australia, for climate change intervention and is being tested for freshwater decisions in New Zealand.

- Reporting: Meaningful indicators and indices

Freshwater monitoring information is used to identify problems and to inform stakeholder values around freshwater resources as well as inform and evaluate the effectiveness of decisions. Many data already exist, but they are often disparate, at varying scales, of varying quality and the related reporting does not comprehensively address stakeholder values. As a result, monitoring data are frequently underutilised especially for national reporting on the state and trend of freshwater resources. To enable reporting against outcomes and decision effectiveness, additional monitoring indicators, ways to convert existing data into

applicable information for environmental reporting⁶ and indexes⁷ that reflect desired outcomes are being developed.

- Reporting: Performance reporting

Performance reporting is the mechanism by which the impact of decisions can be evaluated and reflected on, outcomes reported and learning communicated. It is also a means of facilitating adaptive management. Alternative performance reporting approaches⁸ are being assessed in the context of participatory evaluation approaches (as a means to ensure stakeholders whose values were initially considered remain engaged in the decision-making process) and statutory reporting processes (as a means of driving reform and adaptation).

In summary

It is recognised that freshwater decision-making in New Zealand is becoming increasingly conflicted, largely related to the economic opportunities represented by freshwater resource use in New Zealand and these resources becoming fully or over-utilised. This is evidenced by the proposed reform efforts by central government, e.g. RMA amendments, National Policy Statement for Freshwater Management⁹, the establishment of an Environmental Protection Agency, consideration of alternative governance structures in Canterbury, and initiatives such as the cross-agency New Start for Freshwater¹⁰ projects and the multi-stakeholder Land and Water Forum process.

Councils who are on the frontline for most water decisions are facing growing stakeholder dispute with existing management and proposed management changes¹¹. The myriad of approaches and stakeholder reactions makes council decisions more challenging and their outcomes more uncertain. Councils recognise the need for more effective decision-making approaches and tools to address freshwater management issues. Māori, industry and communities, who depend and benefit from freshwater decisions, are also more actively engaged in these decisions.

Given these influences, it appears that the time is ripe for concerted and focused efforts to streamline, support and explore new, alternative or modified approaches and processes for decision-making concerning New Zealand's freshwater resources. The 'Values, Monitoring and Outcomes' research programme is starting to address some of the issues by evaluating and developing tools to assist decision-makers and by facilitating discussions between councils to explore and compare processes and approaches used in freshwater decision-making.

Acknowledgements

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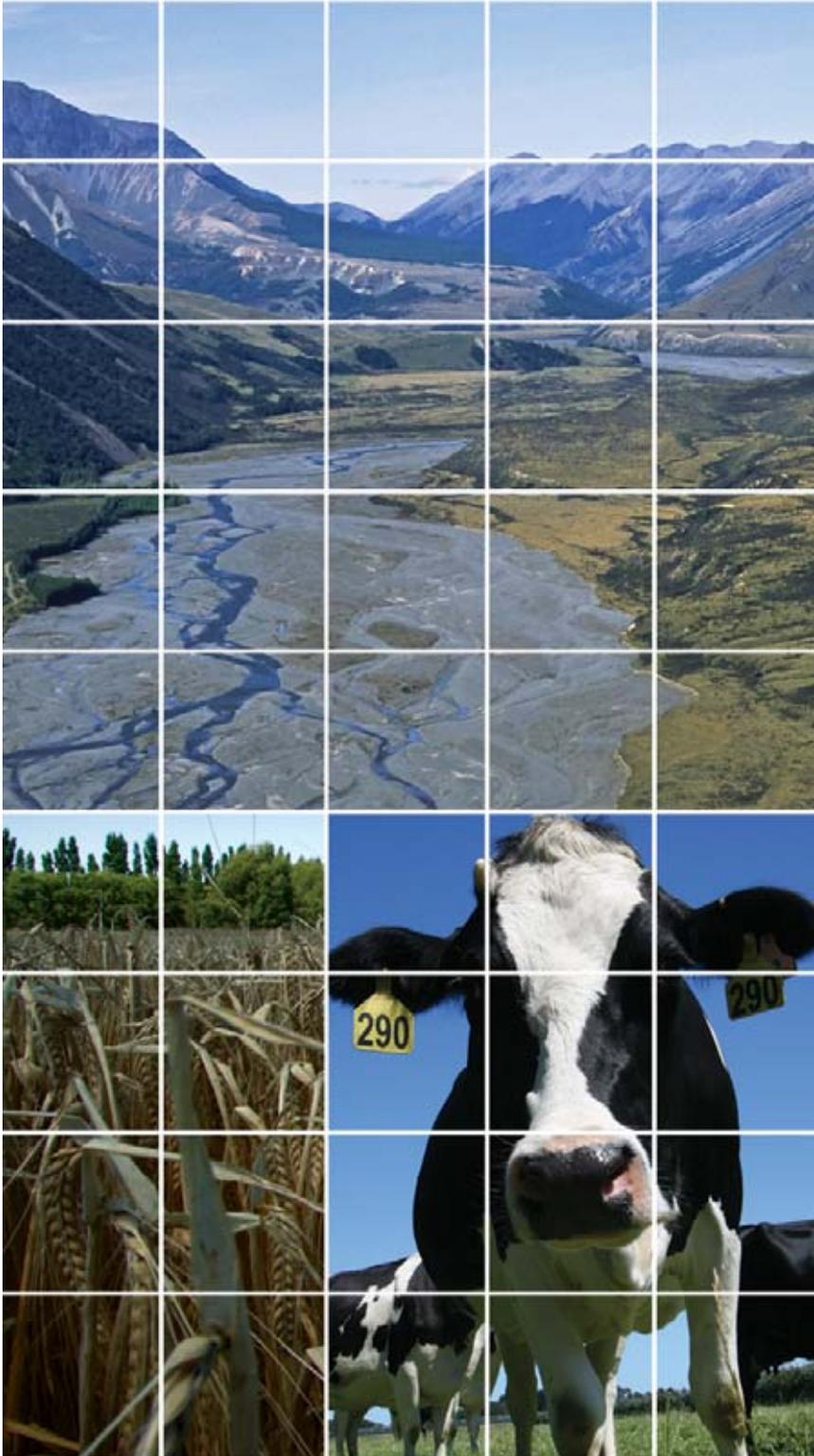
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CHAPTER 5

Water governance in Canterbury



Neil Gunningham



5. Water governance in Canterbury

Neil Gunningham

Summary*

- The RMA does not protect the environment by invoking the precautionary principle. Nor does the Act provide many mechanisms for forward planning to ensure sustainable use. The courts' narrow interpretation of cumulative 'environmental effects' has further limited the reach of the Act.
- In 2007, Canterbury was facing challenges in water management and land use. This chapter presents an examination of the state of water governance interviews with main stakeholders, workshop participation, literature review and broader analysis of data sources. The research identified Canterbury's water resource challenges, existing regulatory and governance mechanisms that engage with them, and the limitations of these mechanisms.
- Water resource governance in Canterbury is seriously inadequate and neither of the principal options through which water can be allocated under the RMA – regional plans and consents – is capable of effectively constraining water takings or of ensuring allocation to its highest-value use. Some current arrangements are not developed at appropriate levels of governance, while others do not engage a sufficiently broad range of actors or across a sufficient range of areas. Moreover, insufficient resources are provided for implementation.

*This chapter draws on material published in Gunningham N 2008. [Innovative governance and regulatory design: managing water resources](#). Landcare Research Contract Report LC0708/137.

Canterbury's wicked problem

Water 'creates and sustains Canterbury's world-famous braided rivers, high country and coastal lakes, as well as lowland streams and wetlands'¹. It is also important for the protection of biodiversity, and has particular significance in terms of tangata whenua values. Canterbury accounts for some 58% of all water allocated for consumption in New Zealand. That water is highly valued for economic reasons (70% of New Zealand's irrigated land is in the Canterbury Region), but it is also central to the social, environmental and cultural values of New Zealand. Water allocation – a significant water governance challenge – is intertwined with other issues of ensuring environmental flow (or flush) requirements, developing appropriate allocation limits for extraction, addressing cumulative effects of extraction, and establishing efficient and equitable allocation between competing uses at various interacting scales. In Canterbury, the problem involves high demand for a constrained resource, multiple 'takes' and cumulative effects, and the complex relationships between groundwater and surface water typical of the region².

Many different actors have a stake in water governance outcomes in the Canterbury Region. There is competition for water not only between different agricultural industries (dairy, arable cropping, horticulture, processed crops and viticulture) but also between agricultural and other users (e.g. municipal, industrial and plantation forestry) together with environmental groups and the broader community who are concerned with a wide range of social, environmental and cultural values associated with freshwater systems. As water demands continue to increase (for agricultural irrigation in particular), the conflict between different types of water users and between the demands of industry and environmental needs will become increasingly stark.

Water governance in New Zealand

In New Zealand, environmental governance takes place through processes and institutions operating at and between a variety of spatial scales and at different levels of authority. Underpinning environmental governance is the Resource Management Act 1991 (RMA) under which the national government has chosen to devolve decision-making to the lowest levels of government at which matters can be appropriately considered and administered.

At the national level, water resource management under the RMA involves the *Minister for the Environment* and *Minister of Conservation* who are required to prepare various nationally binding policy statements and standards. The Minister for the Environment is required to prepare national policy statements, water conservation orders and national environmental standards, and the Minister of Conservation is required to prepare a New Zealand coastal policy statement.

Regional councils have principal responsibilities under the RMA that relate to the consents process for water take and use (a form of licensing) and the development of regional plans. The lowest level, *territorial local authorities (TLAs)*, is also significant, for three reasons. First, implementation measures under management plans are located at this level. Second, the role of TLAs as land use decision-makers is important in addressing issues related to land use decisions and land management practices. Third, TLAs play a role with regard to economic development that is relevant, for example, to the development of water storage infrastructure. Regional plans now act as a central tool of water management by placing restrictions on activities involving water and effectively prohibiting most water-related activities unless they are expressly allowed by a rule in the relevant plan³.

Challenges under the current system

Although it might be anticipated that 'big picture' standards would be set at national level, in practice, the importance of national standards has been understated in the RMA. As a result, concerns are expressed that 'central government has abrogated its responsibility to provide national guidance and policy direction in a number of areas'⁴. Although under the RMA's tiered arrangement of responsibilities central government has the ability to define national policies and national standards, such policies or standards have been exceptionally rare in nearly 20 years of the RMA⁵. Only recently has there been an attempt by central government to prepare a national policy for fresh water and some very limited national standards. The resulting policy void at the national level is to some extent compensated for at the regional level, where the lion's share of the responsibility for determining and implementing water resource policy is borne by regional councils. However, the councils, for a variety of reasons, have struggled with these responsibilities.

The main forums in which such disputes tend to be played out and determinations made as to the scientific 'facts' are the hearings for plans and notified consents, and the courts. Courts are able to consider matters that come before them 'de novo', and they play a crucial role in interpreting the available science and making determinations based on that interpretation. Their influence extends not only to the limited number of cases that end up in court, but also to the future interactions between regulators and applicants for consents that will be shaped in part by past judicial decisions.

Rather than referring to the precautionary principle, the RMA focuses on environmental effects and the courts have not been willing to require a precautionary approach in interpreting the Act. The courts have similarly been unwilling to entertain a proactive interpretation of their responsibilities across a range of related issues, or to act to protect the environment in advance of more certain scientific evidence. The result has been to encourage a piecemeal, case-by-case approach rather than any broader analysis capable of taking into account projected environmental trends, or the potential adverse consequences of unintended water overallocation.

The courts have also taken a narrow view of their responsibilities to take account of cumulative effects (the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions) notwithstanding that such effects are explicitly referred to in the RMA. Rather, the courts have been inclined to focus exclusively on the necessity to demonstrate environmental effects in the particular circumstances of the case before them before declining to grant a consent. They have not showed any willingness to take account of broader *potential* cumulative effects of granting individual consents where granting the consent would have no more than minor impact in the individual case.

Water governance in Canterbury

The legislative basis of water governance in Canterbury is the RMA, under which the control and management of natural and physical resources has been concentrated in the hands of a regional council, Environment Canterbury (ECan), whose jurisdiction is based on river catchment boundaries⁶. The council's main role is to promote the sustainable management of natural and physical resources, primarily under the RMA and the Local Government Act (LGA) 2002. It is funded from rates, government grants and from the users of council services.

Under the RMA 1991, ECan has access to only two mechanisms for allocating water: regional plans and resource consents. The RMA does not allow large-scale water use or water take unless expressly allowed for by a rule in a regional plan or resource consent. Both of these hierarchical instruments are seriously flawed, as

discussed later in this chapter, and constrain regional councils from effectively engaging in water resource management. However, the council has also developed other collaborative arrangements in response to water issues around the region (see Chapters 6, 11 and 12).

Regional plans

ECan's Regional Policy Statement⁷ (required under the RMA) identifies the resource management issues facing Canterbury and sets out how resources will be managed in an integrated way to achieve the goal of 'sustainable management'. Only relatively recently has ECan decided to introduce a regional plan⁸, which will ultimately provide for managing the *effects* of any use, development or protection on natural, physical, or cultural heritage sites and values, etc. This is not to suggest a picture of inaction; the *Transitional Regional Plan* was introduced at the very early stages of regional council establishment and ECan has been developing regional plans on a catchment-by-catchment basis, with the *Opihi Regional Plan* and *Waimakariri Regional Plan* already operative. The proposed *Natural Resource Regional Plan* was notified in 2004.

The proposed regional plan (Canterbury's notified plan is in the process of hearings) is still some years away from being finalised. Until that time it operates only in regard to new plans and consent reviews.

Consents

In the absence of an operative regional plan and of appropriate provisions within it to manage water, to date heavy reliance has been placed on the only other hierarchical tool available to ECan under the RMA, the resource consent. This is a permit to carry out an activity that would otherwise contravene the RMA (or to carry out that activity subject to conditions) – essentially a form of licensing under command-and-control regulation. Requirements included in the resource consent are known as resource consent conditions. Consents provided by ECan are required for water take and water use but not land use. Prior to a proposal being consented, an effects-based assessment of acceptability is required. Especially for large-scale proposals, this process commonly involves decisions by environmental commissioners subject to court appeal under the RMA. In terms of in-river allocations, about 250 environmental flow specifications (mainly minimum flow specifications) have been incorporated into consents, are monitored on a regular basis and provide the basis for imposing surface-water-take restrictions during periods of low flow.

Challenges in the sustainable management of water resources

When it was enacted, the RMA was widely hailed as an innovative and, in some respects, world-leading piece of legislation⁹. The framework it offered for integrating and rationalising environmental management and its ecosystem-based management approach (requiring regulation to be based on managing the effects of resources according to 'the life supporting capacity' of the environment) were seen as imaginative and far sighted. Its emphasis on sustainable management of the biophysical environment, on management that integrates and coordinates the actions of multiple government agencies, and the location of most decision making at the regional level, were particularly praised.

Yet subsequent experience in Canterbury and scrutiny of the RMA suggests that this initial enthusiasm may have been misplaced and that a much more qualified assessment of its contribution is in order. For example, the Parliamentary Commissioner for the Environment (PCE) has subsequently suggested that notwithstanding

the introduction of the RMA, New Zealand has not addressed sustainable development in a coordinated and meaningful fashion and in many respects may be performing poorly in comparison with other developed countries. And a variety of planners, policymakers and academics have pointed to a substantial gap between the aspirations of the RMA and its achievements, identifying a range of specific shortcomings¹⁰.

Planning and policies

Critics from other regions suggest that Canterbury, by failing to develop a regional plan quickly enough, has chosen to address water allocation with one hand tied behind its back. This situation will not be immediately reversed even when the *Canterbury Regional Plan* is finalised and implemented, because it will not in and of itself override existing consents, many of which are of long standing, and operate (unless varied) for some 35 years – a remarkably long period given ‘the current imperfect knowledge base and consequent need for conservatism’¹¹. It can however, change the environmental restrictions under which the consent can be exercised. For example an increase in the environmental flow specification could be imposed, clawing back water for the environment, or, a seasonal adjustment could be introduced for groundwater systems in a period of reduced recharge if spring-fed streamflows were threatened.

Some other regional councils have not yet produced regional plans relating to water, but even where such plans have been produced, they have often failed to meet expectations, in part because of the inadequacy of funding provided. The lack of ecologically relevant management units has also prevented some plans (not Canterbury’s) from fulfilling their intended function under the RMA. Finally, regional plan objectives have also been criticised as too broad and not sufficiently quantified. As a consequence, many resource users are unconvinced of the need for the regulatory criteria promulgated by plans, whereas other groups are concerned that the environment is inadequately protected¹².

Effective, efficient and equitable water allocation requires strategic planning capable of promoting sustainable development. But as Freeman¹³ demonstrates:

“ Whilst the Resource Management Act 1991 prioritized sustainability in planning and resource management... [i]t did not...seek to promote sustainable ‘development’ but sustainable ‘management’, a narrower notion and one focused on natural and physical resources...The Act offers no guidance on critical sustainability issues such as economic development, social development, justice and equity...Neither does it offer guidance on key planning issues such as forward and strategic planning. In fact, such issues are clearly barred from consideration in planning decisions, where the focus is on more precise land use matters, specifically the environmental effects of development on land, air and water. ”

This focus on ‘environmental effects’ is a major obstacle to regional planning and sustainable development because it requires decisions to be made on the basis that any activity can be permitted provided adverse effects on the environment are avoided or mitigated (or at least the court is convinced they can be avoided or mitigated; for example in *Lynton Dairy Ltd v Canterbury Regional Council* the court disagreed with expert evidence on behalf of the regional council regarding effects on the aquifer). This reactive focus on effects inhibits rather than supports strategic planning.

The potential for a more proactive approach capable of anticipating environmental damage (including overallocation of water), and of addressing it before any 'environmental effects' manifest, would have been substantially increased had the RMA explicitly taken account of the precautionary principle, which in essence specifies that rather than await certainty, policymakers should act in anticipation of any adverse effect, to prevent it. This principle has been widely invoked in legislative and policy documents in a number of developed countries. For example, the 1992 Australian Intergovernmental Agreement on the Environment states that:

“Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, private and public decisions should be guided by: (1) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and (2) an assessment of the risk weighted consequences of various options.”

Consents

Experience in Canterbury suggests that the consents process under the RMA is unsatisfactory in a number of respects. First, and crucially, the RMA provides for the allocation of water on a 'first-come first-served' basis. When coupled with the fact that water is 'free', this principle has a number of unfortunate consequences. Since there are no incentives for those who 'come first' to limit their demands, there is a considerable temptation to ask for more water than is likely to be needed and to hoard it – effectively denying any access to later applicants who may be told that water in that area has been fully allocated.

Second, the current consents process leaves public policy decision-makers woefully short of information on which to make strategic decisions. Very few consents require monitoring of the instantaneous take. Indeed, because water use was generally unmetered (except in Christchurch) until 2004 (i.e. consents before that date did not require it) the regional council has little knowledge of how much consent holders are using in practice or whether their allocations under a consent are far in excess of their requirements. The consequence of these and related flaws in the consents mechanism is that it is very difficult for the regional council to estimate how much water is being consumed *in aggregate* under the approximately 18 000 resource consents that have been issued in the Canterbury Region to date.

A third concern is that the consents process does not encourage landholders to improve performance beyond compliance, or to achieve best practice. Flat fees are levied on consent applicants and (much smaller) annual fees are levied on consent-holders. Flat fees do not give users financial incentives to reduce the amount of water requested or used. Higher fees could also potentially create a pool of money that could be used to educate users to go beyond compliance or provide the resources to monitor recalcitrant users who may be exceeding their permitted allocation.

Finally, there are other smaller, but cumulatively important flaws in the consents mechanism. One serious constraint is that consents have been issued on the basis of having sufficient water in four years out of five. Consequently, in some years the full allocation is not available while in others it is not needed. Also, the current structure of consents means that trading of water is likely to increase overall water use, thereby exacerbating the extent of over-allocation¹⁴. Finally, a number of other incentive-based approaches apart

from water trading have considerable merit but these cannot be invoked under current governance arrangements. As the Chief Executive of Environment Canterbury has pointed out:

“ With water availability constraints, there is a case that can be made to provide incentives to water users to find more efficient ways of using allocated water. With access to further water dependent on storage at a higher overall cost of abstraction, there is an opportunity cost for under-utilised water that has already been allocated. Furthermore, investment by water users on infrastructure to improve water use efficiency, such as on-farm storage, is penalised through the additional general rate on the increased property capital value. Similarly, there is no rate benefit for reductions in allocations of the scarce water resource in an economy where further economic development is constrained by water availability ”

Jenkins 2007, p. 22³⁵

Legislation and the courts

The present approach of resource allocation outlined above underscores the intimate connection between the precautionary principle and consideration of cumulative effects. ECan officers point out that in the absence of the precautionary principle, it may never be possible to provide sufficient information about the relationship between, for example, a take in an upper-catchment groundwater aquifer and reduced supply in the lower catchment, at least while there are witnesses willing to assert (even on thin environmental evidence) that such a relationship does not exist. In such circumstances the RMA itself offers little guidance and since the scientific evidence is frequently inconclusive, the courts have opted for a case-by-case and reactive interpretation.

There are frequent disputes over the relevant scientific facts (e.g. will a take in one area affect groundwater or surface water in another area?) between those applying for a resource consent and the regional council. Judicial decisions in relation to contested science often have crucial implications for future water management policy. Yet the courtroom contest is far from an ideal forum in which to determine the veracity of scientific claims. Both sides call their own expert witnesses who will inevitably attempt to find scientific evidence supporting the interests of their clients. Courts are sometimes assisted by environment commissioners who have expert scientific knowledge. However, for the most part, judges and commissioners are arguably ill-equipped to determine where the balance of the scientific arguments lies. Certainly there is considerable frustration on the part of the regional council as to the difficulties in getting credible scientific evidence accepted by the courts.

A further limitation, both of regional plans and of resource consents, is that enforcement is 'variable, and often light handed'¹⁶ (particularly when compared with countries such as Australia or Canada).

Participation

In principle, the RMA has no limitation on 'standing' in planning or consent matters and any person from any part of the country has the right to submit on and be heard on any proposed plan or plan change or on any notified consent. In practice, the range of participants is effectively very restricted in many cases, with serious implications in terms of democratic accountability.

This is because (notwithstanding that the long-standing aim of planning regulation had been the public notification of development proposals that might impact adversely on the public interest); section 94 of the RMA reduces the extent of public notification of consent proposals provided certain criteria are met. In particular it does so (on the grounds of efficiency), by permitting developers to gain written approval for their consent applications from persons 'who may be adversely affected' by their proposal. This often leaves the wider community unaware of a resource proposal that may otherwise raise significant objections¹⁷. As a consequence, section 94 often effectively prevents the public from playing a key role in the consent process.

In terms of the participation of indigenous groups, local Māori 'have only very limited capacity to participate effectively in the consent process, because hapū and iwi still require greater resources to engage in council processes. Many plans concentrated on developing issues, objectives and policies about *processes* for hapū and iwi, rather than substantive resource issues. Moreover, there is little evidence of these processes [being implemented in practice], due in part to the issues of capacity¹⁸.

However, as we will see in Chapter 12, notwithstanding the restrictions imposed by section 94, substantially expanded participation is provided for through collaborative mechanisms that ECan is developing at local (i.e. catchment or sub-catchment) level.

Resourcing water management

Resourcing questions are of considerable practical significance, primarily at regional level where responsibility lies for implementation. A central question is how ECan can best finance its various responsibilities in terms of water management. Apart from an aggressive cost-recovery approach as regards the monitoring and processing of consents, ECan must also fund its scientific, hydrology, modelling and advocacy activities, which it has done out of the general rate. The consequence is that the majority of the costs are borne by the urban residents of Christchurch, few of whom are significant beneficiaries of irrigation activities. Equity suggests that the holders of water consents should pay an additional charge to enable ECan to better discharge its various responsibilities that relate directly to that group.

Another way of addressing resource and implementation challenges is by limiting the external pressures and demands on regional councils. At present one of the most substantial demands on their resources is managing existing consents and dealing with new ones, numbers of which are so large that ECan officers report being variously 'overwhelmed' and 'inundated' to such an extent that they can neither do recovery management (i.e. consent reviews) on current consents nor adequately process new ones. Whether a national policy statement along with support from the Ministry for the Environment would provide a better means of stymieing the flow of consent applications and achieve a better result remains to be seen.

Conclusions

The consequence of the limitations of the RMA itself, its interpretation by the courts and of the political constraints that delayed regional planning in Canterbury is that the regional council has only a limited number of mechanisms through which to address water allocation. Crucially, neither of the principal options through which water can be allocated under the RMA – regional plans and consents – is capable of effectively constraining water takes or of ensuring allocation to its highest-value use.

This is unfortunate given that the dairy industry is currently booming, the demand for irrigation water is increasing dramatically, and some areas are already overallocated. Whether the serious limitations of current

water resource governance in Canterbury might be overcome by the sort of 'hybrid governance' arrangements that are currently emerging is the subject of discussion in Chapter 12.

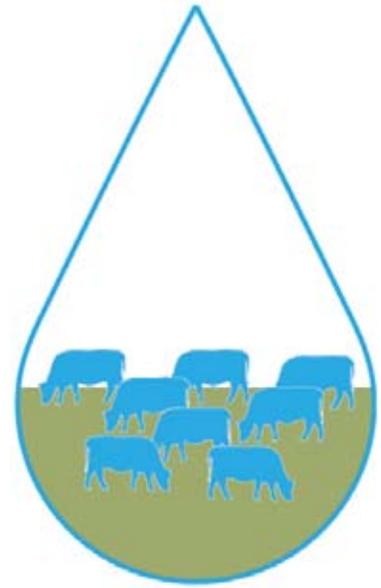
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CHAPTER 6

Sustainability limits and
governance options in
Canterbury water management



Bryan Jenkins



6. Sustainability limits and governance options in Canterbury water management

Bryan Jenkins

Summary*

- As water availability and cumulative effects of water use reached sustainability limits, traditional governance models of representative democracy and RMA processes in New Zealand have led to a high level of adversarial conflict, long-drawn-out decision processes and suboptimal outcomes. Canterbury has shifted to introduce a collaborative governance approach for water management.
- The collaborative governance approach relies on involving stakeholders and communities who are affected by decisions, in facilitated decision-making. Agreed outcomes are implemented or given statutory backing.
- This approach is based on Ostrom's model of 'self-managed communities'. It is a 'nested system' operating at a number of geographical scales. The decision-making is matched to the geographical scale of the issue being managed and to the people affected by the decision.
- The paper describes the current governance arrangements, their successes and shortcomings, and market and collaborative governance alternatives.

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New Zealand's governance of water resources

After World War II, the welfare state was the dominant model, where the government was a major provider of services. In New Zealand, the Ministry of Works was the designer and provider of water infrastructure. It built major hydro projects (such as the Waitaki scheme in South Canterbury) and irrigation schemes (such as the Balmoral scheme in North Canterbury). In Australia, government construction of the Snowy Mountains scheme is a similar example.

In the 1980s, there was a shift to the regulatory state, where the role of government was limited to that of regulator. In New Zealand, the Ministry of Works was disbanded. The Resource Management Act 1991 was introduced. The role of government was to define the environmental constraints and leave it to the private sector to propose water resource development. This is an example of 'hierarchy' as defined in the regulatory institutions literature¹. There are parallels in Australia with environmental impact assessment and pollution control legislation.

The current trend, the post-regulatory state, is to look for alternatives to state law and hierarchical control. In New Zealand, in fisheries management for example, there has been a shift to market-based approaches to manage scarce fish resources. Market instruments have been introduced in Australia for water resources. While the RMA allows for 'transfers' of consents there is only a limited amount of trading under these provisions as it is only in recent times that water has become recognised as a scarce resource in New Zealand.

Water management and governance issues in Canterbury: sustainability limits

There has been a rapid increase in the demand for water in Canterbury. This has led to water allocated from river systems reaching availability limits either in terms of reliability of supply for irrigation or environmental flow requirements for river systems. It has also led to groundwater allocation limits being reached in many groundwater zones².

Furthermore the cumulative effects of water use are evident. Water quality impairment, in particular nutrient levels in groundwater, has reached the stage where further land-use intensification is constrained. In addition, reductions in flow regimes are influencing the aquatic health of rivers, especially for lowland streams.

This meant that the water resources in Canterbury needed to be managed as a "common pool resource"³. It was no longer sufficient to manage on the basis of the effects of individual takes and uses. The rest of this chapter examines the current governance arrangements in Canterbury, before discussing market-based and collaborative alternatives.

Current governance arrangements in Canterbury

Resource Management Act

The key legislation in relation to water management in New Zealand is the Resource Management Act (RMA). The purpose of the Act is to promote sustainable management. The legislation is 'effects-based' and focuses on the environmental effects of activities rather than the activities themselves. With this emphasis on environmental effects, the pursuit of economic and social goals is left to other mechanisms.

Under the RMA, the Ministry for the Environment has responsibilities for 'national environmental standards' and 'national policy statements'. Other than the water metering regulations made in 2010, there are no standards or policies relating to water management at national level⁴.

Regional councils are required to prepare 'regional policy statements' identifying resource management issues and policies and methods to achieve integrated management of resources. Regional councils also have the authority to prepare 'natural resources regional plans', which can include water management. Regional councils have the authority to issue resource consents for the taking and use of water, and for discharges to water. Use of water either requires a rule in a plan or a specific consent.

Territorial authorities (district and city councils) are required to prepare 'district (or city) plans', which cover land use and subdivision. Territorial authorities have the authority to issue consents for land use.

Under the RMA, the Environment Court has extensive powers not only to consider appeals on resource consent decisions but also on regional policy statements and plans. The Court has the ability to review the technical merit of decisions. This has led to a highly legalistic and adversarial process for natural resources decision-making, with major projects, regional policies and plans being decided in court processes.

Strengths and weaknesses of the RMA

RMA processes have been used to effectively manage point-source discharges (e.g. the Christchurch municipal effluent discharge has been removed from the Avon–Heathcote Estuary). RMA processes have also enabled environmental flow restrictions to be placed on abstractions from rivers (there are about 250 restrictions in place in Canterbury). RMA processes have enabled the management of project-specific effects (e.g. well pumping interference effects). Authority under the RMA has also enabled enforcement of compliance with consent conditions (e.g. annual audits of dairy effluent compliance in Canterbury).

However, there are also some significant limitations of the RMA. These include:

1. Management of diffuse sources of pollution
2. Allocation is on the basis of first-come first-served
3. Management to sustainability limits and of cumulative effects
4. Absence of a precautionary approach
5. Reactive role for the regulator
6. Effects-based rather than outcome-based.

Two examples of recent decisions illustrate some of difficulties now being faced in water management in Canterbury. One is the decision for a groundwater take application by Lynton Dairy in what was considered by the regional council as a fully allocated groundwater zone. The second is the proposal for a major irrigation scheme on the Canterbury Plains – Central Plains Water.

Lynton Dairy

Lynton Dairy made an application for consent to extract groundwater from the Rakaia Selwyn Groundwater Zone in 2004. This zone was declared to be fully allocated in the notified *Proposed Natural Resources Regional Plan*. The recommendation by regional council staff was to decline the consent because of groundwater interference effects on an existing well and cumulative effects on lowland streams fed by the aquifer. This recommendation was accepted by commissioners hearing the consent application and submissions on the application. Lynton Dairy appealed the commissioners' decision to the Environment Court, having reached an agreement with the existing consent holder.

In 2005, the Court upheld the appeal by Lynton Dairy and granted them 70% of the volume requested. The Court accepted the estimate of the total volume of groundwater resource available for abstraction from the aquifer system. However, the Court considered that the regional council's requirement that all abstractors should be able to obtain their water requirements except in very dry years (one in five-year drought) was too conservative. The Court determined that an average-year requirement was sufficient (hence the reduction in volume granted).

The Court accepted that a major contributor to reducing lowland stream flows is increased abstractions. However, the Court concluded that there was no 'probative evidence' to indicate that this specific abstraction from the upper reach of the groundwater basin would affect lowland stream flows. The Court considered that individual consents are small in the context of the resource: Lynton Dairy was less than 2% of the allocation of the groundwater resource; and, there is measurement uncertainty with flow measurement accuracy at best $\pm 5\%$, thus with natural variation and system complexity, the attribution of cause and effect for an individual take is not discernible by measurement. In the absence of a precautionary principle in the RMA, dealing with cumulative effects is problematic.

Central Plains Water

Central Plains Water is a large-scale proposal for water diversion, damming, reticulation and irrigation of 60,000 ha of the Central Plains of Canterbury. Initial feasibility studies were contemplated in 1991. A resource consent application for taking up to 40 cumecs of water from the Rakaia and Waimakariri rivers was applied for from the regional council in 2001⁵. Further consent applications were lodged with the regional council in 2005 for land and water use, and in 2006 for land use from the district council.

The project is highly controversial with the major concerns relating to the effects of abstraction from braided rivers, the effects of storage and distribution canals on mudfish habitat and existing properties, and the effects of land use intensification on groundwater quality for drinking water.

The hearings of the consent applications began in February 2008 and concluded in March 2010. The commissioners and submitters sat for 71 days at a cost of more than \$2 million. Around 2000 people or organisations submitted on the consent applications. The commissioners had indicated during the hearings that consents to dam the Waianiwaniva Valley were unlikely to be granted and the applicant opted to

continue the hearing process with an amended run-of-river scheme. This has an effect on the viability of the scheme as the available water is highly unreliable and requires storage to be cost-effective.

The applicant has also been engaged in lengthy litigation with two other applicants for water on who has first access to limited water. The RMA is based on 'first-come first-served' but is not clear at what point in the process this applies to. The issue has been through a series of courts that have given different interpretations and is currently before the Supreme Court⁶.

Shareholders and other supporters had contributed \$10 million so far. Now the company is seeking approximately \$3 million over the next 2 to 3 years to resolve appeals to the resource consent and to prepare for the next phase in the scheme.

The lengthy, expensive, litigious and adversarial process following the RMA procedures has led to a suboptimal outcome in relation to water resource management. Either the environmental acceptability or the economic viability is compromised. A different approach is needed to deal with the allocation, assessment and management of water resources at or near their sustainable limits and where there are cumulative effects.

Local government

In relation to governance matters for water management, the other key piece of legislation is the Local Government Act. The amendments in 2002 provided for local authorities such as regional councils to play a broad role in promoting the social, economic, environmental and cultural well-being of their communities, taking a sustainable development approach. The emphasis is on contributing to community outcomes (determined by the community) and for government working in partnership with communities and industry. It provides for general powers for local authorities, subject to preparation of a 10-year plan that requires community involvement. It represents a shift from representative democracy towards participative democracy. For regional councils it provided the opportunity to add the role of facilitating sustainable development to its RMA role of regulator for environmental protection.

Reliance on representative democracy has been problematic with respect to water management in Canterbury. The regional council was evenly balanced between pro-economic and pro-environment perspectives. This even balance of views around the council table was a fair reflection of the community interests in the Canterbury Region. However it was difficult to get resolution of issues as there was a polarisation of debate often marred by poor interpersonal behaviour.

There was also political conflict between different levels of government. One conflict related to the performance of regional council regulatory functions over territorial authorities; there was a high level of non-compliance by territorial authorities and resentment of regional council enforcement actions. A second conflict was with central government over the delivery of policies and plans – the regional council seeking greater leadership on national approaches and central government being concerned over slow progress with RMA plans at the regional level⁷.

Consideration of markets

Under the Council of Australian Governments (COAG) agreement on water in 1994, Australia has adopted a market-based approach to water management. This includes water pricing and trading as part of a national agenda for microeconomic reform to increase the productivity and efficiency of Australia's water use⁸. This reform agenda was refreshed in the National Water Initiative by COAG in 2004⁹.

Consideration was given to the potential for market-based approaches to deal with water scarcity in Canterbury. However the Canterbury situation has particular characteristics that limit the suitability of market-based approaches for addressing the water management issues facing the region. These limitations fall into three categories: price sensitivity, environmental issues, and economic efficiency.

For markets to be effective then users need to be sensitive to price. For water there is a high cost of infrastructure investment. Debt servicing is a major cost component for new infrastructure. For Opuha Dam (the most recent major water storage built in Canterbury), shareholders hold shares for a water entitlement and are required to pay 80% of the annual charge whether or not they use their entitlement. This is to cover the cost of debt servicing. This sunk cost reduces market price sensitivity. Furthermore if there is to be investment in new infrastructure then investors want some certainty on access to long-term water supply to be assured of a return on their investment. Markets create uncertainty in long-term accessibility to the resource.

There is a second price sensitivity issue in relation to infrastructure design flows. Water conveyance systems are designed for specific flows. Channel and pump efficiencies vary with flow. Increasing flow is constrained by design capacity while operating below design flow is inefficient (e.g. the Rangitata Diversion Race when operating at half design flow can only deliver a quarter of the water to farms compared with the design flow). Thus there is limited capacity to respond to price changes in a cost-effective manner.

With respect to environmental issues there are a number of matters that reduce the suitability of markets to manage water allocations in Canterbury. One is that at sustainability limits, pursuing self interest (which underpins market approaches) leads to resource degradation: this is the 'Tragedy of the Commons' problem. In addition, there are environmental externalities relating to the *use* of water not just the sustainability of supply limits associated with the *taking* of water. One matter is the impact on water quality of land use intensification from irrigation. This constraint would need to be incorporated in any market regime for water supply. A second matter is the effect of water use on recharge to groundwater and the maintenance of spring-fed lowland streams: if surface water is used for irrigation then recharge to groundwater is increased, whereas if groundwater is used then net recharge is decreased. Another consideration is the differential effects of water extraction if the water take is relocated. For groundwater takes consideration needs to be given to the interference effects on neighbouring bores. For surface water takes, consideration needs to be given to the reach of the river from which the water is taken and the flow requirements of that reach.

In relation to economic-efficiency considerations, ability to pay does not always equate to resource productivity. In Canterbury, many of the old inefficient irrigation schemes only need to pay the marginal operating cost for accessing and conveying water. These schemes were sold by government to farmers, well below their capital value, when the Ministry of Works was disbanded. Whereas, any new scheme or where farmers have invested in improved efficiency needs to cover the cost of capital as well as the operating cost. Furthermore, the water strategy investigations indicate that greater resource productivity from a regional economic perspective can be achieved from integrated catchment management and inter-basin transfer rather than bilateral trades between farmers.

Governance models for common pool resources

In her work on governing the Commons, Ostrom (1990)¹⁰ has identified three institutional models for collective action in relation to resource management:

- Leviathan model: this is where there is direct government provision of services with integration of policymaking and operational functions
- Privatisation model: this is where there is private-sector provision of services with the government role as regulator
- Self-Governing Community model: this is where there is community determination of resource management requirements

Ostrom's Model of Self-Managed Communities

Ostrom has investigated governance models for situations where there are multiple users of a renewable resource that is subject to scarcity and where use by one user can affect the use by others. As an alternative to 'government direction' or 'privatisation' governance options, Ostrom develops a model of a cooperative strategy worked out with users that is based on an agreed sharing of resource capacity. To be effective there needs to be transparent, mutual monitoring of the resource and its use; institutional arrangements that reflect the collaborative strategy; a commitment to the rules (this could be statutory backing); and, agreed approaches to enforcement of infringements and resolution of conflicts. This requires communication, power sharing and trust between the collective users. For larger systems, the allocation, monitoring, enforcement, conflict resolution and governance activities may need to be organised in multiple levels as part of a 'nested system'.

A paradigm shift across multiple levels

With water scarcity becoming a major issue in Canterbury, there is recognition of the need for a paradigm shift in water management in the region. Canterbury has chosen a strategy-driven collaborative governance approach to regional water resource management¹¹, based on Ostrom's model of self-governing communities. More recently, Central government is exploring collaborative governance approaches at the national level also through the Land and Water Forum¹².

Sustainability frameworks recognise the need to consider resource management at multiple levels and multiple time frames that reflect the characteristics of the system being managed¹³. For the water management issues facing Canterbury, there are five levels that appear to be the most important:

1. The national level, where the main issues are national standards and policies, Treaty of Waitangi matters and national interests such as hydro-generation of electricity
2. The regional level, where the key issues are water availability and land use intensification
3. The catchment level, at which the sustainable limits of water use and its effects, cumulative effects of water use, and the reliability of supply are the main issues
4. The sub-catchment level, where environmental flow requirements in river reaches and the management of streams and their riparian margins are the most significant issues; and
5. The property level, where the irrigation and land use practices that influence water quantity and quality are determined.

Conclusions

In Canterbury, the RMA regulatory approach is not suited to the management of water where sustainability limits of availability and cumulative effects of use are evident. In addition, representative democracy and multiple political levels led to conflict at the governance level.

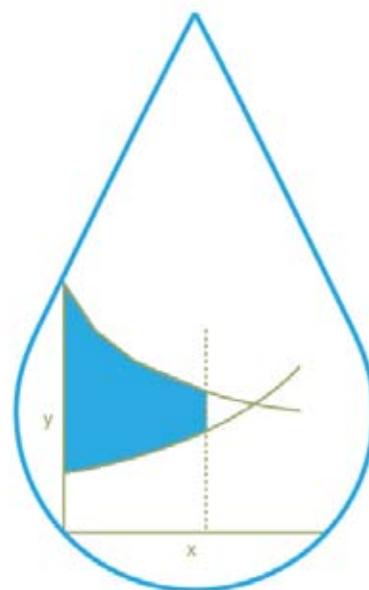
A different collaborative governance approach that is stakeholder and community led has been introduced at the regional scale after its successful application at the sub-catchment and catchment scale. It has led to the development of a Canterbury Water Management Strategy as a framework for water management in the region. There has been the need for a nested approach to deal with issues at different geographical scales.

The development of the collaborative governance in Canterbury is described in Chapter 11.

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- 1 For example, Gunningham N (2008), Innovative Governance and Regulatory Design: Managing Water Resources. Landcare Research Contract Report LCo708/137.
 - 2 Jenkins BR 2007. Water allocation in Canterbury. New Zealand Planning Institute Conference, 27-30 March 2007, Palmerston North.
 - 3 A 'common pool resource' refers to a natural or man-made resource system that is sufficiently large as to make it costly (but not impossible) to exclude potential beneficiaries from obtaining benefits from its use (Ostrom, 1990 p30).
 - 4 The National Policy Statement for Freshwater Management was gazetted on 12 May 2011 and will take effect from 1 July 2011. Further details can be found here <http://www.mfe.govt.nz/rma/central/nps/freshwater-management.html>
 - 5 The amount that can be taken can be limited by the flow in the river. For more detail on the CPW, see <http://ECan.govt.nz/get-involved/consent-projects/central-plains-water/pages/default.aspx>
 - 6 Ngai Tahu Property Ltd v Central Plains Water Trust SC 15/2008.
 - 7 The Canterbury situation led to a Ministerial Review of Environment Canterbury and the replacement of the elected Council by appointed Commissioners.
 - 8 Council of Australian Governments 1994. Water Reform Framework. Canberra.
 - 9 Council of Australian Governments 2004. Intergovernmental Agreement on a National Water Initiative. Canberra.
 - 10 Ostrom E 1990. Governing the Commons: The evolution of institutions for collective action. New York, Cambridge University Press.
 - 11 Canterbury Water 2009. Canterbury Water Management Strategy: strategic framework. Prepared by Environment Canterbury for Canterbury Mayoral Forum.
 - 12 Land and Water Forum 2010. Report of the Land and Water Forum: A fresh start for fresh water. Wellington.
 - 13 Gunderson LH, Holling CS 2002. Panarchy: Understanding transformations in human and natural systems. Washington, DC, Island Press.

CHAPTER 7

Quantitative economic
analysis



James Lennox

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7. Quantitative economic analysis

James Lennox and Adam Daigneault

Summary*

- Agricultural irrigation has large economic benefits in New Zealand. This chapter focuses on economic modelling of irrigation, but there are many other important market and non-market values associated with water resources also and with aquatic and riparian ecosystems. At least some of these could also be modelled quantitatively.
- The economic models and accounting methods traditionally used in New Zealand to assess impacts of regional water policies or infrastructural developments are inadequate. In particular, they do not account for interactions between different types of farming enterprises that are mediated by land or other markets.
- Partial equilibrium models can be practically developed at catchment scale in New Zealand. These models approximate the profit-maximising choices of producers in responses to policy or other changes to the market. They can deliver significant value for policymakers addressing water allocation or other environmental issues.
- Economic and biophysical data limitations are a serious impediment to robust economic analysis at the regional and catchment scale in New Zealand. However, the value of these data and therefore the motivation to invest in collecting them may be increased by the wider use of partial equilibrium and other sophisticated economic models of New Zealand's regions and catchments.

* This chapter is based on two papers: (i) Lennox JA, Diukanova OD 2011. Modelling regional general equilibrium effects and irrigation in Canterbury. *Water Policy* 13: 250–264; (ii) Daigneault A, Greenhalgh S, Samarasinghe O, Sinclair R 2011. Estimating co-benefits of agricultural climate policy in New Zealand: A catchment-level analysis. Prepared for 2011 AAFA Conference, Pittsburgh, USA. Accessed online at: <http://purl.umn.edu/103855>.

Quantitative economic analysis of water policies and developments in New Zealand's regions and catchments

The economic costs and benefits associated with irrigated agriculture in New Zealand, and particularly in Canterbury, are significant. At the national scale, irrigation was estimated to account for 11% of farm-gate value added in 2002/03¹. Several ex post evaluations of specific irrigation schemes in Canterbury have found considerable on-farm and wider socio-economic benefits². Thus, using water for irrigation can increase the productivity of land and generate higher economic returns, as well as flow-on social benefits. In New Zealand, higher returns to land due to irrigation are primarily capitalised into land values³. A recent econometric study of the Mackenzie Basin, in inland South Canterbury, found that rights to irrigation water could generate a land sale price premium, relative to similar unirrigated properties⁴. Premiums ranged up to 50%, although values for many properties in the region were found to be much lower than this.

Although this chapter focuses on the use of water for irrigation, it is important to note that many other market and non-market values are associated with water resources and with aquatic and riparian ecosystems. These values may be positively or negatively affected by water storage or irrigation. For example, a new dam may reduce the value of an area to trampers, but increase it for jet-skiers. Changes to downstream flows may positively or negatively affect users such as anglers, kayakers, jet-boaters and swimmers. The restoration of flushing flows may improve habitat for native species, the very existence of which is valued. Any comprehensive assessment of policies or developments should consider all such values; if not quantitatively, then qualitatively.

Economic models allow us to quantify the benefits and costs of different water policies and developments within a catchment or an entire region. Such analyses can support the development of local and regional policies, for example comparing the cost-effectiveness of alternative policy instruments to meet a given environmental objective. The indirect (or 'flow-on') benefits of irrigation developments are often cited to gain wider community support. To date though, economic modelling of the direct and indirect costs and benefits of regional policies and developments has arguably been very limited. This is generally the case for most regional analyses, not just those that impact water resources. Policymakers, developers and stakeholders have relied heavily on farm budgeting models to assess the direct impacts of proposals on producers, and on input-output multipliers to estimate indirect effects in other sectors. Estimates of land-use change have generally taken the form of ad hoc scenarios based on expert judgement.

In many other countries, general and partial equilibrium models have been widely used to assess the costs and benefits of environmental and other policies and developments⁵. These models can be used to analyse the direct and indirect effects of policies. Unlike the farm budgeting models or input-output multiplier techniques, these models take into account the demand and supply responses of producers and households to changes in relative prices of goods, land, labour and capital. They can be used, *inter alia*, to estimate changes in land use in response to a policy or other change. The 'partial' nature of partial equilibrium models relates to their narrower scope, covering just one or a few sectors of any economy. General equilibrium models represent all sectors of an economy, but often in lesser detail. Fundamental microeconomic assumptions of both general and partial equilibrium models are that the objective of producers is to maximise their profits, while that of households is to maximise their utility. Economists acknowledge that actual behaviour is much more complex and less predictable than this. Nevertheless, such models can give valuable insights into real-world responses, particularly in cases where the interaction of several factors may lead to unintuitive outcomes.

Economic models developed for Canterbury

To determine how practical and useful catchment- or regional-scale partial and general equilibrium models might be in a New Zealand context, we developed a regional general equilibrium model for the Canterbury Region and a partial equilibrium model for the Hurunui and Waiau catchments in North Canterbury. We illustrate the application of these models to different scenarios relating to water supply, and in the case of the catchment model, also water quality.

Regional general equilibrium model

We developed a computable general equilibrium (CGE) model for the Canterbury Region to determine whether these sorts of models could be practically used at the regional scale in New Zealand (see Figure 7.1). The model describes interactions between all sectors of the Canterbury regional economy and with the rest of New Zealand and the World. While this model is very simple, it is sufficient to capture some of the 'stylised economic facts' about the use of land and water resources in the region. It can be used to assess the direct and indirect economic effects of policies or other changes affecting water supply or use in primary production at an aggregate regional level.

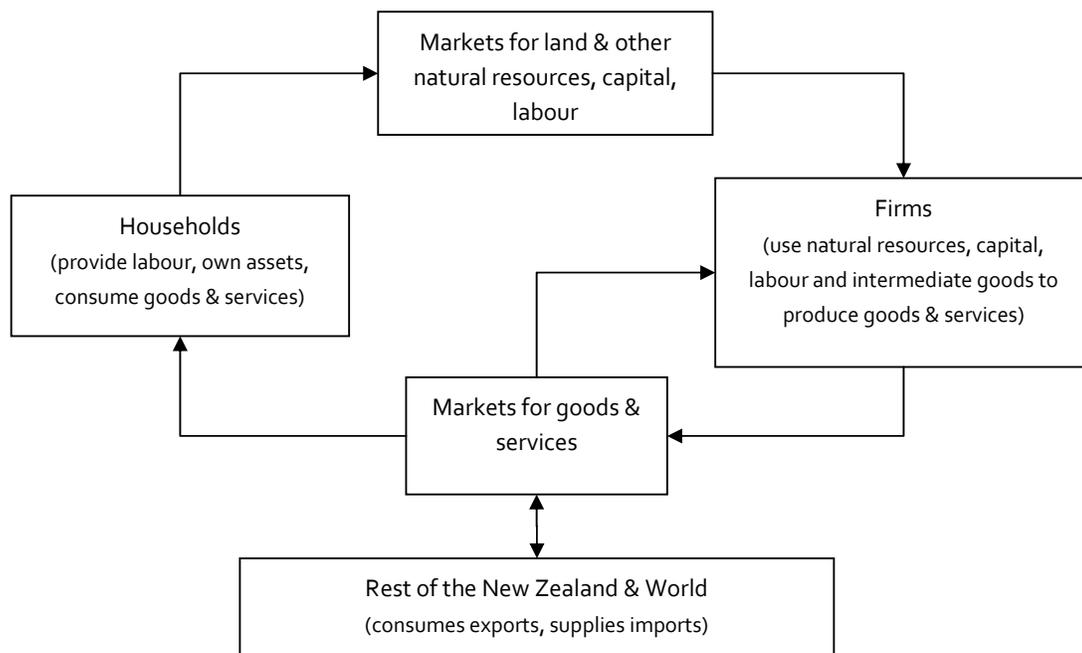


Figure 7.1: Simplified schematic of regional economic flows in the Computable General Equilibrium model.

Ten types of production are modelled: horticulture and viticulture; sheep and beef farming; dairy farming; other agriculture (which includes other livestock farming and agricultural services); forestry; meat processing; dairy processing; other processing and manufacturing; transport and distribution services; and other services.

All of these activities use capital and labour, generating income for households. The use of land and water in several sub-regions by agricultural and forestry activities is also modelled. Consumers are modelled as a single 'representative household', which derives income from the provision of capital, labour, land and potentially also water rents, and expends income purchasing goods and services for consumption.

Partial equilibrium model

The partial equilibrium 'New Zealand Forest and Agriculture Regional Model' (NZ-FARM) is a comparative-static, regional, non-linear programming model of regional New Zealand land use. Its structure is similar to that of the US Department of Agriculture's Regional Environment and Agricultural Planning (REAP) model⁶. The model maximizes rural farm income across a catchment, accounting for the environmental impacts of land use and land-use changes. It can be used to assess how changes in technology (e.g. greenhouse gas (GHG) mitigation options), commodity supply or demand, resource constraints (e.g. water available for irrigation), or how proposed farm, resource, or environmental policy could affect a host of economic or environmental performance indicators that are important to decisions-makers, land managers and communities. The environmental impacts currently considered in NZ-FARM include GHG emissions (and sequestration), water use, and nutrient losses. Future updates will include additional GHG mitigation options and a wider array of ecosystem services.

Modelling the impact of irrigation in Canterbury: an illustration

Water is an increasingly scarce resource on the Canterbury Plains. Demand for irrigation water is expected to continue increasing, while climate change is expected to increase variability of supply, and scarcity in some areas⁷. In this context, there is considerable interest in assessing the regional economic impacts of increasing or decreasing water availability for irrigation. We assess such a generic scenario using the regional CGE model. We look at the impact of a reduction in water availability on the output of not only the farm sectors, but also of other sectors of the regional economy. We also assess the overall economic impacts on the region, as measured by the gross regional product and returns to capital and labour.

New medium- to large-scale water storage is seen by many as essential to providing for growth of irrigation demand and mitigating the impacts of climate change. The Hurunui Water Project (HWP) proposed one such development for North Canterbury that would allow additional irrigation of nearly 20,000 ha. We apply the NZ-FARM model to assess the impacts of a scenario for water storage. This scenario is of our own creation, but was loosely based on one of HWP's proposals in 2010⁸. We demonstrate the ability of NZ-FARM to model changes in nutrient loadings with a second scenario in which catchment-wide nitrogen (N) and phosphorus (P) loadings are capped at their levels prior to any additional irrigation. Using this model, we can estimate changes in land use between different types of farm and forest enterprises in different areas of the catchment (plains, foothills and hills). We can also estimate changes in catchment-wide value added, nutrient loadings and greenhouse gas emissions.

Regional computable general equilibrium model

To illustrate the use of the CGE model, we applied it to several hypothetical scenarios⁹. One of these involved a 20% reduction in the total water available for irrigation in North and South Canterbury (for a 20% *increase*, the model would show changes with similar magnitudes in the opposite direction). Results from CGE models typically have significant uncertainties, and should generally be interpreted 'semi-quantitatively': the use of the model is concerned with whether changes are positive or negative; whether they are relatively small or large; and whether one sector or factor of production gains while another loses.

Conclusions drawn from CGE modelling should also be supported by extensive sensitivity analysis. To illustrate how model results may depend on the choice of model parameters and how they are more sensitive to changes in some parameters than to others, we present results of our illustrative scenarios with the default as well as with two other sets of parameters (variants A and B). In variant A, we allow for a greater ease of substitution between water and other inputs in agriculture (e.g. investing in capital equipment to use a given amount of water more efficiently). In variant B, we allow greater flexibility in changes between alternative land uses (e.g. if landowners are more readily inclined to change land uses in response to differences in returns).

Table 7.1 shows percentage changes in the gross output of each of the 10 sectors (*italics*). It should be noted that these sectors are of very different sizes, with *services* being by far the largest. We find that the negative impacts on agricultural output of reducing water availability are modest, and are significantly greater for the *dairy* sector than for *sheep and beef farming* or *horticulture*, which use less irrigation water relative to the value they generate. These changes result in some shift from agriculture to *forestry*, which does not use irrigation water directly but can impact the available water resources (not modelled). The two downstream agricultural processing sectors are also negatively affected. However, economic output in the other sectors (which are larger) increases slightly.

Table 7.1: Percentage changes in sector outputs

Sector	Scenario variant		
	1	1A	1B
Horticulture/viticulture	-0.60	-0.23	-0.57
Sheep and beef farming	-0.86	-0.36	-0.58
Dairy	-1.63	-1.02	-1.82
Other agriculture	-0.24	0.01	-0.17
Forestry and logging	0.54	0.23	0.44
Meat and wool processing	-0.84	-0.35	-0.59
Dairy processing	-1.24	-0.76	-1.36
Manufacturing	0.08	0.04	0.07
Transport and distribution	0.04	0.02	0.03
Services	0.03	0.02	0.03

Table 7.2 shows percentage changes in key economic aggregates (column 1). We can now see that the overall impact on regional output as measured by gross regional product is negligible. Slight declines in the prices of capital and labour benefit the non-agriculturally-based sectors, explaining their slight increase in production (7.1). The other two columns in Table 7.2 show the sensitivity of the results to plausible upper bounds on the water input substitution (1A) and land transformation (1B) parameter values. These results are most sensitive to the ease of substitution between water and other inputs. The impacts are reduced if such substitutions are easier and, conversely, would be increased if substitution were more difficult. The impacts on shocks of this

type will also be somewhat mitigated if there is greater flexibility between land uses; in this case, to shift out of dairy, which is impacted most strongly by a reduction in irrigation water availability.

Table 7.2: Changes in key indicators with respect to benchmark values (%)

	Scenario variant		
	1	1A	1B
Gross regional product	-0.005	-0.003	-0.004
Labour price	-0.052	-0.023	-0.042
Capital price	-0.061	-0.029	-0.051
Agricultural sector value added	-0.586	-0.266	-0.487
Agricultural labour (quantity)	-0.870	-0.301	-0.722

Thus, the overall picture is one in which the negative economic impacts are small, but concentrated in the agricultural and downstream processing sectors. We can reasonably assume that impacts concentrated in these sectors would particularly affect farm households, farming towns and rural areas of the Canterbury Region in general.

Catchment partial equilibrium model

To illustrate the use of the NZ-FARM model, we applied it to assess the impacts of increased irrigation in the Hurunui catchment, with and without restrictions on catchment nutrient loadings¹⁰. We stress that at the time of writing, the model required further validation. One key priority for validation would be to ensure the model approximates observed farmer responses (in this or similar catchments) to changes in commodity prices and input (e.g. fertiliser) prices. Another is to ensure that the model approximates observed rates of change in enterprise type with the award of additional irrigation consents¹¹. The results presented here are not sufficiently reliable for use in commercial or policy decisions.

The current (baseline) level of irrigated area in the Hurunui is about 22,100 of the nearly 260,000 ha of the catchment. Almost all of this (99.7%) is centralised in the plains region, where a majority of the area's agricultural output is produced, including 98% of the catchment's dairy production. Primary enterprises in the catchment are sheep and beef, dairy, solely sheep, and pine plantations (Figure 7.2). Baseline net revenues for the catchment are estimated at \$225 million, while total N and P leached are approximately 2000t and 17t respectively (Table 7.3).

The irrigation scenario is loosely modelled on developments that have been proposed by the Hurunui Water Project¹² (HWP) to meet increased demand for irrigation in North Canterbury. The HWP proposals to improve the water supply situation include building a dam on the South Branch of the Hurunui River (costing upwards of \$42 million) and/or to construct a control weir (costing about \$3 million) at the outlet of Lake Sumner in the western part of the catchment (See Figure 7.2). A recent study found that this combined storage could allow irrigation of about 42,000 hectares¹³.

Given that there are ongoing discussions about water quality in the region, we also ran an alternative policy scenario (N+P Cap scenario) that allows irrigation in the catchment to increase but restricts N and P loading limits to baseline levels. We allowed N and P leaching to be constrained at the regional (instead of farm) level,

providing economic flexibility to landowners as they are allowed to trade their allocated permits with other farmers in the region.

Table 7.3: Key outputs for Hurunui catchment scenarios

Scenario:	Baseline	Irrigation	% Change	N+P Cap	% Change
Net revenue (mil \$)	225	244	8	239	6
Irrigated land (ha)	22,100	42,100	90	38,000	72
N leaching (t)	1960	2280	16	1960	0
P leaching (t)	17.2	18.2	5	17.2	0
GHG emissions (t)	887	1097	24	840	-5

Increased water supply primarily affects the more fertile plains region, which contains most of the irrigable land. The increased irrigation has the greatest effects on the dairy, sheep, sheep and beef, and grain producing enterprises. The mix of enterprises is expected to change as well (Figure 7.3). Land use in the plains is estimated to shift from pasture and horticulture to forest and cropland, while land use for the foothills and hills zones stays almost unchanged. Total catchment income is expected to increase by about \$19 million (8%) as a result of changes in land-use intensity from added irrigation, but N and P leaching could also increase by 16% and 5%, respectively. Thus, while adding irrigation could provide strong economic gains to the region, it could also have strong impacts on the catchment’s water quality. However, while loadings would be higher, we have not modelled the impacts on water quality per se. These would depend also on changes to stream flows due to operation of the storage and irrigation schemes.

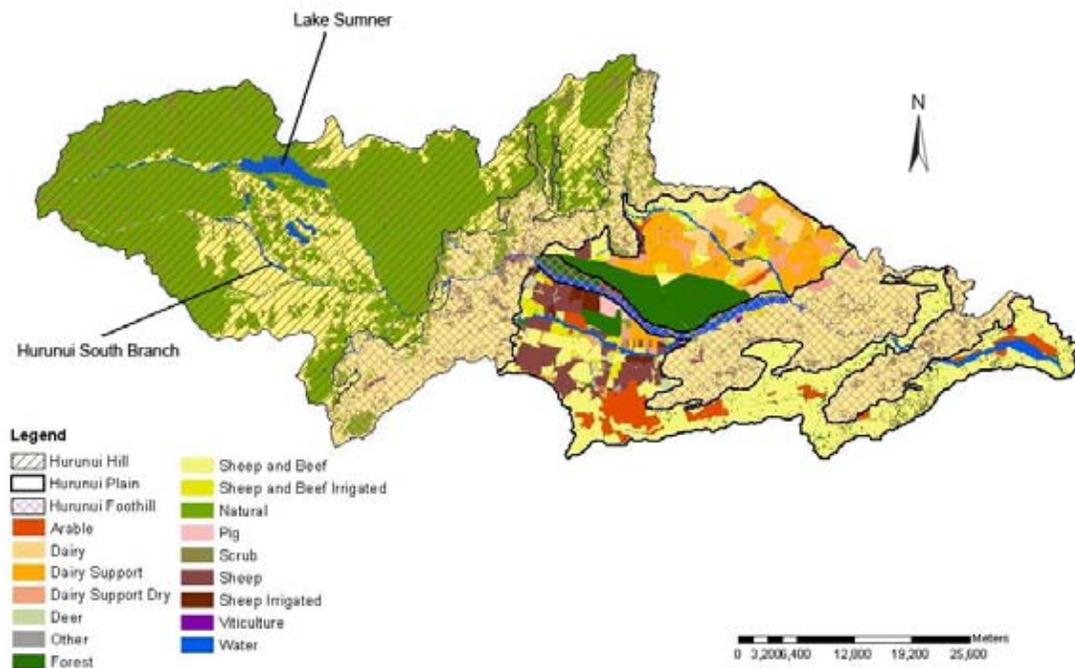


Figure 7.2: Sub-zones and enterprise area uses in Hurunui catchment¹⁴.

Estimates indicate that 38,000 of the 42,000 ha of available irrigated land are expected to be economically viable for landowners in the plains to use if they also face catchment-wide limits on nutrient loading. The areas devoted to irrigated dairy and sheep and beef enterprises are all expected to grow, but not by as much as the unconstrained scenario because of their relative high per hectare leaching rates. As a result, we expect to see increases in pine plantations and irrigated arable crops compared with the scenario without a nutrient cap. Net revenue for the catchment would increase by 6% over baseline levels. Catchment-level GHG emissions could actually be reduced by 5%. Thus, a side-effect of a nutrient cap could be to reduce the costs of meeting a (national) GHG emissions reduction target. Overall, our results suggest that while there is potentially a strong trade-off between water quantity and water quality in the Hurunui catchment, appropriate policies could significantly reduce some of the environmental impacts from an expected increase in land-use intensity, without great economic costs.

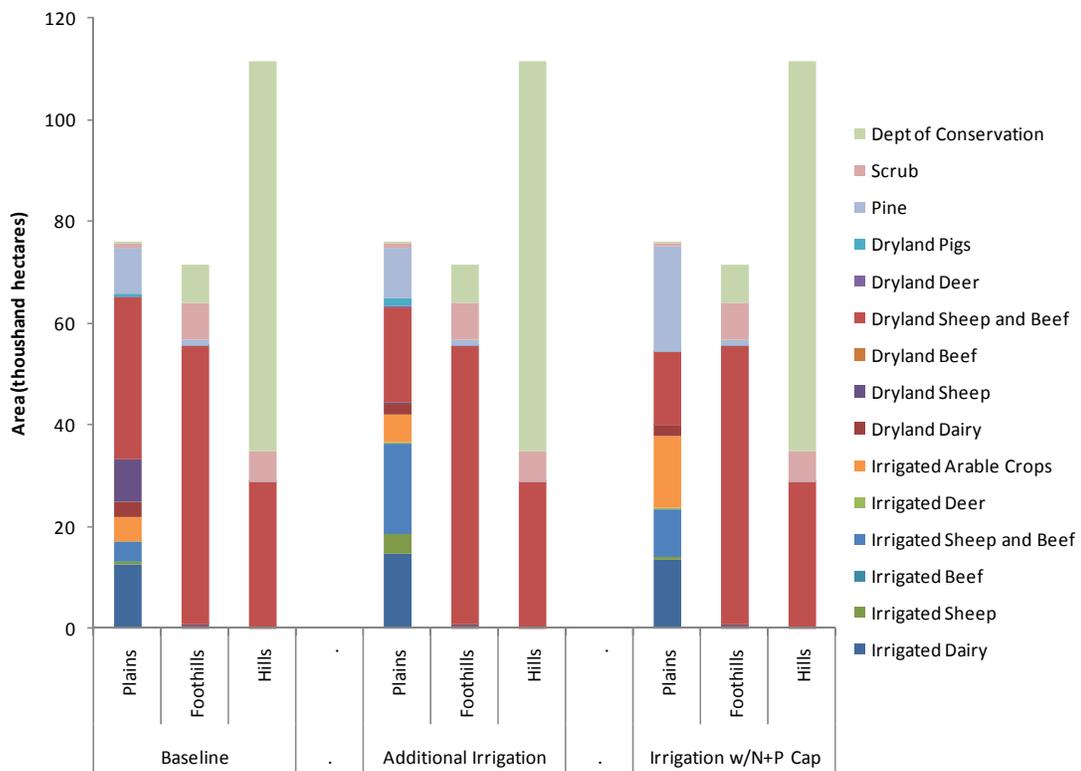


Figure 7.3: Hurunui Catchment Enterprise Area, Baseline and Irrigation scenarios.

Concluding comments

Regional general equilibrium or partial equilibrium catchment models can both be applied to analyse policies relating to or affecting water quantity or quality. However, while partial equilibrium models and to a lesser extent CGE models are widely used for this purpose in many other countries, we are unaware of any previous applications at the regional or catchment scale in New Zealand.

Using general equilibrium models, we can assess the direct and indirect impacts of any change on the regional economy, considering interactions between all sectors of the regional economy mediated by markets for goods and services, labour, capital and land. However, the illustrative analysis presented here suggests that even relatively large changes in water supply have only relatively small indirect effects within the regional economy. Most of the impacts are concentrated in the rural economy and immediate downstream sectors. These sectors are an important but still relatively small part of the total regional economy of Canterbury. While the CGE model developed offers some interesting economic insights such as the importance of the labour supply response, these insights could also be obtained using much smaller, stylised general equilibrium models, or by more qualitative economic reasoning.

Partial equilibrium models have a narrower scope, but allow much more detailed representations of the sectors of interest and are practically applicable at smaller spatial scales. Our illustrative scenarios using NZ-FARM showed the economic and land-use-change impacts of additional irrigation in the Hurunui catchment. With a concomitant limiting of catchment nutrient loadings, land-use changes differed, with only a modest reduction in the economic benefits. Although further work is required to validate the underlying data and parameters for the NZ-FARM model to ensure the modelled responses are realistic, we believe that it has strong potential for analysis of various types of water policies in Canterbury and other regions of New Zealand.

This chapter focused on economic modelling of irrigation, while acknowledging that there are many other important market and non-market values associated with water resources and with aquatic and riparian ecosystems. General or partial equilibrium models may be extended to account for some of these, particularly more tangible values that have relatively direct relationships to changes in different economic activities.

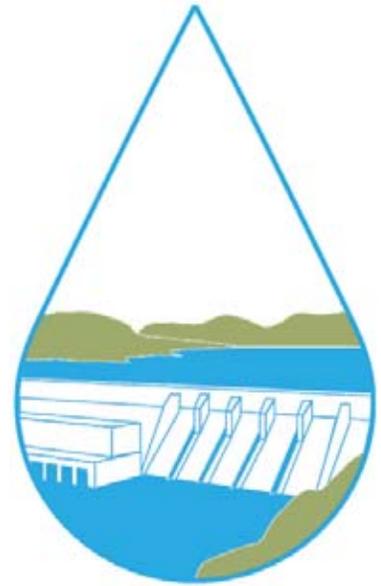
Acknowledgements

We acknowledge Olga Diukanova and Oscar Montes de Oca Munguia, both formerly of Landcare Research, who helped to develop the regional general equilibrium model and spatial datasets respectively. Garry McDonald and staff at Market Economics Ltd, Auckland, provided a regional input-output table for Canterbury. We also acknowledge Oshadhi Samarasinghe and Robyn Sinclair of Landcare Research, Steve Green of Plant and Food Research, and farm consultant Stuart Ford, all of whom contributed to the development of the dataset for the Hurunui partial equilibrium model. Elizabeth Marshall of USDA Economic Research Service also contributed significantly to model development.

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- 1 Ministry of Agriculture and Forestry 2004. The economic value of irrigation in New Zealand. MAF Technical Paper No. 04/01, Wellington.
 - 2 Ford S 2002. Economic and social assessment of community irrigation projects, MAF Technical Paper No. 2002/13, Wellington; Harris S, Butcher G, Smith W 2006. The Opuha dam: an ex post study of its impacts on the provincial economy and community. Timaru, Aoraki Development Trust.
 - 3 This is because the legal and practical opportunities to trade consents within or between catchments is quite limited. Where water allocations may be readily traded over a wide area, as for example in Australia's Murray Darling Basin, the value is capitalised in the water right itself.
 - 4 Grimes A, Aitken A 2008. Water, water somewhere: the value of water in a drought-prone farming region. Motu Working Paper No. 08-10. Wellington, Motu Economic and Public Policy Research.
 - 5 See, for example, Hertel T 2002. Applied general equilibrium analysis of agricultural and resource policies. In: Gardner B, Rausser G eds Handbook of agricultural and resource economics. Amsterdam, The Netherlands, North Holland Press; Johansson R, Peters M, House R 2007. Regional Environmental and Agricultural Programming Model (REAP). US Department of Agriculture Economic Research Service, Technical Bulletin No. TB-1916. 118 p. <http://www.ers.usda.gov/Publications/TB1916/>; van der Werf E, Peterson S 2009. Modeling linkages between climate policy and land use: an overview. *Agricultural Economics* 40: 507–517.
 - 6 See Johansson et al. 2007, note 5.
 - 7 See p.26 Strategic Framework in Canterbury Water Management Strategy, November 2009. <http://www.canterburywater.org.nz/background-documents/>
 - 8 HWP has developed and modified its proposals over several years and, at the time of writing, is working in collaboration with the Hurunui-Waiapu Zone Committee to review water storage options. Our scenario and analysis do not reflect the position or views of HWP.
 - 9 The model and scenarios are described in more detail in Lennox JA, Diukanova OD 2011. Modelling regional general equilibrium effects and irrigation in Canterbury. *Water Policy* 13: 250–264.
 - 10 The model and this scenario are described in more detail in Daigneault A, Greenhalgh S, Samarasinghe O, Sinclair R 2011. Estimating co-benefits of agricultural climate policy in New Zealand: A catchment-level analysis. Prepared for 2011 AAEA Conference, Pittsburgh, USA. Accessed online at: <http://purl.umn.edu/103855>.
 - 11 The model is adjusted to reflect observed behaviour primarily by changing the value of elasticities. The current elasticities have been chosen within the range of those reported in the international literature and used in similar models to NZ FARM, based also on our own expectations of the likely responsiveness to prices and water availability in North Canterbury.
 - 12 Hurunui Water Project 2010. Hurunui Water Project: Our Ideas. Accessed online at: <http://www.hurunuiwater.co.nz/our-ideas.php>.
 - 13 Aqualinc Research Limited 2010. Impact of restrictions on pasture production for a sample of Hurunui irrigation development scenarios. Report No. Co8089/01, prepared for Landcare Research.
 - 14 This map is based on data provided by Environment Canterbury for the period October 2010. It does not reflect all recent changes, including cutting of a significant proportion of the Balmoral Forest (dark green area in centre of map).

CHAPTER 8

Structuring stakeholder participation in Canterbury



James Lennox

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8. Structuring stakeholder participation in Canterbury

James Lennox, Wendy Proctor and Shona Russell

Summary*

- There is growing interest in environmental issues by actors and a desire to become involved in the policymaking process, especially when dealing with wicked problems¹. This interest has driven efforts to incorporate participatory frameworks into policy formulation through meaningful and constructive stakeholder engagement. Extensive, systematic and structured stakeholder engagement can play an important role in modern water resource governance.
- Opportunities for participation, as currently applied under the RMA, can be ad hoc and fail to include a sufficient range of stakeholders². Provision of an up-front, effective and independently facilitated stakeholder participation process early on may avoid some of these lengthy legal processes delaying planning decisions.
- The Deliberative Multi-Criteria Evaluation (DMCE) approach combines the structuring and transparency qualities of multi-criteria evaluation with the deliberative and knowledge-building qualities of the Citizens' Jury process to engage stakeholders in a decision-making process.
- In 2009, elements of the DMCE approach were applied to two case studies in Canterbury, – one addressing the development of a water storage proposal and the other a regional water management strategy. Here, we discuss insights concerning the development of criteria prior to the workshops, the process of evaluating options using multiple criteria, and the contribution of DMCE processes in different types of decision-making processes.

* This chapter draws on material published in [Lennox, J., Proctor, W., and Russell, S 2011. Structuring Stakeholder Participation in New Zealand water resource governance. *Ecological Economics*. Vol. 70, pp. 1381 - 1394](#) and [Russell S, Ward M 2010. Sustainability Appraisal: Application to Canterbury Water Management Strategy. Landcare Research. Lincoln NZ.](#)

Deliberative Multi-Criteria Evaluation

Decisions concerning management of water resources often involve complex and uncertain (sometimes-disputed) scientific, social and cultural facts, multiple (sometimes conflicting) values of individual and different stakeholders, and high stakes. The growing interest in environmental issues by actors and their desire to become involved in the policymaking process has led to the need for participatory frameworks to be incorporated in policy formulation where stakeholders are engaged in a meaningful and constructive way. Extensive, systematic and structured stakeholder engagement can play an important role in modern water resource governance.

Deliberative multi-criteria evaluation (DMCE)³ engages stakeholders in a decision-aiding framework that combines the structuring and transparency qualities of multi-criteria evaluation (MCE) with the deliberative and knowledge-building qualities of the Citizens' Jury process. MCE ranks different discrete decision options by identifying criteria by which the options can be measured and assessed; then weighting the criteria provided by the decision-maker or decision-makers (e.g. stakeholders) to reflect the importance that is placed on those criteria in contributing to how well the options perform. MCE software then combines these quantitative data to determine the overall ranking of the options. The Citizens Jury process involves a panel of stakeholder jurors who must come to consensus on a decision problem after hearing information from expert witnesses, questioning these witnesses, and taking part in discussions and deliberations with each of the other decision-makers to agree on a consensus position. The overall objective of the DMCE process is to come to a consensus or as much agreement as possible on the weightings, and the process concludes when stakeholders do not wish to change their weightings further. Based on these two methods, the fundamental tasks of the DMCE are:

- Representative stakeholder jurors are chosen to take part and agree on the objective of the process and a discrete set of options to ultimately decide upon and criteria by which the options can be assessed.
- An impact matrix is developed to reflect how each of the options performs against each of the criteria.
- In the options assessment process the stakeholders subjectively weight the criteria to reflect the importance to them.
- Criteria with large differences in weightings are then concentrated upon and stakeholders are given the opportunity to discuss and deliberate on the differences and to call in and question experts in relation to particular criteria.
- An iterative process then commences involving reweightings and running the MCE software to show the option ranking and then further deliberation.

Multi-criteria approaches can produce an overall score for each option, and the potential benefits of using such approaches in general include aiding elicitation of stakeholders' different perspectives and preferences; helping stakeholders to acknowledge and understand others' positions; structuring communication of complex science to lay participants; and increasing the clarity and transparency of subsequent decision processes. Other processes that are based partly on multi-criteria evaluation avoid the use of criteria importance weightings and focus on development and discussion of the impact matrix, considering trade-offs between criteria only implicitly or qualitatively⁴.

Here, we discuss insights from the incorporation of aspects of DMCE in two case studies undertaken in Canterbury in 2009 with regards the development of criteria prior to the workshops, the process of evaluating

options using multiple criteria, and the contribution of DMCE processes in different types of decision-making processes.

DMCE and the Hurunui Water Project

In 2009, the Hurunui Water Project⁵ organisation (HWP) conducted a consultation process regarding potential water storage in the South Branch of the Hurunui River and/or Lake Sumner, in North Canterbury. The proposal has been under development by a consortium of farmers and other shareholders for almost a decade in response to an interest in the sustainable use of water for irrigation and hydro generation. In an effort to involve stakeholders prior to submitting a resource consent, HWP sought contributions from James Lennox and Wendy Proctor to develop a series of workshops with the aim of obtaining feedback from a wide range of stakeholders (i.e. including local community members, representatives of environmental and recreational groups, etc.) on their concerns and preferences.

In preparation for the workshops, HWP, with the help of various other consultants involved in the project, developed four options (see Box 8.1) to be evaluated with reference to a set of evaluative criteria (Table 8.1), and an impact matrix.

Box 8.1: Options for the HWP storage development

- Utilise both storage sites by raising the water levels of Lake Sumner and the South Branch dam – Maximum water supply for irrigation
- Utilise just the Lake Sumner option (no South Branch dam) – Minimal ecological change, limited water supply
- Utilise just the South Branch dam (no Lake Sumner option) – Minimal ecological change, limited water supply
- No development of either Lake Sumner or the South Branch dam – Emphasis on water use efficiency and some on-farm storage.

The workshops involved approximately 20 invited representatives of farming, local community, recreational and environmental interests. In late 2008 and early 2009, two three-hour workshops were held with invited participants bringing together people with divergent views on the project including farming and environmental interests (some were involved in an application for a Water Conservation Order⁶ over the Hurunui River). However, to secure the participation of some stakeholders, it was agreed to keep the DMCE process results confidential.

In the first workshop, a criteria-weighting exercise was conducted, with participants each distributing a given number of matchsticks between the different criteria on a sheet of paper followed by a discussion of the different weightings, which illustrated a difference in emphasis between two main groups described (albeit approximately) as farmers and environmentalists. Those with farming interests gave a high weight to 'economic benefit to farmers', while environmentalists gave this a low weight. Conversely, environmentalists gave somewhat more weight to environmental criteria (such as 'river ecology' and 'groundwater quality') than did those with farming interests. More interestingly, both groups gave significant weight to 'economic benefit to wider community', suggesting broad consensus on this value. The weighting exercise was followed in the second workshop by a comparison of the four options, using alternative weightings and the impact matrix prepared by HWP to produce overall scores. However, this stage of the process revealed that some

participants had not fully understood the scoring methodology, while others objected to the impact matrix that had been developed by HWP and its consultants.

Table 8.1: Hurunui Water Project evaluation criteria

ENVIRONMENTAL	
Criteria	Description
River ecology – upstream of Mandamus recorder ^a and irrigation offtake	The overall impact on instream values (including consideration of the requirements of aquatic life, vegetation quality, stream physical form, stream flow, wildlife)
River ecology – downstream of Mandamus recorder ^a and irrigation offtake	The overall impact on instream values (including consideration of the requirements of aquatic life, vegetation quality, stream physical form, stream flow, wildlife)
River ecology – fish passage at dam site/s	Ability for fish passage to be maintained at major structures
Surface water quality	Applies downstream only, related to contamination, temperature and sediment
Groundwater quality	Applies downstream only, related to contamination and discharge
Upstream terrestrial ecology	Including vegetation and bird life – upstream of offtake
Downstream terrestrial ecology	Including vegetation and bird life – downstream of offtake
SOCIO-ECONOMIC	
Criteria	Description
Economic benefit to farmers	Net financial benefit of the option to farmers in the area
Economic benefit to wider community	Flow-on financial benefits to the wider community
Recreation	Impacts on recreational activities such as recreational fishing, kayaking
Tourism	Broader impacts on tourism in the region
Community infrastructure	Effects on cohesion and trust of community?
Cultural values	Māori values associated with river and surroundings
Aesthetic values	'Look and feel' of the affected area
Fishability	Likelihood of catching fish in the region

^aThe Mandamus recorder measures river flow of the Hurunui River upstream of the Mandamus confluence.

Unfortunately, the DMCE process was then abandoned, for the following reasons:

- Severe time constraints prior to and during the workshops meant that participants had inadequate understanding of the DMCE process. It also meant that while there was ample discussion (and general consensus) on the criteria, there was no opportunity to review either the options or the impact matrix.
- It was clear that some participants did *not* agree with the impacts as assessed by HWP. The full DMCE process requires these differences to be discussed and resolved – possibly by means of further research.
- Some of the participants were representing organisations that were a party to or supporting an application for a Water Conservation Order over the Hurunui, while others opposed this. The impending legal hearings were inimical to frank and open discussion in the workshops.

Multi-criteria evaluation in a Sustainability Appraisal of the Canterbury Water Management Strategy

In 2009, contributions were sought from key stakeholders and the wider public via public meetings, mail-out surveys and workshops in order to identify principles and options (see Box 8.2) as the Canterbury Water Management Strategy was nearing completion⁷.

Box 8.2: Options for approaches for regional water management⁸

- A: Continue to improve the current approach
- B: Advance environmental protection before developing significant infrastructure
- C: Reconfigure consents and infrastructure for protection and repair of the environment, improved reliability of supply and for development
- D: Advance infrastructure with strong requirements for environmental repair and protection

In June 2009, the CMWS Steering Group and officials⁹ participated in a Sustainability Appraisal¹⁰ (SA) workshop that aimed to evaluate options by comparing the sustainability implications/dimensions of each, and to identify a single option or combination of options that best fit a sustainable development objective for the region's water resources. The workshop incorporated the use of multiple criteria to evaluate the options against sustainability limits. This was not a DMCE process, but involved development and application of evaluative criteria without any weighting step. This section describes and discusses the criteria developed and their application in the workshop.

The criteria were initially developed by an 'expert group' (including officials, a district councillor, policy consultants and economic and scientific researchers – including the third author), then reviewed and revised by participants in the Sustainability Appraisal workshops. The third author designed a matrix for evaluating the CWMS options against each criterion on a five-point scale. Members of the expert group developed criteria and qualitative scale descriptors pertaining to environmental, social, cultural and economic outcomes and to governance aspects (see Table 8.2 for list of criteria).

One criterion that is evidently specific to the New Zealand context is that relating to *kaitiakitanga* (guardianship) by *tangata whenua* (people of the land). The specificity of the other criteria to the context of the case study is subtler. For example, the reference to groundwater in Criterion 3 relates to the importance of spring-fed streams in lowland Canterbury, many of which are depleted and/or contaminated because of over-extraction of groundwater and agricultural runoff. The elaboration of the equity dimension under *kaitiakitanga* gives prominence to the tensions between different types of water users in Canterbury, most notably between current irrigators, prospective irrigators and in-stream users.

In many cases, the scale descriptors reflect regionally or nationally specific concerns by defining outcomes with respect to particular phenomena or over a particular range. For example, the descriptors of 'water quality for ecosystem health' were specifically related to the water quality chapter of the *Natural Resources Regional Plan*¹¹. Experts considered that survival of all key species could not realistically be assured by any feasible strategy. Yet, as this is required by the New Zealand Biodiversity Strategy¹², the terminology was adopted for the 'strong positive' descriptor of Criterion 1.

Table 8.2: CWMS evaluative criteria developed by expert group

Criteria	Indicator No.	Brief description
Aquatic and Riparian Biodiversity	1	Aquatic and riparian indigenous biodiversity, including key species
Aquatic and Riparian Ecosystems	2	Integrity of aquatic and riparian ecosystems including habitat and ecosystem services (e.g. flow connectivity and variability)
Water Quality for Ecosystem Health	3	Water quality for aquatic species' health (measured against regional plan water quality objectives and standards)
Water Quality for Human Health	4	Water quality for drinking (national standards) and contact recreation (regional plan objectives and standards)
Terrestrial Biodiversity	5	Terrestrial (non-riparian) indigenous biodiversity, including key species
Regional Value Added	6	Total change in value added in regional and sub-economies over 30 years
Employment Impacts	7	Changes in employment over 30-year period in the region measured as full-time-equivalents
Household Income	8	Change in median regional and sub-regional household incomes over 30 years
Community Cohesion	9	A Rural community viability and cohesion B Regional cohesion. Increased understanding and cooperation between rural and urban populations
Recreation	10	Recreational opportunities
Landscapes	11	Landscape values
Equity of Water Allocation, Access and Costs	12	A Fair treatment of all users/interests including existing and new abstractive users and in-stream interests B Fair allocation of costs, with consideration of affordability, and the distribution and balance of benefits and costs to individuals and groups
Opportunities for <i>Kaitiakitanga</i>	13	Opportunities to Ngāi Tahu to exercise <i>kaitiakitanga</i> (capacity and empowerment)
Feasibility	14	A Consistency with core policies, plans and with legislation (allowing for any changes) B Public funds required
Resilience	15	A Diversity and adaptability of investments (to, e.g., climate change, international markets, biosecurity risks) B Flexibility of regulatory mechanisms and devolution to appropriate social, economic, hydrological and ecological scales
Balance of Total Financial Benefits to Financial Costs	16	Balance of total financial benefits to financial costs over 30 years at a discount rate of 8% (Benefit to Cost Ratio, BCR) for New Zealand

Note: 'A' and 'B' refer to sub-criteria.

Participants reviewed the criteria developed by the expert group in the workshop and agreed to add four additional criteria: opportunities for *rangatiratanga*¹³; sense of experience; knowledge requirements; and trust and legitimacy of (A) institutions and (B) processes. However, there was insufficient time in the process to discuss these new criteria in any depth, or to develop corresponding scale descriptors.

Sustainability Appraisal workshop participants were then broken into small groups for the purpose of evaluating the strategic options against all of the above criteria. Each of four groups considered a different one of the four options and produced a consensus evaluation through a process of deliberation and (when necessary) negotiation. Finally, each group had the opportunity to review the assessment made by one of the other groups. This assessment process significantly increased each group's collective understanding of the problems that needed to be addressed through the CWMS and of the likely performance of the strategy under *any* one of the four options. One key example of this was in the realisation of the subtle but important distinction between maintaining the present *approach* to water management (as in option A) and producing

neutral *impacts*. Increasing pressures on water systems and the inertia of many biophysical systems mean that increasingly negative outcomes are likely if the current approach is simply continued.

Due to time constraints, the assessment exercise had to be completed off-line. Individual participants were asked to assess every one of the four options against all criteria. These scores were combined by averaging to produce an overall assessment that was provided to the ultimate decision-makers in the CWMS: the Canterbury Mayoral Forum¹⁴. The process appears to have been regarded as beneficial by most of the stakeholders and decision-makers concerned. However, we suggest that continued deliberation among the stakeholders in a workshop setting, instead of the off-line process, might have generated greater understanding and even consensus around a specific strategy.

Discussion

Criteria

We found that in both cases, multiple evaluative criteria were a useful device for structuring the deliberative participatory processes. The criteria developed for the CWMS were both detailed and comprehensive. They explicitly integrated a concern for Māori interests in water management. Indeed, we suggest that this set of criteria might be a useful starting point for future multi-criteria processes relating to water resource management in New Zealand.

Deliberative Process

Many of the reported advantages of multi-criteria evaluation methods were observed in each of the cases. For example, in the HWP case, the deliberative process of eliciting weightings helped to structure discussion and increase understanding of different value positions. In the CWMS case, the deliberative process of assessing options against individual criteria helped participants to consider and discuss issues systematically. However, both cases highlighted a major challenge (in common with any 'in-depth' deliberative process): to operate successfully, such a process requires significant amounts of time, both in workshop settings and in preparatory activities. However, time-consuming processes place heavy demands on participants. They may also conflict with pressures for decision-makers to act rapidly.

Participation in decision-making

In the case of HWP, it is not clear that additional time and other improvements to the DMCE implementation would necessarily have achieved any better outcome. Achieving a broad consensus on this particular issue may simply have been impossible in the absence of a framework for addressing the question of water storage in North Canterbury in a wider strategic context (as may now be achieved under the CWMS). The adversarial legal process associated with the Hurunui Water Conservation Order created particular difficulties for some participants [see Ch 1]. Perhaps because of this in particular, some participants insisted that the deliberations be confidential. While it is important that stakeholders feel free to express their views in such a process, complete confidentiality undermines the need for transparency in decision-making. Adopting Chatham House Rules in such situations may provide an appropriate balance.

Once the CWMS is fully operational, it is possible there will be a clearer framework within which individual projects may be evaluated and that it will provide increased support for collaborative as opposed to adversarial processes. Such developments should facilitate participatory decision-making processes, such as DMCE, by providing a clearer context for their operation and by reducing the high demands currently placed on many individuals and organisations to involve themselves in a great number of different administrative, legal and participatory processes.

Conclusions

Our involvement in and observations of the stakeholder engagement processes of HWP and CWMS lead us to conclude that stakeholder involvement in decision-making is beneficial and increasingly necessary in collaborative approaches to the governance of Canterbury's water resources. A more effective process could be built on the examples that have been started here, but developed around a much more structured framework that would incorporate community values and perspectives long before the need to resort to legal submissions.

As far as the two case studies went, the observed benefits of deliberative multi-criteria methods were consistent with those found in Australia and other countries¹⁵. However, both case studies highlighted practical and systemic barriers that must be overcome if the potential of such methods is to be more fully realised.

- The aims of the participatory process must be clear and achievable.
- Processes must be designed with adequate resources and allow adequate time to achieve the aims.
- If the aims are unlikely to be achieved given the resources and time available, they should be reconsidered.
- Chatham House Rules may provide an appropriate balance between the need for transparency and accountability, and the need for participants to be free to express their views.

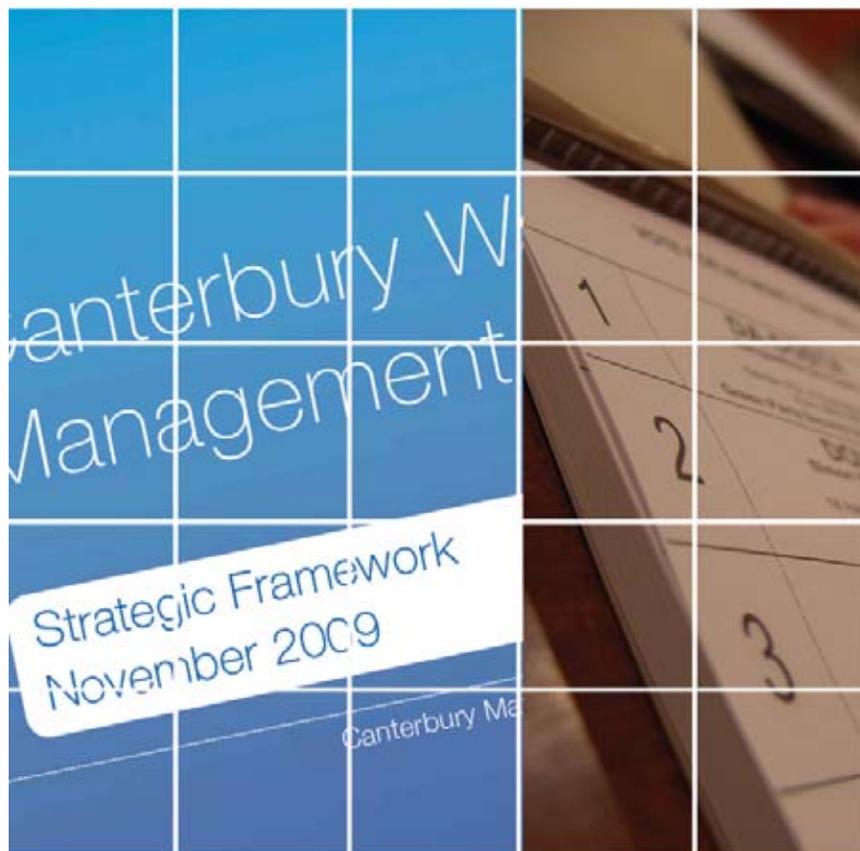
Acknowledgements

Funding for this research was provided by the Foundation for Research, Science and Technology, New Zealand. We also gratefully acknowledge the opportunities to conduct this research provided to us by both Environment Canterbury and the Hurunui Water Project.

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- 1 As outlined in Ch 1, Wicked problems are characterised as involving involve complex and uncertain (sometimes-disputed) scientific, social and cultural facts, multiple (sometimes conflicting) values of individual and different stakeholders, and high stakes.
 - 2 See Chapter 4
 - 3 Proctor, W. and Drechsler, M. 2006. Deliberative multicriteria evaluation. *Environment and Planning C: Government and Policy* 24, 169-190
 - 4 One such process was used in Stage 3 of the Canterbury Strategic Water Study (Whitehouse, I., Pearce, A., and McFadden, G 2006 Canterbury Strategic Water Study (CSWS) Stage 3. Multi-stakeholder evaluation of water storage options. Canterbury Mayoral Forum Christchurch New Zealand
 - 5 See Hurunui Water for further information <http://www.hurunuiwater.co.nz/index.php>, accessed 17 December 2010
 - 6 An instrument under the Resource Management Act designed 'to recognise and sustain outstanding amenity and intrinsic values' of waters.
 - 7 For further information about the CWMS see Chapters 6, 11 and 12.
 - 8 Canterbury Water Management Strategy 2009. Creating a sustainable future for Canterbury Water – Have your say! Canterbury Water Management Strategy, Christchurch, New Zealand
 - 9 Participants included officials, members of the CWMS Steering Group and officials from district councils, the regional council, and central government agencies.
 - 10 For example, a 'Sustainability Appraisal' process examines the social, environmental and economic effects of the strategies and policies in a development plan to ensure that the decisions that are made accord with sustainable development¹⁰ and the process requires stakeholder involvement in the definition and agreement of the plan's objectives before identifying how these objectives can be met and assessed under each of the social, environmental and economic categories.
 - 11 Environment Canterbury 2004 Variation 1: Proposed Natural Resources Regional Plan. Chapter 4: Water Quality Available here <http://www.ECan.govt.nz/publications/Plans/nrrp-chapter-4-000704.pdf>
 - 12 Department of Conservation & Ministry for the Environment 2000. The New Zealand Biodiversity Strategy: February 2000. Wellington, Department of Conservation and Ministry for the Environment. 146p. Available online at <https://www.biodiversity.govt.nz/pdfs/picture/nzbs-whole.pdf>
 - 13 Various translated as sovereignty, chieftainship, right to exercise authority, chiefly autonomy, self-determination, self-management, ownership.
 - 14 See Russell & Ward 2010. Sustainability Appraisal. Application to the Canterbury Water Management Strategy. Landcare NZ, Lincoln, New Zealand
 - 15 See for example Tan PL, Jackson S, Oliver P, Mackenzie J, Proctor W, Ayre M 2008. Collaborative water planning: context and practice. Literature review. Volume 1. Topical rivers and coastal knowledge report.

CHAPTER 10

Participating in decision-making
processes



Shona Russell

Martin Ward

9. Building social capital

Martin Ward and Shona Russell

Summary*

- 'Social capital' describes the 'connections among individuals and the social networks and the norms of reciprocity and trustworthiness that arise from them' (Putnam 2000)¹. These norms and networks enable people to act collectively to achieve a task or goal, or to create value² improving the efficiency of society by facilitating coordinated actions. Efforts are being made to develop consensus-based decisions, managing conduct and resolving disputes outside formal RMA processes leading to more collaborative responses to water management challenges.
- In Canterbury and Otago, groups are taking collective action to develop and manage water resources through shared schemes, storage proposals and sub-catchment groups helped by the connections between individuals. This chapter examines three examples of collective action and how social capital has developed in each case as groups strive to achieve their respective goals.
- Investment in social capital and commitment to the development of collective action over time contribute durable and less contested solutions with wider community support. While the catalysts and goals for each example vary, important factors to facilitate coordinated action include community-based leadership, local identity, shared knowledge, reliable and up-to-date information, and good relationships with regulators at a sub-catchment scale.

* This chapter originates from [Ward M, Russell S 2010. Water sharing schemes: insights from Canterbury and Otago Strategy. Landcare Research Contract Report LC2.](#)

Social capital and natural resource management

'Social capital' describes the 'connections among individuals and the social networks and the norms of reciprocity and trustworthiness that arise from them' (Putnam (2000)³). These norms and networks enable people to act collectively to achieve a task or goal, or to create value⁴ improving the efficiency of society by facilitating coordinated actions.

Benefits of investing in social capital include contributing to outcomes of identity, having a sense of belonging, increasing community resilience, and lowering transaction costs. Loss or relative deficit of social capital is associated with social exclusion or intolerance of difference, reduced family and community functioning, and corruption⁵. Social capital plays a similar, sometimes complementary, role to human (individual), economic (manufactured) and natural (environmental) capital to enable action and coordinate action. Strong social capital and strong natural capital is important in the delivery of enduring approaches to natural resource management⁶.

Individuals and groups having common interests, values and aspirations create social capital through relationships of trust and reciprocity. Social capital has been separated into *bridging* and *bonding* forms. Bridging capital creates social capital between groups, whereas strong bonding capital creates connections between members of a group but may create antagonisms between members of different groups. Figure 9.1 depicts elements of social capital that can be influential in environmental management.



Figure 9.1: Elements of social capital (Pretty & Ward 2001, p. 211⁷).

Insights from Canterbury and Otago

Water sharing schemes, water storage proposals and water management groups are initiatives underway in both Canterbury and Otago. While each initiative aspires to different goals, they each bring together different groups of people to achieve a particular goal where social capital and trust relations are intertwined in their respective development. Building on previous research⁸ that identified factors necessary for water sharing schemes to develop (community-based leadership, local identity, shared knowledge, reliable and up-to-date information, and good relationships with regulators); each of these initiatives is described prior to discussion of how social capital has influenced their development.

Water sharing schemes

Irrigation in the lower Kakanui River valley requires that irrigators, Otago Fish & Game and the Kakanui Ratepayers and Improvement Society (KRAIS) collaborate under an arrangement determined by an Environment Court hearing in 1998⁹. The arrangement established a water allocation committee and required it to meet twice a year (before and after the 'irrigation season'). All parties acknowledge that the twice-yearly meetings, also involving the regional council¹⁰, have become increasingly positive over time. Nowadays they cover issues of wider community interest rather than just water takes. By agreement of all parties, meetings are held less frequently as relationships are able to be easily managed between meetings¹¹. This collaborative initiative, while being created due to the actions of the Environment Court, has led to improved relationships among those concerned with the river and to consideration of other issues and how to respond to them as trust has developed.

The Opuha River Environmental Flow Release Advisory Group (OREFRAG) was formed to operate the Opuha Dam in South Canterbury. OREFRAG agrees on variations to the specified environmental flows, for the purposes of creating an artificial fresh (short-term flood-level flows) to approximate natural flow variation for ecological benefits, and drawing down from the dam in anticipation of flood flows. The Advisory Group comprises one representative each from the stakeholders of in-stream values (appointed jointly by the Department of Conservation and the Central South Island Fish & Game Council), tangata whenua, irrigators (appointed by South Canterbury Federated Farmers), and Timaru and Mackenzie district councils. The Advisory Group has absolute authority to act on decisions but must notify the regulator – Environment Canterbury – of its actions. There is no provision for a decision that is not agreed by all members of the Group. Similar to the Kakanui group, OREFRAG has begun to act more informally as a result of growing trust amongst groups over time and the nature of the environmental flow releases becoming more routine and regular; the group has begun to act more informally in terms of making decisions about flows, as a result of trust on both sides¹².

“ By the time the consents had been lodged Tom (Henderson) had had a cup of tea in almost every kitchen in South Canterbury ”

Interviewee A

Farmers and supporters who developed and built the Opuha Dam established strong relationships between individuals and groups in the community from the early planning for the dam and the functioning of the Opihi Augmentation Society¹³. The trust relationship had a strong foundation in the water storage objectives for the scheme, which were described from the outset as water augmentation and set as a hierarchy – for town

supply, for industrial use, for the river itself, and finally for irrigation. The river and water were seen as a community resource.

Several individuals were involved from an early stage of the Opuha development. These individuals created trust relationships through personal connections often by visiting peoples' homes to share information and connecting with the family not just the 'head' of the household. Meeting the whole family ensures that networks of spouses and adult children are engaged and informed as well. Face-to-face meetings enable the family to judge character for themselves. These individuals drew on relationships with others to bring people and organisations together to promote water storage on the Opihi River. This led to collective action to garner regional and local support, raise capital and obtain consents for this multi-million-dollar dam and storage project.

Building trust between the various individuals and groups in the wider community was fundamental to the ease and speed of the consenting process for water storage in the Opuha Dam on the Opihi River¹⁴. These relationships underpin the effective operation of the various organisations and committees that contribute to the management of the Opihi catchment and of the irrigation assets that serve the community today.

Water storage proposals

Infrastructural developments in Canterbury have involved farmers and irrigators coming into conflict with environmental and recreational interests. Several development proposals for water infrastructure illustrate breakdown in social capital through highly adversarial proposals linked to distrust and antagonism between different interest groups.

The Central Plains Water proposal and application for water storage and distribution facilities pitted interest groups (farmers, local landowners and recreationalists) against each other in Environment Court Hearings. There was bonding social capital between those with similar interests, creating loyalty, contrasted with antagonism towards others representing different interests. The Hurunui Water Project (HWP) proposal¹⁵ for water storage and irrigation created similar forms of antagonism but this time involving an application for a Water Conservation Order. North Canterbury Fish & Game and Whitewater NZ submitted a joint application in August 2007 with the aim of securing river flows for ecological and recreational use. The applicants withdrew their application in December 2010 so that they could focus on the collaborative processes of the Canterbury Water Management Strategy¹⁶.

Communities of farmers, recreationalists and environmentalists from within North Canterbury and elsewhere were working within their groups creating bonds of social capital, with conflicting visions for the river and catchment in an example of antagonism between communities. It appears that diverse groups are investing in collaborative processes in the catchment, which may indicate the forging of bridging forms of social capital as well as bonds within groups. For proposals that store or divert surface water, bridging capital can only develop and be maintained if the water sharing scheme delivers common goods. The proposal must accommodate the needs of all water users for the glue of social capital to develop, adhere and be durable. This process will involve compromise and is dependent on the development of trust relationships.

Environment Canterbury established the South Canterbury Water Enhancement Group (SCWEG) by open invitation following some years of complaints to the regional council and letters to the press about water use and river flows. SCWEG is chaired by the regional councillor for the area. Participants include representatives from two district councils, Fish & Game Central South Island, the Opuha Dam Company, Forest & Bird, Trust Power, the Department of Conservation, individual and company farm and water resource consultants,

Federated Farmers, individual farmers/irrigators, the Arowhenua Rūnanga, individual recreationalists and some recreational groups.

“ [SCWEG] has been non-threatening in its attitude and even-handed in its evaluation of the science sought from and provided by Environment Canterbury. This science, combined with common sense, provides the guiding principles for issue resolution by the group. The strength of the group is in its ability to bring together widely differing opinion in order to reach a consensus on enhancement of water resources for economic and recreational purposes, and ecological values... Since its formation in 2002 ... 'an atmosphere of co-operation has developed around the committee table and members have relished the opportunity to inspect sites and question expert speakers. The real value of the group is the willingness of participants to speak openly and frankly about concerns

Interviewee B ”

The Upper Taieri Water Resource Management Group (UTWRMG) was formed with assistance from the Sustainable Development Fund. The group's aim is 'to plan how best to manage water using more efficient, flexible and co-ordinated long-term approaches'. The Upper Taieri group includes representatives from the irrigators, Department of Conservation, Fish & Game Otago, University of Otago and Central Otago District Council. Geoff Crutchley, a Maniototo farmer and irrigator, chairs the group and a staff member of the New Zealand Landcare Trust coordinates the group.

“ The Upper Taieri Water Resource Management Group [UTWRMG] was established to encourage dialogue between diverse community interests. The defining difference between this project and previous projects is that the concept of 'community' extends beyond irrigation interests. The project recognises that all those with an interest in the Upper Taieri waterways should have a say in future allocation and management

Interviewee C ”

As well as promoting community-based water management, the groups sponsor forums for discussion between different water use groups, conducting several public field days and events in the catchment to enable discussion on current water use, distribution, values and management. Each group has brought together different opinions, used science to guide how the group resolves issues, and built trust among group members. Dialogue, discussion and field days are part of each group's respective commitments to water management.

Discussion

Each initiative has sought to attain or pursue goals ranging from providing irrigation for farms to developing long-term approaches to water management. The differences in their respective origins and drivers provide rich insights about how to develop new irrigation schemes and how collectives of people can work together to respond to challenges in their communities. While each example above is distinct, all are linked to an aspect of water resource management that was deemed unsatisfactory and required change.

Some were led by prominent figures in the community while others were established by regional councils in response to conflicts concerning water allocation. For example, the Opuha scheme developed from a desire to manage a community resource and provide secure water supplies; the latter being a reason for both the CPW and HWP proposals; Kakanui responded to an Environment Court hearing; and the water management groups emerged from a desire to address conflicts over water allocation and develop sustainable approaches to water management.

In each case, those involved sought to develop in pursuit of a goal, drawing upon activities and practices that align to elements of social capital. For example, formal advisory boards in Opuha and Kakanui are complemented by informal decision-making as relationships of trust build between members of the schemes. As such, common rules, norms and sanctions are being negotiated in the schemes and groups rather than being imposed from regulators. This is not to say that everything becomes informal and unmonitored. Rather members of water sharing schemes are negotiating and developing different ways to manage conduct. Within some water sharing schemes, rules are set in water supply agreements, and company articles are strictly, and often swiftly, enforced¹⁷.

Reciprocity of exchanges underlies trust and must be demonstrated through a commitment to common processes, respect for differing opinions, and demonstration of compromise. Trust-building emerges from these examples as the most fundamental element for building and maintaining social capital, capital that can be used – expended – to deliver support for management of environmental flows, water storage developments and multi-party water groups. Reciprocity of exchanges in both groups requires that parties demonstrate similar degrees of commitment and do so through connections between individuals and across networks.

Trust builds over time. Participants interviewed in the course of the work identified 18 months as a minimum time for individuals and groups of differing viewpoints to start to collaborate and for trust to emerge. Trust develops when participants: demonstrate commitment to a process that allows relationships to develop, often through face-to-face interactions; are transparent and honest (do what they say they will); and demonstrate willingness to compromise. Existing connections in communities and ongoing building of relationships amongst people through face-to-face interactions helps.

Conclusion

While efforts are underway to facilitate collaborative approaches that build trust, there are also examples of water management that have become antagonistic. Investing in social capital and trust within and between communities is important to enable water resource management to be undertaken at a catchment or water-zone scale. The examples illustrate instances where farmers and non-farmers, rural and urban, or recreationalists and farmers have come together in response to various issues ranging from Environment Court decisions, desire for secure water supply, or environmental conservation.

While the catalysts and goals for each vary, each group is making investments in social capital for coordinated action. They are developing new ways of making decisions, managing conduct and resolving disputes, leading to more collaborative responses to water management challenges. Investment in and commitment to development or maintenance of social capital through the demanding and often controversial process of managing water resources may contribute to durable and less controversial solutions with wider community support. As efforts for collaborative governance and coordinated action develop in regional planning (such as the Canterbury Water Management Strategy) and national policy settings (such as the Land and Water Forum), it is worthwhile considering how to invest in social capital and the evaluation of such processes to share learning with others elsewhere in New Zealand and overseas.

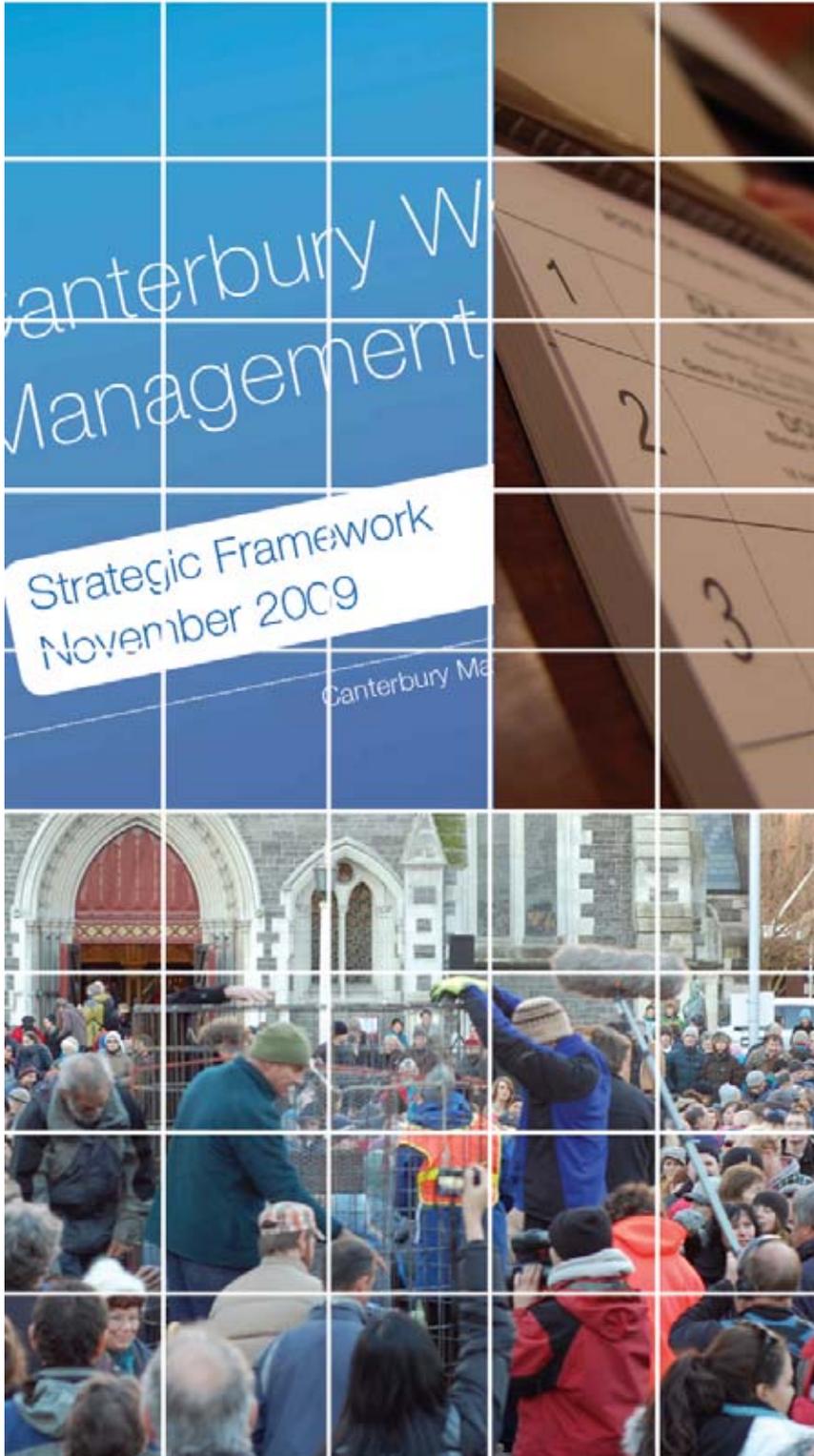
Acknowledgements

Funding for this research was provided by the Foundation for Research, Science and Technology, New Zealand, under the 'Old problems, new solutions' project (C09X0702). We also gratefully acknowledge the opportunities to conduct this research provided to us by Environment Canterbury, Irrigation New Zealand, Otago Regional Council and many individuals who have been so generous in providing information and insights.

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 - 11 See Endnote 8.
 - 12 See Endnote 9.
 - 13 Jay Graybill, Chief Executive Fish and Game Central South Island, pers. comm., 25 January 2010.
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CHAPTER 10

Participating in decision-making
processes



Shona Russell

Martin Ward

10. Participating in decision-making processes

Shona Russell and Martin Ward

Summary*

- In New Zealand, the current mix of hierarchical and collaborative models of planning and decision-making under the Resource Management Act 1991 (RMA) and Local Government Act 2002 (LGA) enables people to participate in decision-making processes by making submissions on plans and resource consents and appealing decisions in court¹. The ideal that everyone can participate in decision-making is encouraged by the open standing provisions of the RMA and the extensive avenues for individual comment and submission required of councils by the LGA.
- This chapter examines *how participation has worked in practice* in terms of who is involved, where, and how people participate in relation to decision-making processes in Canterbury regarding resource consents, water management strategies and legislative changes.
- Over the course of 3 years of conversations and observations of decision-making processes we identified reasons why some people do not participate in *statutory processes*; examined how opportunities to participate were created in the development of a *non-statutory process*; and discuss the implications of legislative change and the emergence of participation through *civil society processes*.
- As responsibilities for decision-making and resourcing of water resource management in Canterbury are being distributed amongst government and non-government actors, opportunities for public and stakeholder participation are emerging that require collaborative engagement practices that in turn require trust and support over time. What remains to be seen is how such styles of collaboration achieve desired sustainable water management outcomes for those involved and for the wider public in New Zealand.

* This is original material.

Understanding participation

Public and stakeholder participation is integral to environmental governance. In addition to direct participation through planning processes, authorities responsible for aspects of environmental governance encourage public and stakeholder participation using initiatives such as expanding public awareness to inform both those responsible for change in water management and those affected by it² and introducing different information and knowledge to the decision-making process³. In addition to specific participatory initiatives, stakeholders or the public (as individuals or groups) can participate in decision-making processes by voting or standing for a community board or local or central government, by joining a community group and volunteering, or by signing petitions, donating money or writing letters to editors and Ministers of Parliament⁴.

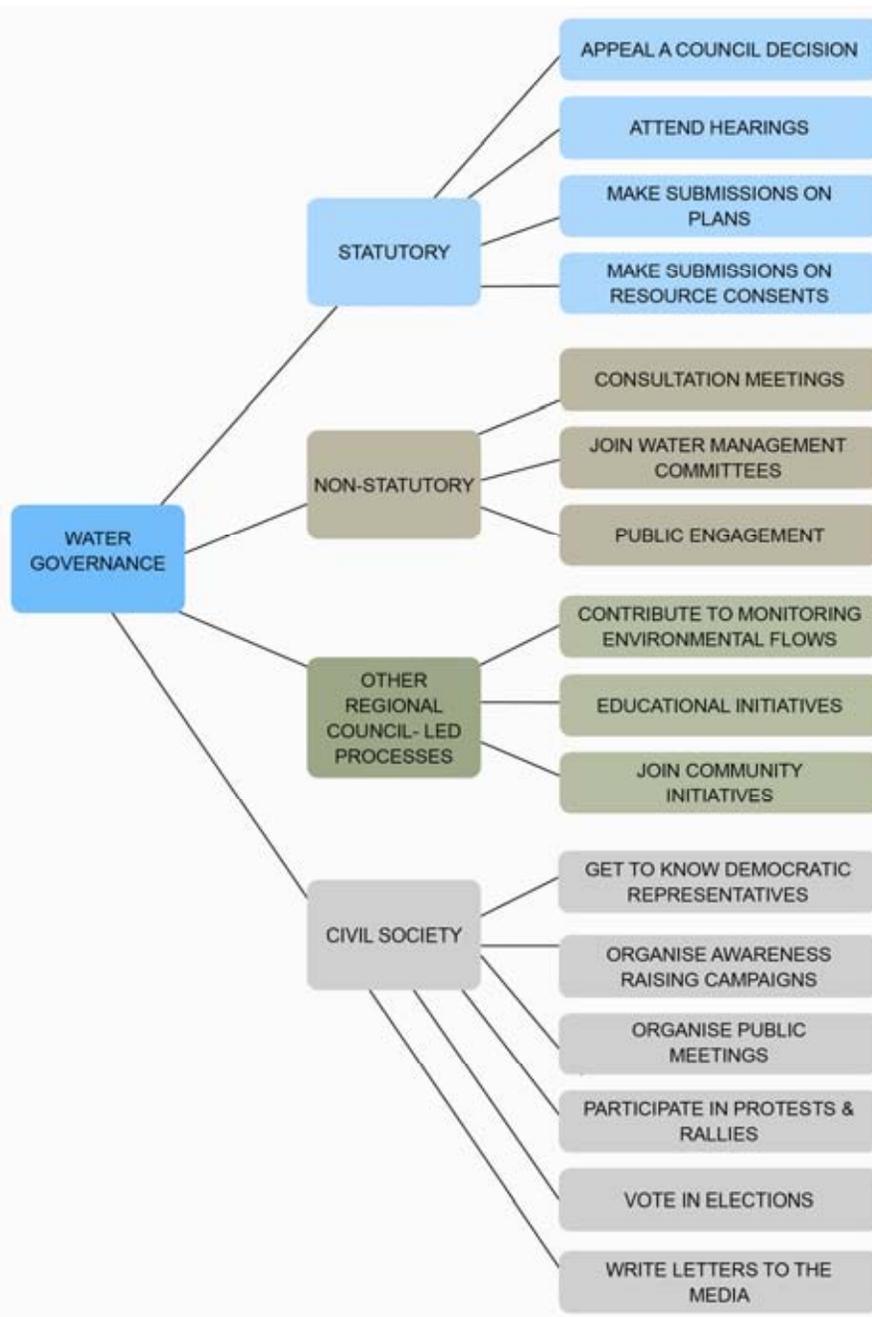


Figure 10.1: Possible opportunities for participation in water governance.

Participatory initiatives are deemed beneficial because they may legitimise the policies and actions of responsible authorities, minimise conflict with or among stakeholders, and potentially overcome administrative and legal challenges to the decision-making process⁵. Concerns about public participation include the time required for processes to develop generally. Those leading the process may be concerned about costs or potential loss of control over final decisions. Those taking part could struggle to participate without adequate resources, suffer from information overload, or feel that their participation will not influence the final decisions⁶.

In New Zealand, the current mix of hierarchical and collaborative models of planning and decision-making under the Resource Management Act 1991 (RMA) and Local Government Act 2002 (LGA) enables people to participate in decision-making processes by making submissions on plans and resource consents and appealing decisions in court⁷. The ideal that everyone can participate in decision-making is encouraged by the open standing provisions of the RMA and the extensive avenues for individual comment.

Environment Canterbury – the authority responsible for water resource management in Canterbury – developed various initiatives to encourage public involvement as part of its responsibilities for water management and allocation under the RMA (see Chapter 6). Statutory and non-statutory processes invite public participation through submissions and attendance at public meetings. Non-governmental organisations⁸ encourage those who are interested in environmental issues to engage with local government and the media through civil society processes in addition to engaging with planning processes led by the regional council (see Figure 10.1 for possible ways for the public to participate in water governance).

Previous chapters have cited examples where the regional council and stakeholders have participated in decision-making in response to issues of water quality, water storage proposals and water management strategies in Canterbury (see for example Chapters 8 and 9). This chapter will consider *how participation has worked in practice* in terms of who is involved, where, and how people participate in relation to particular decision-making processes⁹.

Examining participation in Canterbury

Between 2008 and 2010, water governance in Canterbury was under increased scrutiny as the competition for water resources continued, the capacity of a regional council to manage water resources was reviewed, collaborative initiatives were developed and legislative intervention was made to the region's water governance. In the rest of this section, we describe why some people do not participate in *statutory processes*; how opportunities to participate were created in the development of a *non-statutory process*; and what happens when opportunities for participation through local government elections were suspended following a *legislative process*.

Statutory processes: resource consents and flow regimes (2008)

Statutory processes led by Environment Canterbury and underway in North Canterbury in 2008 included applications for resource consent and reviews of the environmental flow regimes for the Waipara and Waiau rivers. Rivers in this area are subject to summer-low-flow stress, where competing demands for water and increased demand for irrigation create a challenge for allocation and management arrangements. Individual interviewees in North Canterbury expressed their views on statutory processes led by Environment Canterbury (the regional council) where participation involved writing submissions, responding to questionnaires, taking part in small interest groups and attending large public meetings.

Despite there being opportunities to participate in consent and planning processes, some interviewees mentioned that they, and friends or colleagues, were not doing so despite being interested in water resource management. Reasons given for non-participation included not being invited or being unaware, being intimidated or disillusioned by the process, or not having the time or resources to participate (see Table 10.1). In some cases, it appeared that non-participation by individuals was due to meeting details not being publically notified by those organising the meeting, or possibly because the individuals were not on a list of affected parties relating to certain resource consents. Some individuals had found ways around these difficulties to enable them to participate should they wish by appointing representatives to attend on behalf of themselves and others, or obtaining support with travel costs and resources to attend meetings and participate in writing submissions.

Table 10.1: Forms of non-participation in resource consent applications and reviews of environmental flow regimes

Reason	Explanation
Uninvited or unaware	The uninvited or unaware include persons with knowledge and interest in water issues but who were not sent meeting notices or invitations seeking their contribution. Some were clearly able and willing participants who had been dropped off the consultation radar or were not deemed to be requiring notification due to only taking a small amount of water. Others – not devotees of council websites or public notice columns – were unaware of pending meetings or other consultation activities. This applies to the situation where some meetings were frequently held in certain areas rather than others, which was interpreted as favouring certain water/economic interests over others in the decision-making process.
Intimidated by the processes	A small group of people with knowledge and experience that might be useful to the proceedings, but who had little understanding of them, felt intimidated by the language and formality of the processes. Knowing what they could say, or what matters were relevant to a particular process or proceeding, was not clear to them and speaking in public was not something they were comfortable with. While they did not participate at the meetings, they may have 'kept in touch' with the issues through their interest group or other participants.
Disillusioned by the processes	The disillusioned comprised those who had contributed in the past without affecting change or who know of others (e.g. friends or colleagues) who have had similar experiences; and those who believed past decisions were bad or that decisions were poorly enforced – which led them to decide not to take further part in consultation activities. Others in this group have experienced that the responsible agencies do not have the experience to give due respect to their position (tangata whenua – Treaty partner)
Without available time or resources	Busy people, who are unable to participate in daytime hearings or afternoon and evening meetings due to work and family commitments, and due to time and costs of travelling to meetings, were also excluded. This is a particular problem at key stages of the farming or horticultural cycles, although the most obvious clash, the afternoon/evening milking, is now well avoided by regional councils. The problems associated with travelling to attend evening and afternoon meetings have been addressed by some interest groups by appointing one person to attend and represent their issues and report to the group. However, this strategy may not be open to everyone who has an interest and wishes to participate in decision-making relating to water resource management.
Silent	Finally, there may be those people who might be inclined to participate but choose not to. These people hold strong views and are uncomfortable or disagree with water use practices but remain silent. They fear that expressing their opinions or views could negatively affect their relationships in the community because they are not supporting a widely shared view on the vision for their local community.

Non-statutory process: Canterbury Water Management Strategy (2008–2009)

Environment Canterbury (ECan) also developed various non-statutory processes, including establishing enhancement groups with stakeholders supporting sub-regional water management groups and the Canterbury Water Management Strategy (CWMS) process. These processes were designed to encourage stakeholder and public participation in an effort to minimise the risk of contestation in the courts following particular decisions and to widen the base for decision-making [see Ch 6]. Here, we consider how opportunities for public participation were created throughout the course of the strategy.

The CWMS emerged from an initial assessment in 2000 of the ability of the region to meet long-term requirements for water and developed into a strategic framework for sustainable management of the region's water resources. The Steering Group of the CWMS and facilitators from ECan invited participation by stakeholders and the public at various stages between 2008 and 2009 (see Table 10.2). In August 2008, meetings were held around the region with those representing organisations or community groups, to identify the uses and benefits of water. Following stakeholder engagement and public consultation in 2008, various documents were published on the Strategy's website (www.canterburywater.org.nz) summarising responses under themes of allocation systems, biodiversity, economic implications, environmental flows and levels, governance and social dimensions.

In April 2009, the public were again invited to participate in response to distribution of the leaflet 'Creating a sustainable future for Canterbury Water – Have your say!' which featured details of principles and strategy options. In addition to making submissions, the public could attend meetings with the Steering Group in May 2009, and attend hearings in June 2009. The Strategic Framework (November 2009) established a basis for addressing the region's water issues in accordance with a vision, first- and second-order priorities, and targets through zone committees and a regional water management committee. The public and stakeholders were invited to apply to become members of both zone and regional committees. Each committee meets regularly, and the agenda, as well as minutes, of each meeting are available on the CWMS website (www.canterburywater.org.nz).

Table 10.2: Public participation in Canterbury Water Management Strategy¹⁰

Year	Dates	Opportunities for stakeholder & public participation
2008	July–September	Stakeholder & special-interest consultation on uses and benefits of water, and on initial draft of fundamental principles
2009	March–April	Stakeholder consultation completed
	27 April	Public consultation begins with household delivery of the public discussion document
	18–22 May	Public meetings – dialogue with Steering Group
	25 May	Submissions close for those wanting to appear at hearings
	2–5 June	Hearings in Christchurch, Timaru and other centres
	5 June	Public consultation period ended. Closing date for submissions

Under the CWMS, interested members of the public and stakeholder groups have had opportunities to participate directly in the development of programmes to implement water management through water management committees. Public and stakeholder participation has become, and continues to be, an important part of the region's response to water management. In the course of the Strategy's development, meetings having been in different parts of the regions, information is available on websites and distributed via email alerts, and there are more opportunities to become directly involved through joining a water management committee. These aspects of are becoming regular features of non-statutory processes for

those responsible for water resource management. This reflects an increased commitment to collaborative processes led by the region's Mayoral Forum and supported by the regional council.

Legislative process: The Environment Canterbury (Temporary Commissioners and Improved Water Management) Act (ECan Act (2010))

In November 2009, the Minister for the Environment and Minister for Local Government announced a review of ECan's performance following its poor review under the 2007/08 Resource Management Act survey where the council only processed 29% of consents on time. Other problematic areas identified included lack of a proper framework to manage water resources and poor relationships with territorial local authorities. The review was conducted under section 24A of the RMA, looking at ECan's resource management functions, and included non-statutory assessment of ECan's governance and policy functions under the LGA¹¹.

The Government moved to pass legislation because of this review, and following meetings between Ministers and stakeholders in the region. Reasons for this intervention were that the council had failed to effectively manage the region's fresh water; there was no operative regional plan and policy framework in the 18 years since the passing of the RMA; and there was a gap between what was required to effectively manage water in Canterbury and the council's ability to do so.

“Water is of huge strategic importance to Canterbury and New Zealand yet we have been failing to properly plan for its use, control pollution and take up the opportunities for storage,” Dr Smith said. “It is a big call to replace councillors with commissioners but this circuit breaker is required in Canterbury to ensure water is better managed.”

Rt Hon Dr Nick Smith

The Environment Canterbury (Temporary Commissioners and Improved Water Management) Act (ECan Act) was passed on 31 March 2010. It replaced the elected councillors with appointed commissioners, who have powers to impose moratoria on water takes, consider water conservation orders and to fast-track regional water plans. The legislation also deferred the regional council elections due in October 2010 until the Commissioners have completed their tasks, with elections due no later than late 2013. The legislation gave statutory recognition to the visions and principles of the CWMS.

With the suspension of usual statutory processes, individuals and groups used creative ways to express their concerns about this legislative intervention by responsible authorities (namely Ministers of the NZ Parliament), public meetings and panel discussions were held between politicians, lawyers and academics accompanied by perspective pieces in the local press, articles in legal journals and commentaries on blogs¹². In Christchurch, public events such as public meetings and protest rallies were organised by activists, artists, environmental non-governmental organisations and an umbrella group 'Our Water, Our Vote'¹³ (see Table 10.3). In this situation, practices for participation (such as holding placards and chanting at protests and singing, reading poetry, and talking about the spiritual and cultural value of water at rallies, and creating sculptures) more commonly associated with social movements and activism than practices in statutory and non-statutory processes that involved writing submissions and attending consultation meetings.

Table 10.3: Public events related to the ECan Act (2010)¹⁴

Type	Date	Title (organiser)
Public meeting	10-Apr-2010	Save Our River public meeting (former ECan councillor)
Public meeting	14-Apr-2010	Our Water Our Vote meeting (Green Party)
Public meeting	15-Apr-2010	Where to with Canterbury's water woes? (Forest & Bird)
Rally	22-Apr-2010	Black Thursday – last ECan council meeting (Our Water Our Vote)
Rally	30-Apr-2010	Our Water Our Vote, ECan (Our Water Our Vote)
Rally	9-Jun-2010	Key protest rally (Our Water Our Vote)
Rally	13-Jun-2010	Reflections on Water (Our Water Our Vote)
Rally	1-Jul-2010	Nicky's Office Party (Our Water Our Vote)
Public meeting	22-Jul-2010	The ECan Act and the Future of NZ Environmental Law (Lecturer, Lincoln University)

While the legislation was intended to address deficiencies in the region's water management, some academics and lawyers questioned whether the intervention was appropriate given that certain processes and recourse to the Environment Court are now not possible in Canterbury, thus creating inequality in terms of processes and practices available for public participation compared with other regions¹⁵.

“Suspending both regional elections and appeals to the Environment Court clearly minimises the scope of debate over crucial water issues by eliminating many of the players from the field.”

Ann Brower, Lincoln University

Discussion

Prior to the ECan legislation, opportunities were available in Canterbury for public and stakeholder participation in statutory and non-statutory processes prior to decisions being made on resource consent applications or review of a flow regime and before approval was given to a water management strategy. Participation through civil society processes occurred once the ECan legislation had been passed. This distinction may explain why the nature of the participation in terms of who participated and how they participated is somewhat different.

While resource consent applicants and regional councils are two actors involved in statutory processes, non-statutory and legislative processes lead to other actors getting involved in water resource management through a range of different practices. Table 10.4 depicts *how participation has worked in practice* in terms of who is involved, where, and how people participate in relation decision-making processes described above. Practices used in each process span – but are not limited to – making submissions on notified resource consents or attending public meetings; writing letters to the media; and organising rallies, protests and public meetings with the help of online technologies. Following the ECan Act, participation in water governance moved from offices and public halls to conference rooms, riverbanks and city squares.

Table 10.4: Mapping public participation in Canterbury (2008–2010)

	Statutory processes (2008)	Non-statutory process (2008–2009)	Civil society process (2010)
What is the basis of participation?	Application of a resource consent Review of environmental flow regime	Development of a regional water management strategy	Passing of legislation by the New Zealand Parliament
Who was the decision-making authority?	Regional council	Mayoral Forum Regional Council	Minister for the Environment and Minister of Local Government NZ Parliament
Who participated?	Individual applicants Affected parties Concerned members of the community	Individual members of public Stakeholder groups	Individual members of the public Activist groups Academics Artists Politicians Parliamentarians
How did people participate?	Attended public meetings Responded to questionnaires Wrote submissions	Attended public meetings Wrote submissions Attended hearings	Attended meetings and rallies Carried placards Sang songs Built sculptures Read poetry
Where did people participate?	Office buildings Church halls	Church halls School classrooms	Outside buildings Public squares Riverbanks
What issues were linked to participation?	Allocation of resources Water use Land use	Collaboration Consensus and deliberative decision-making Catchment based management Sustainability limits Reform of water governance system Different understandings of sustainable water resource management	Understandings of sustainable water resource management Importance of Citizen participation Democracy in local government Cultural, spiritual value of water Legislative interventions in regional issues Importance of institutions in environmental law

During each of these processes, the complexity of water resource management was visible. Issues around water allocation, water use and land use were discussed in statutory processes. Collaboration, deliberation and catchment-based management and establishing new organisational bodies for water management emerged in the context of non-statutory processes alongside different understandings of sustainable water resource management, tensions between uses of water resources for agricultural development or conservation and protection of iconic water bodies were subject to some debate during the development of the CWMS¹⁶. Such tensions around approaches to water resource management were raised in the context of the legislative process alongside concerns about the nature of democracy in local government, the appropriateness of central government interventions in regional water governance and the changing nature of environmental law in New Zealand.

Concluding comments

This chapter identified the diverse nature of decision-making processes and participatory practices in water governance observed between 2008 and 2010. While legislative decisions by central government can change the course of decision-making and suspend certain forms of participation, collaborative and deliberative decision-making processes offer other opportunities for public and stakeholder participation illustrating how decisions made in one realm can influence what happens in others¹⁷. The types of practices of participation emerge in relation to particular decision-making processes. Different individuals and groups continue to create practices to engage in decision-making processes and in some cases become responsible for decision-making themselves. The redistribution of responsibilities for decision-making and resourcing of water resource management is creating new and complex arrangements involving responsible authorities and others. This creativity may be exactly what is required for sustainable water resource management.

As responsibilities for decision-making and resourcing of water resource management in Canterbury are being distributed amongst government and non-government actors (e.g. through zone committees under the Canterbury Water Management Strategy), opportunities for public and stakeholder participation are emerging that require collaborative engagement practices that in turn require trust and support over time. What remains to be seen is whether such styles of collaboration amongst interest groups rather than decision-making by elected officials achieve desired sustainable water management outcomes for those involved and for the wider public in New Zealand.

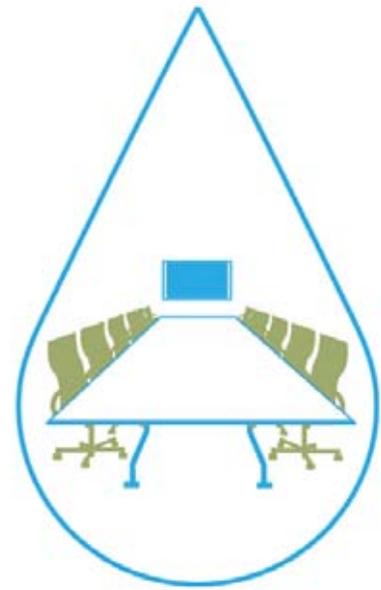
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 - 7 See Endnote 1
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 - 14 Details were collated from websites of the Green Party (<http://www.greens.org.nz/>); Forest and Bird (<http://www.forestandbird.org.nz/>); Lincoln University (<http://www.lincoln.ac.nz/>); Mackenzie Guardians (<https://www.mackenzieguardians.co.nz/>); and Our Water Our Vote <http://www.ourwaterourvote.org.nz> and associated facebook pages. Accessed 7 March 2011.
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CHAPTER 11

Development of collaborative
governance approach



Bryan Jenkins

11. Development of collaborative governance approach

Bryan Jenkins

Summary

- The Ostrom Model of self-managed communities has been applied in Canterbury. This has required the introduction of a collaborative governance approach by the regional council.
- An essential component of this approach is the development of a cooperative strategy with all resource users. It also requires institutional arrangements that reflect a collaborative strategy, and different approaches to decision making and conflict resolution.
- Initially this approach was undertaken informally at the sub-catchment scale. It was taken to the regional scale with the development of the Canterbury Water Management Strategy through a collaborative governance approach. It has now been formalised as 10 zone committees and a regional committee to facilitate community engagement in the development of implementation programmes to achieve the targets of the Canterbury Water Management Strategy.
- This paper describes the development of a collaborative model and its implementation in Canterbury between 2004 and 2010.

Paradigm shift in water management

For Canterbury, there was a need for a paradigm shift in water management that was less reliant on Resource Management Act (RMA) statutory processes and representative democracy. In relation to natural resource management, such a process would incorporate:

- Water allocation and availability that addresses sustainability limits and climate variability
- Management of cumulative effects of water takes and land use intensification
- A shift from effects-based management of individual consents to integrated management based on water management zones.

This recognition led to undertaking of the Canterbury Strategic Water Study and the development of a Canterbury Water Management Strategy (CWMS)¹. This work has been carried out in four stages as set out in Table 11.1

Table 11.1: Stages in the development of the Canterbury Water Management Strategy

Stage 1	an initial study of water availability issues in Canterbury. This found that run-of-river abstraction and groundwater withdrawal were reaching sustainability limits. Further water availability would require storage.
Stage 2	an investigation of potential storage sites. The key output was a suite of water storage options for each part of Canterbury.
Stage 3	a multi-stakeholder review of storage options. This stage concluded that an integrated water management strategy was needed that addressed land use intensification and water quality implications and the need to improve environmental flows in rivers.
Stage 4	the development of an integrated water management strategy. This produced a strategic framework that included fundamental principles, infrastructure options, targets for multiple objectives and governance arrangements.

With respect to governance arrangements for the development and implementation of the CWMS, the concept of 'self managed communities' based on Ostrom's² design principles was introduced (see Box 11.1). There has been success in community-based collaborative approaches at the sub-catchment and catchment level in Canterbury³. Such approaches are consistent with the purpose of the 2002 amendments to the Local Government Act. There was a desire to repeat the success that had been achieved at the small scale at multiple scales relevant to the water issues facing the Canterbury Region.

Box 11.1: Principles for self-managed communities (Ostrom 1990)

- transparent, mutual monitoring of the resource and its use;
- institutional arrangements that reflect the collaborative strategy;
- a commitment to the rules ; and,
- agreed approaches to enforcement of infringements and resolution of conflicts

Initial work at sub-catchment level

One of the initial collaborative governance approaches established by Environment Canterbury was the *Living Streams* programme⁴, which was designed to maintain and improve the health of waterways using working partnerships with the region's communities. The key people involved are those who manage land beside the waterway. This is at the sub-catchment level and there are now more than 30 sub-catchments managed under this programme

There are also *water user groups*. These are designed to assist those with water takes whose consents are tied to the same environmental flow monitoring point to manage water takes in a collaborative manner to minimise the time on water use restriction, improve reliability of supply and maintain environmental flow requirements.

Cluster groups were established in the Rakaia-Selwyn groundwater zone, based on subzones with similar groundwater characteristics. These cluster groups were to assist a consent review process for the Rakaia-Selwyn groundwater zone, which had reached fully allocated status.

Governance at multiple levels

Success at sub-catchment level led to collaborative approaches at catchment scale to either address specific issues (e.g. a dam proposal for the Orari River⁵, management of the lower Waitaki after the withdrawal of Project Aqua⁶) or to coordinate community and multiple agency activities (e.g. Avon Heathcote Ihutai Trust, which has a joint programme⁷ of Environment Canterbury, Christchurch City Council and community; and, Waihora Ellesmere Trust⁸, which has community and stakeholder members and is working with a statutory agencies group on development of a management plan for Te Waihora / Lake Ellesmere).

Collaborative governance for CWMS development

The initial stages of the Canterbury Strategic Water Study were technical studies investigating water demand and supply (Stage 1) and opportunities for major storage (Stage 2). There was oversight by a Steering Group that reported to the Canterbury Mayoral Forum comprising 10 people from government, with industry, environmental and tangata whenua representatives. Stage 3 involved a multi-stakeholder review of storage options. Stakeholders gave clear feedback that any water strategy would need to:

- Address water quality risks from land use intensification
- Develop an integrated solution, and
- Involve wider public consultation and engagement with interest groups in seeking a solution, rather than an adversarial approach.

Stage 4 was the development of the Strategy (CWMS) and comprised the following key elements:

- Stakeholder and community engagement in developing options and fundamental principles for a strategy
- Definition of strategic options by a multi-stakeholder steering group
- Community consultation on option preferences
- Strategic investigations of likely outcomes
- Sustainability appraisal of options
- Strategic approach to water management, environmental restoration, infrastructure requirements and governance arrangements.

To ensure a broader range of interests was involved the Steering Group was expanded with six additional representatives from irrigation, fishing, environmental, recreational and health groups were added making the majority of members from non-government organisations. There was an extensive programme of stakeholder engagement and community consultation. This involved engagement in the preparation of the key documents:

- Multi-stakeholder consultation on the uses and benefits of water involving over 300 stakeholders in meetings throughout the Canterbury Region, which led to definition of the Vision and Fundamental Principles for the Strategy
- Steering Group definition and then multi-stakeholder and public consultation on strategic options leading to the strategic concepts for the Strategy
- Multi-stakeholder discussion on the targets that the Strategy needs to meet; these targets now form the basis for testing the programme of activities needed to implement the Strategy
- Public hearings and stakeholder review of the Draft CWMS leading to preparation of the final Strategic Framework document.

Approaches

These engagement processes led to the use of some novel approaches during the development of the CWMS. These approaches have been developed and applied to inform decision-making when dealing with complex problems. First, the generation of fundamental principles arose from the use of OpenStrategy⁹. This is a web-based tool for collaborative decision making. OpenStrategy provided a structured framework concerning four themes of projects, results, uses, and benefits. The tool was used to compile input from multiple stakeholders from a series of community meetings across the region. This helped to overcome the problem of conducting a collaborative approach at a regional scale.

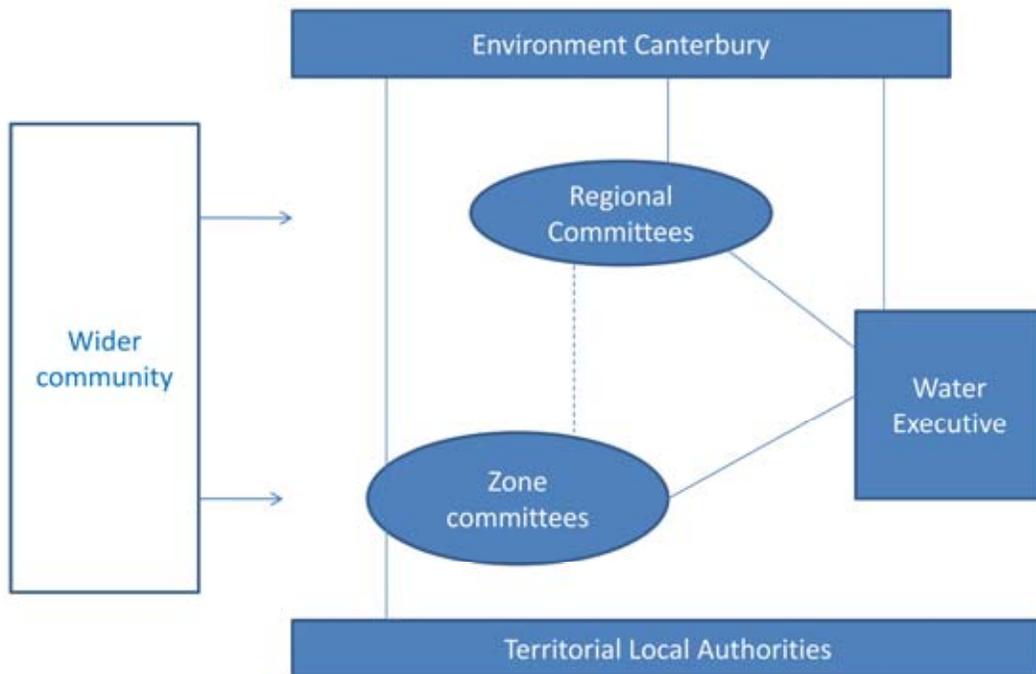
Development of the strategic options was facilitated by the use of *Strategic Choice*¹⁰. This approach for option development and selection arose from experience of decision making in environments where inter-organisational collaboration was essential to successful service delivery¹¹. Strategic Choice is designed to accommodate uncertainties associated with selecting from options where there are uncertainties because there are multiple objectives, uncertainties about having adequate information, and uncertainties because of related decisions having to be made.

The evaluation of options was undertaken using a *Sustainability Appraisal* approach¹². This is based on the ability of the options to meeting sustainability bottom lines and achieving sustainability top lines for social, cultural, economic and environmental capital assets. This approach differs from effects assessment because it focuses on contributions to outcomes rather than mitigation of adverse effects. It differs from weighted-average-factor approaches¹³ because it requires options to be above sustainability bottom lines for all criteria before trade-offs between criteria can occur, rather than allowing trade-offs between different criteria whether or not sustainability bottom lines are met.

Collaborative governance for CWMS implementation

To address Canterbury's water management issues there is a need to consider governance arrangements at the regional level as well as at catchment and sub-catchment levels. A component of the Strategy considered the governance arrangements for integrated management¹⁴ (see Figure 11.1).

The governance structure comprised a 'regional water management committee' to address regional issues and coordinate the development of a 'regional implementation programme', and 10 'zone water management committees' to coordinate the development of 'zone implementation programmes'. A need was also seen for a national forum to address Treaty issues and national policy and standards.



Regional Committee: committee of Regional Council to facilitate community recommendations
 Zone Committees: committees of Regional Council and TLAs in zone to facilitate community recommendations

Figure 11.1: Governance arrangements for CWMS

By January 2011¹⁵, the Regional Committee and six of the 10 zone committees were established with the other four zone committees in the process of being established. The zone committees are joint committees of the regional council and the territorial authorities in the zone, with all councils having a representative on the committee. This brings together the relevant authorities for water and land use. Each rūnanga (Māori local council) in the zone can appoint a representative. There are 4–7 appointed members who come from the community, with a range of backgrounds and interests: agricultural, environmental, recreational, economic, energy and community.

The Regional Committee is a committee of the regional council with two regional council members and four territorial authority members. Each zone is represented (10 members). There are three rūnanga members and one from Te Rūnanga o Ngāi Tahu (the organisation that services the Ngāi Tahu tribe). There are also seven community members and an observer from central government.

A 'water executive' has been established at Environment Canterbury to facilitate the zone committees and regional committee and to project-manage implementation of the Strategy.

The purpose of the *zone committees* is to facilitate community engagement in the development of zone implementation programmes that give effect to the CWMS for issues at zone level. These issues primarily relate to land and water use and the management of cumulative effects on water quality. Also of importance is the development of a biodiversity management programme for each zone.

The purpose of the *regional committee* is to coordinate the development and periodic review of a regional implementation programme for the wider Canterbury Region that gives effect to the CWMS and takes

account of the implementation programmes of the zone committees. The main regional issues relate to water availability. The current focus is on the contributions that seven infrastructure options¹⁶ identified during the strategy development investigations can make to the achievement of the CWMS targets. This is being undertaken through 'strategic assessments'. These are assessments of contributions to CWMS outcomes as defined by the targets. This can be contrasted to assessments of environmental effects of the project as required by RMA processes.

It is also important to note the operating philosophy for zone committees. This included:

- Giving effect to principles and targets of the Strategy
- Considering and balancing the interests of all stakeholders
- Working in a collaborative and cooperative manner
- Appointing on the basis of knowledge and experience rather than representation of particular interests
- Promoting collective interests rather than individual rights
- Seeking consensus in decision making, and
- Being culturally sensitive to tikanga Māori¹⁷.

Differences in style and tools for differences in outcomes

The shift from a regulatory approach to a collaborative approach reflects a difference in style of governance arrangements compared with traditional regulatory approaches (see Table 11.2).

Table 11.2: Comparing approaches

Collaborative Approach	RMA regulatory approach
Involving the community at the geographical level appropriate to the issue	Involving communities as affected parties or submitters on proposals
Making decisions on a collaborative basis	Making decisions in a legal (adversarial) process
Providing information on issues and outcomes	Using information as evidence in an interrogative process
Seeking agreement on actions to achieve outcomes, and giving statutory backing to agreements ¹⁸	Relying on legal judgement as the basis for decisions and actions.

The focus on collaborative governance to achieve outcomes has led to a different style of debate compared with representative governance of regulatory process. Once trust is established, the collaborative debates have led to creative and compromise solutions to address concerns of all stakeholders, compared with adversarial debates around entrenched positions¹⁹. While the collaborative approach of CWMS is still 'work-in-progress', it is our experience that involving the people who have to live with the decisions is more likely to lead to innovative solutions with widespread support compared with stakeholder representatives who feel compelled to defend positions and are reluctant to shift positions in an adversarial environment because it is seen as a sign of weakness.

The collaborative approach has also required adoption of different tools and methods. This includes:

- Identification of the values and principles of stakeholders (using web-based tools like OpenStrategy)
- Development of options involving stakeholders (using processes like Strategic Choice)
- Sustainability appraisal of options for contributions to outcomes (rather than assessment of adverse effects of projects)
- Strategic assessment to achieve targets (rather than mitigation modifications to reduce adverse effects of projects), and
- Development of integrated management strategies to achieve community outcomes (rather than reliance on applicant proposals).

In addition to institutional changes to facilitate collaborative governance, there has also been the need to make organisational design changes within the regional council as the resource management agency. These have included:

- Introduction of a Strategies and Programmes Group to facilitate and manage strategy development
- Change to the planning framework from regulatory process to policies to provide statutory backing for the Strategy and plans to provide statutory backing to regional and zone implementation programmes
- Establishment of a Resource Management Group to integrate resource care (i.e. collaborative approaches and regulatory functions around geographical zones)
- Alignment of investigation, planning and operational activities to support strategic initiatives through programme management, and
- Introduction of an organisational development programme on service delivery.

Concluding comments

A collaborative governance approach that is stakeholder and community led has been introduced at the regional scale after its successful application at sub-catchment and catchment scale. It has led to the development of the Canterbury Water Management Strategy as a framework for water management in the region. A nested approach was needed to deal with issues at different geographical scales.

It is noteworthy that the introduction of collaborative governance has led to other changes. These include:

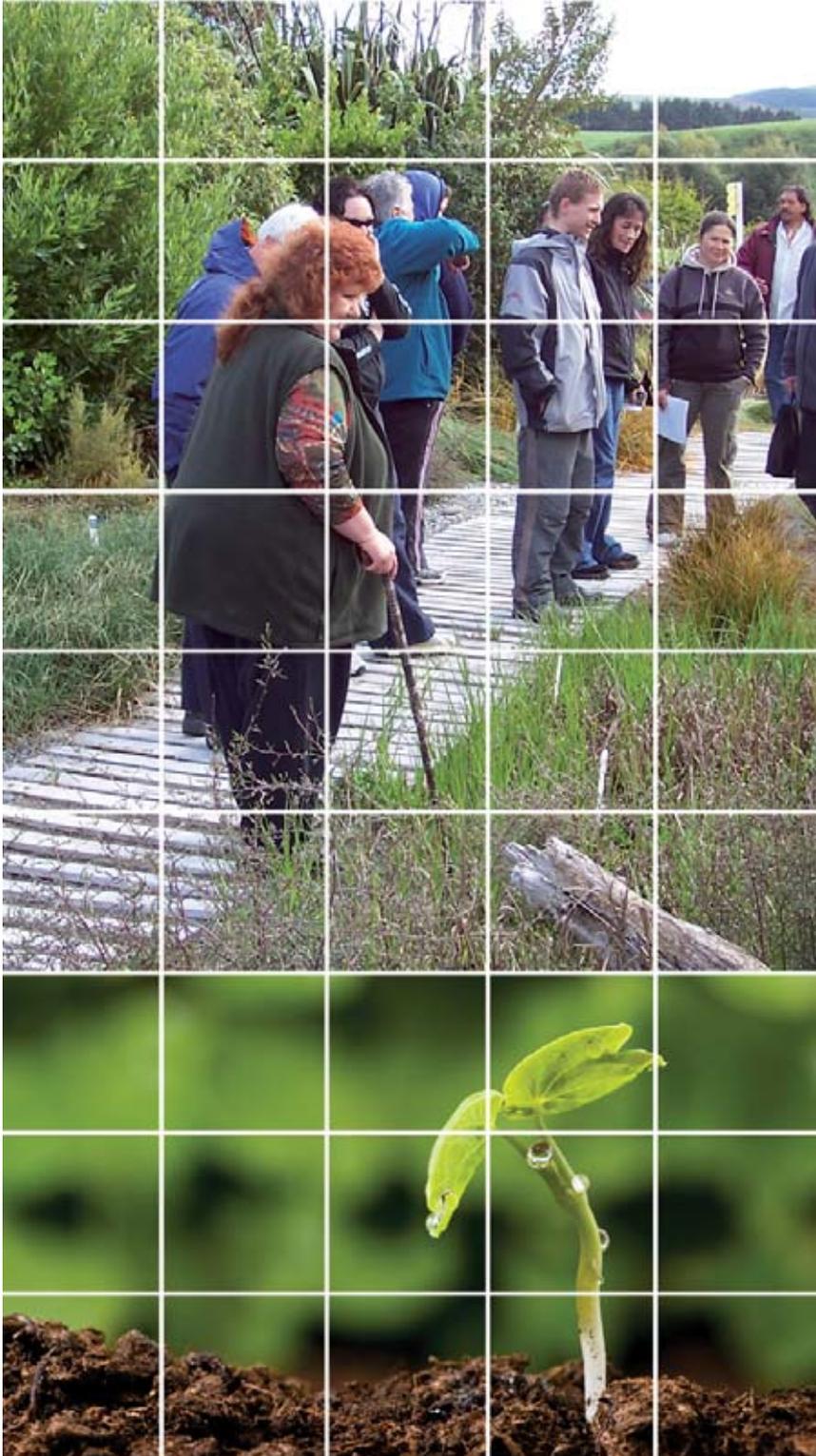
- New institutional arrangements in the form of regional and zone committees to coordinate regional and zone implementation programmes
- Changes in stakeholder and community interaction with high levels of engagement in strategy development and implementation
- Changes in operating philosophy and debate, with greater cooperation and innovation in approaches to water management issues
- The introduction of new tools and methods for decision making including OpenStrategy for defining values and principles, Strategic Choice for generating strategic options, sustainability appraisal for option evaluation, and strategic assessments for evaluating contributions to strategic targets
- A change in resource management agency function by adding the role of facilitating sustainable development to its regulatory role for environmental protection, and
- Changes in organisational design to focus on outcomes rather than process.

The introduction of the collaborative governance approach has not only led to a significant shift in water resource decision making but also to significant shifts in institutional arrangements, community engagement, operating philosophy, new tools, and, changes in agency function and organisation design. It shows the potential to create the paradigm shift needed in water management in Canterbury.

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- 1 Canterbury Water 2009. Canterbury Water Management Strategy: strategic framework. Prepared by Environment Canterbury for Canterbury Mayoral Forum.
 - 2 This is based on the approach described in Ostrom E 1990. *Governing the Commons: The evolution of institutions for collective action*. New York, Cambridge University Press. As discussed in Chapter 6.
 - 3 Jenkins BR 2009. Best practice partnerships at the local government level for the environment. Community Boards Conference, March 2009, Christchurch, NZ.
 - 4 See Environment Canterbury website <http://ECan.govt.nz/get-involved/local-projects-community-groups/living-streams>.
 - 5 Jenkins BR, 2007. What role for storage in Canterbury? NZSOLD/ANCOLD Conference "Dams – Securing Water for Our Future" 19-20 Nov 2007, Queenstown.
 - 6 Project Aqua was a hydroelectric scheme proposal for the lower Waitaki River. The proposal was abandoned in 2004. See <http://www.meridianenergy.co.nz/about-us/news/media-releases/2004/meridian-energy-withdraws-project-aqua-consent-applications/>
 - 7 The Trust has developed the Ihutai Management Plan. Although this is non-statutory, it provides the basis for integrating the activities of community groups and government organisations to an agreed vision, goals and targets.
 - 8 See Waihora Ellesmere Trust <http://www.wet.org.nz/>
 - 9 See Open Strategies <http://openstrategies.com>.
 - 10 Friend J, Hickling A 2005. *Planning under pressure: The strategic choice approach*, 3rd edn. Amsterdam, Elsevier.
 - 11 Midgley G 2000. *Systemic intervention: philosophy, methodology, and practice*. New York, Kluwer Academic.
 - 12 Jenkins BR, Russell S, Sadler S, Ward M 2010 Application of sustainability appraisal to the Canterbury Water Management Strategy. Sustainability Assessment Symposium 2010: Towards Strategic Assessment for Sustainability, 25–26 May, Fremantle, Western Australia.
 - 13 See http://en.wikipedia.org/wiki/Multi-criteria_decision_analysis.
 - 14 Canterbury Water, 2009, pp. 9–12 see Endnote 2
 - 15 This is at end January 2011, status and progress by Committees is available at <http://www.canterburywater.org.nz>.
 - 16 The seven options are: Use of Lake Coleridge for storage; Efficiency improvements in mid Canterbury; Groundwater storage in Central Plains; Hurunui integrated option; Lees Valley storage; Lake Tekapo water for South Canterbury; Extension of Hunter Downs to north.
 - 17 Tikanga refers to correct procedure based on Māori custom.
 - 18 For water management in Canterbury statutory backing implies a statutory instrument of the Resource Management Act, such as a regional policy statement, a regional plan or a resource consent.
 - 19 An example of an innovative solution is the alternative to the proposed dam on the Orari River generated during the Orari Catchment Community Group discussions. The alternative developed involved galleries to take high flows from the Rangitata River to an off-river storage site.

CHAPTER 12

Innovations in collaborative governance



Neil Gunningham

12. Innovations in collaborative governance

Neil Gunningham

Summary*

- Approaches to the allocation of scarce water resources by policymakers involve decisions about whether to rely on hierarchical systems, such as command-and-control regulation; to place greater faith in market mechanisms such as water trading; or to shift to much more collaborative, community-oriented forms of decision making, and to identify ways to resolve differences between the interests and values of different stakeholders and overcome conflicts between them¹.
- This chapter describes some of the recent innovations in collaborative governance underway in Canterbury and the emergent successes from collaborative initiatives that involve a paradigm shift in water management thinking brought about by regional collaboration and significant improvements in the water quality of small streams.

* This chapter draws on material published in Gunningham N 2008. [Innovative governance and regulatory design: managing water resources](#). Landcare Research Contract Report LC0708/137.

Introduction

Governance arrangements in Canterbury are widely perceived to be seriously inadequate, prompting a search for innovative alternatives (see Chapter 6). Individuals, groups and segments of society differ markedly in how they perceive the challenges of water resource governance. The current governance arrangements involve an uncomfortable relationship between de facto highly restricted rights to participation under the RMA and the much more expansive approach under collaborative arrangements initiated by the regional council outside of the RMA. The unsatisfactory nature of this relationship is illustrated by the fact that those who disagree with purported outcomes under collaboration can defect by exercising rights of court appeal under the RMA, thereby effectively undermining these collaborative initiatives².

The multi-level and multi-scale nature of water resource management in New Zealand can give rise to multiple problems of governance such as:

- What if other regions are able to lower the cost of water as a competitive bait to attract rural industry to their area?
- What if regional councils are captured by special interests?
- What if upstream sub-regions are unwilling to agree to a particular allocation because they have little to gain from providing more water to lower-catchment communities?
- Will the lowest level of government agree to take responsibility for implementing measures specified at the next level of government (in regional plans) when it perceives this as yet one more resource burden from which it will gain little benefit?

The lack of opportunity under current governance arrangements to provide economic incentives for efficient water use and the limitations of current hierarchical arrangements make it particularly important to explore alternative mechanisms under collaborative governance. At first sight, it might be assumed that such mechanisms cannot be engaged in under that legislation since the RMA does not address the prospect of collaborative governance directly. Yet philosophically, one can also argue that the RMA is not hostile to collaborative approaches and indeed directly encourages them, at least in the context of developing resource management plans. On close inspection, where the RMA is silent as to a particular prospect or initiative, then there remains substantial policy space for experimentation. Such is the case with regard to collaborative governance.

In the future, questions about environmental governance may concern whether responsibilities at the regional level should be discharged directly by regional councils through traditional bureaucratic structures and mechanisms (hierarchy) or whether they should be substantially devolved to regional or local communities under a form of collaborative governance that is more scale-sensitive.

Collaborative governance offers more scope to explore differing perceptions (e.g. about the science and appropriate solutions) through dialogue and debate. This approach encourages a better appreciation of the positions of others, and increases the chances of developing some shared understanding of the problem and means of best addressing it. Collaboration is often undertaken in combination with hierarchical models governance where government agencies establish components of the governance model (see Table 12.1) by setting the framework for collaborative arrangements, creating a hybrid solution similar to those described in Chapter 2.

Table 12.1: Possible state contribution to a hybrid governance model (combined hierarchy with local collaboration)

Components	Explanation
Definitional guidance	State defines the nature of the collaborative governance arrangement with reference to: <ul style="list-style-type: none"> - scope and anticipated outcomes - extent of participation - geographical boundaries - funding arrangements
Participatory incentives	State provides positive or negative incentives for participation
Enforcement capability	Mechanisms through which the state ensures that collaborative governance participants fulfil their obligations

Collaborative governance in Canterbury in 2007

ECan is shifting from its traditional statutory role to one of facilitator of sustainable development. The Local Government Act 2002 (LGA), with its emphasis on achieving sustainability by delivering community outcomes through government, community and industry partnerships, provides a legislative underpinning for such a new role. Environment Canterbury is developing a number of collaborative initiatives with programmes that are engaging with communities at each of four levels (see Table 12.2).

As part of the Canterbury Strategic Water Study (CSWS), a suite of water supply options for each part of Canterbury was studied (see Chapter 11). Each option comprised the physical components such as water sources, storage and water conveyance facilities, and management components such as river allocation rules. In its later stages, it also involved a multi-stakeholder evaluation. Ultimately integrated water management as conceived under this initiative is likely to include development of water storage, redesign of existing irrigation infrastructure to improve water delivery efficiency, and development of water delivery systems for distribution of water from water-rich to water-poor catchments.

Table 12.2: Collaboration in water issues across scales³

Scale	Issue	Examples of collaborative initiatives
Regional	Water availability Land use intensification	Canterbury Water Management Strategy
Catchment	Sustainable level of water use and effects Cumulative impacts of water use Reliability of supply	Catchment engagement started more than 5 years ago with the Waihora Ellesmere Trust, Avon Heathcote Ihutai Trust, South Canterbury Water Enhancement Group and Lower Waitaki Water Management Society
Sub-catchment or stream reach	Environmental flow requirements, river reaches Management of streams and their riparian margins	Informal stream-reach groups commenced in the late 1990's and the 'Living Streams' programme (covering streams of greatest interest) was launched in 2002 and covers more than 30 sub-catchments and a quarter of the region; property-level interventions (seeking beyond-compliance approaches rather than just consent conditions) also commenced around 2002
Property	Land use practices that influence water quality and quantity are defined	Audited self-management

ECan has sought to avoid the adversarial setting of hearings and courts by developing collaborative initiatives with local stakeholders at the subcatchment scale (Table 12.3), seeking to gain their agreement to a particular form of action, and then seeking legal endorsement (via the consents process) at a later stage. For example, a community forum might be conducted, consultations undertaken with rural industry and key water scientists, and substantial agreement reached, and criteria agreed, on how best to go forward.

ECan initiatives working in partnership with communities in the Canterbury Region involve⁴:

- Getting stakeholder engagement to define issues and request information
- Compiling information for stakeholder evaluation and a search for options
- Option development in consultation with stakeholders
- Responses by ECan to requests for analysis and means of resolving differences
- Reaching agreement and negotiating compromises, and
- Giving statutory backing to the agreements

Following the concept of *facilitating self-governing communities*, ECan is working with groups of farmers to form water user groups that work together to manage their combined water takes so that rivers are not placed on restriction⁵. This improves environmental outcomes by keeping flows above the minimum flow restrictions for longer and improves resource availability by keeping water available for extraction for longer.

Table 12.3: Collaborative Initiatives in Canterbury⁶

Initiative	Details
Lower Waitaki River Management Society	Formed from a group established in July 2004 to produce a community-based management plan for the Lower Waitaki River using the principles of integrated catchment management (ICM)
Upper Waitaki Water Quality Trust	Formed by the community in the Mackenzie Basin to address water quality effects and their management associated with possible irrigation development in the upper Waitaki
Avon–Heathcote Ihutai Estuary Trust	A partnership between the community, ECan and Christchurch City Council to integrate implementation of a management plan for improving the estuary
Orari Catchment Group	Facilitated by ECan and the Landcare Trust to work with the community to develop an integrated catchment strategy
Pahau River Enhancement Group –	Formed to implement a community-based action plan that addresses water quality issues in the Pahau catchment – involves the irrigation company, coordinated work on river reaches, and property owners in remedial actions
South Canterbury Water Enhancement Group	Open-forum, multi-stakeholder group set up to investigate and try to resolve water management conflicts such as algal build-up in the Opuha River

Following the concept of *audited self-management*, ECan is also 'encouraging the rural sector to self managed water use whilst providing a platform for more cost effective collection of resource information'⁷. As the CEO of ECan at the time pointed out: 'The system had resource threshold alarms so that the water user and ECan were informed when the river's trigger level or cut off level was reached, the rate of take exceeded the consented rate, the daily or weekly volume was exceeded or the combined rate of take of all users exceeded the available water'⁸. Notwithstanding some early success (see Box 12.4), particularly at local level (i.e. at catchment and sub-catchment level) where genuine community can often be mobilised, challenges remain at a wider geographical scale because the difficulties of gaining active engagement and ownership of the problem increase with scale^{9,10}.

Box 12.4: Examples of measured success

- Reduced bacterial contamination in Lyell Creek
- Reduced phosphorous load in Pahau Creek
- Reduced periphyton cover in Opuha River downstream of the dam
- Reduced sediment load and improved fish spawning habitat in Harts Creek
- Improved aquatic ecology in Boggy Creek
- Improved management of environmental flows in Te Ngawai River
- Improved nesting success of braided-river bird species in the Ashley River

In addition to a growing number of hybrid initiatives that sit somewhat uncomfortably alongside the RMA, there is a limited use of market mechanisms. The principal such mechanisms at work in Canterbury are: trading of shares within irrigation companies; transfers under the RMA (in 2007, there were 40 transfers being processed by ECan); and sales of land with consented water.

Concluding comments

In 2007, collaborative governance initiatives were expressly provided for under the RMA, and had no legislative backing, thus they relied substantially on consensus solutions. Unless all sides have incentives to participate in dialogue and negotiate mutually agreed solutions¹¹, collaboration can be a serious problem

when there is conflict. For example, there may be tension between the protection of instream environmental flows (or flushes) and maximisation of productivity (and sometimes water use) by landholders who then reject 'working together' towards consensus solutions.

Similarly, there are no default penalties that provide a credible threat of a (less desired) regulatory resolution if parties do not reach agreements. Indeed, under the RMA (and the LGA) there are no penalties whatsoever for failing to engage in collaborative governance and those who fear being disadvantaged by the outcomes of community-based decisions can opt out of them entirely by the simple expedient of exercising their rights under the RMA and going to court¹². Doing so fundamentally undermines the integrity of the collaborative process. It is also the case that court action, being adversarial in nature¹³, undermines the trust that may well be necessary for collaboration to succeed.

Balancing the economic needs of various stakeholders and the environmental interest might most effectively be achieved by a combination of direct regulation (hierarchy) and collaboration. A hybrid involving both collaboration and the state will also enable water managers to maintain legitimacy in the face of conflicting demands, while the adaptive nature of collaboration best takes account of the fact that the science is unclear and the future demands for water and the capacities of water resources to meet them are uncertain. But such a hybrid also requires the state to play the sort of facilitative role described above. This approach is already yielding some positive results, not the least of which is the shift in water management thinking occurring as a result of regional collaboration achieving significant improvements in the water quality of small streams.

Acknowledgements

The project was funded by FRST (Landcare Research Contract Report LC0708/137) and by an Australian Research Council linkage grant on collaborative governance. It also forms part of the broader research agenda of the National Centre for Groundwater Research and Training.

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- 1 Huitema D, Bressers H 2006. Scaling water governance: the case of the implementation of the European Water Framework Directive in the Netherlands. Bali conference paper, available at <http://www2.bren.ucsb.edu/~idgec/abstracts>.
 - 2 Any collaborative arrangement or agreement that involved the allocation or use of resources would need to be finally 'sealed' with a consent or plan change to secure it into the future. This being the case there is opportunity for it to be challenged through the courts.
 - 3 Jenkins BR 2007. Water allocation in Canterbury. Keynote address to the New Zealand Planning Institute National Conference, Palmerston North, 27–29 March 2007.
 - 4 Jenkins 2007. (see Endnote 3)
 - 5 Jenkins 2007, p. 15. (see Endnote 3)
 - 6 Jenkins 2007, p. 15. (see Endnote 3)
 - 7 Jenkins BR 2005. Giving statutory backing to non-statutory strategies through regional policy statements; a case study of the Urban Development Strategy for Greater Christchurch. Presentation to the Resource Management Law Association Conference, Christchurch, 6–8 October 2005. (p. 16)
 - 8 Jenkins 2005, p. 16 (see Endnote 7).
 - 9 Jones C, Hesterly WS, Borgatti SP 1997. A general theory of network governance: exchange conditions and social mechanisms. *The Academy of Management Review* 22: 991–945.
 - 10 Lane, MB McDonald GT, Wentworth TH 2004. Decentralisation and environmental management in Australia: A comment on the prescriptions of the Wentworth Group. *Australian Geographical Studies* 42: 103–115.
 - 11 Nelson R 2005. Legislation for ICM: advancing water resources sustainability? *Environment and Planning Law Journal* 22: 96–129. (p. 123)
 - 12 Notified applications for consents under the RMA typically go to a Commissioner Hearing and on occasion to the Environment Court (and ultimately to the higher courts) on appeal. The commission and courts provide a framework that enables both sides to put forward the relevant scientific and technical evidence and for a reasoned decision to be made on the basis of that evidence.
 - 13 This is in large part because both consents and regional plans are statutory documents, and in consequence, decisions are necessarily made on legal rather than environmental grounds, following the standard adversarial courtroom contest.

CHAPTER 13

Co-governing fresh water



Jacinta Ruru

13. Co-governing fresh water

Jacinta Ruru

Summary*

- The Treaty of Waitangi settlement statutes provide new opportunities for Māori to be involved in co-governing fresh water.
- This article outlines how these agreements are providing opportunities for new governance structures for the management of fresh water through legal devices.
- Statutory acknowledgments, in particular, are new legal devices that help to create a platform for better communication between decision-makers and iwi and hapū.
- In recent years, some iwi and hapū have successfully negotiated new management regimes for fresh water, most notably the new operative model for the Waikato River.
- However, to date, iwi and hapū have not successfully negotiated ownership of fresh water.

* This article draws on published material by Jacinta Ruru: The legal voice of Māori in freshwater governance. A literature review (Landcare Research, 2009). And Ruru, J. 2010 '[Undefined and unresolved: exploring Indigenous rights in Aotearoa New Zealand's freshwater legal regime](#)' *The Journal of Water Law* 20: 236–242.

Introduction

Since the 1980s, government has been committed to engaging in a fair and final Treaty of Waitangi settlement process. Many of the legislated settlements have some focus on fresh water. This article outlines how these agreements are providing a new co-governance structure for managing fresh water through the use of new legal devices.

The legislation

The Treaty of Waitangi settlement process is conducted through the Office of Treaty Settlements as a separate unit within the Ministry of Justice. The Office has the mandate to resolve historical Treaty claims (defined as claims arising from actions or omissions by or on behalf of the Crown or by or under legislation on or before 21 September 1992). The settlements aim to provide the foundation for a new and continuing relationship between the Crown and the claimant group based on the Treaty of Waitangi principles. Settlements thus contain Crown apologies of wrongs done, financial and commercial redress, and redress recognising the claimant group's spiritual, cultural, historical or traditional associations with the natural environment. These settlements are given effect to in legislation¹. Many of the now 20 or so legislated settlements have some focus on fresh water. This article focuses on three legislated dimensions: statutory acknowledgments recording the importance of water bodies for specific iwi and hapū; legislative fresh water co-management; and, legal recognition of iwi ownership of some lake beds but not the water sitting above those beds.

Legal device (1): Statutory acknowledgements

The Treaty of Waitangi claims settlement statutes include provisions that acknowledge the importance of rivers and lakes to the relevant iwi and hapū. This is done by recording a statutory acknowledgement of 'statements of association'. These statements are set out in the schedules to the Acts and outline the cultural, spiritual, historical and traditional association of the relevant Māori trustees with a particular area or resource. Many water bodies now have a statutory acknowledgment. For example, one of the early settlements, the Ngāi Tahu Claims Settlement Act 1998, statutorily acknowledges the particular cultural, spiritual, historic, and traditional association of Ngāi Tahu with Mata-Au (the Clutha River) (section 206). Schedule 40 of the Act records that the river is regarded as a descendant of the creation traditions where the earth mother and sky father separated to create a world of light in which we live in today. The schedule explains the importance of the river to Ngāi Tahu ancestors including travels along it, camping beside it, and the collection of food from it. The schedule also speaks of the continuing mauri (life force) of the river, something that:

“...represents the essence that binds the physical and spiritual elements of all things together, generating and upholding all life. All elements of the natural environment possess a life force, and all forms of life are related. Mauri is a critical element of the spiritual relationship of the Ngai Tahu Whanui with the river.”

Schedule 40

Other settlement statutes include similar Crown acknowledgements of the importance of waterways to Māori. Table 13.1 below identifies some of waterways that today are statutorily acknowledged as being important to iwi and hapū.

Table 13.1: Water bodies subject to statutory acknowledgements

Statute	Schedule	Water body
Affiliate Te Arawa Iwi and Hapu Claims Settlement Act 2008	Schedule 3, part 1.	Parts of the Kaituna, Tarawera and Waikato rivers and the Waiteti and Ngongotaha streams
Ngāti Mutunga Claims Settlement Act 2006	Schedule 3.	Onaero and Urenui rivers and parts of the Waitara and Mimi rivers
Ngaau Rauru Kiiitaki Claims Settlement Act 2005	Schedules 9–11.	Patea, Whenuakura and Waitotara rivers
Ngāti Tuwharetoa (Bay of Plenty) Claims Settlement Act 2005	Schedules 3, 7, 8.	Rangitaiki and Tarawera rivers
Ngāti Awa Claims Settlement Act 2005	Schedules 10–12.	Whakatāne, Rangitaiki and Tarawera rivers
Ngati Tama Claims Settlement Act 2003	Schedules 9–10.	Mohakatino and Tongaporutu rivers
Ngati Ruanui Claims Settlement Act 2003	Schedules 4, 7–9).	Tangahoe, Whenuakura and Patea rivers
Ngāi Tahu Claims Settlement Act 1998	Schedules 15–17, 19, 21, 23, 26, 40, 50, 52, 55, 56, 69, 72, 74 for the rivers. Schedules 20, 22, 24, 25, 28–32, 46, 48, 57–59, 61, 68, 71, 75–77 for the lakes.	Aparima and Hakataramea rivers, Hakatere (Ashburton River), Hekeao (Hinds River), Hurunui, Kakaunui and Kōwairivers, Mata-Au (Clutha River), Ōreti, Pomahaka, Rangitata, Taramakau, Waiau, Waitaki, and Waipara rivers. Hoka Kura (Lake Sumner), Kā Moana Haehae (Lake Roxburgh), Karangarua Lagoon, Kōtuku-Whataoho (Lake Brunner Moana), Kuramea (Catlins Lake), Lakes Hauroko, Hawea, Kaniere and Ohau, Ō Tū Wharekai (Ashburton Lakes), Ōkārito Lagoon, Takapo (Lake Tekapo), Te Ana-au (Lake Te Anau), Te Ao Mārama (Lake Benmore), Te Wairere (Lake Dunstan), Uruwera (Lake George), Wairewa (Lake Forsyth), Whakatipu-wai-māori (Lake Wakatipu), Whakamataui (Lake Coleridge) and Whakarukumoana (Lake McGregor)

But what is the purpose of statutory acknowledgements? This is spelt out in the legislation and generally follows the same pattern². First, they require relevant consent authorities, the Environment Court and the Historical Places Trust to have regard to the acknowledgements when deciding whether the trustees are persons who may be adversely affected by the grant of a resource consent for activities relating to the statutory area, who may have an interest in proceedings greater than the public generally, or who may be directly affected in relation to an archaeological site, respectively. Second, the acknowledgements require the relevant consent authorities to forward summaries to the trustees of resource consent applications impacting on the area in relation to which a statutory acknowledgement has been made. Third, the trustees and members of the relevant Māori group are able to cite the statutory acknowledgements as evidence of their association with a statutory area in relevant proceedings or submissions. This is not, however, binding as deemed fact.

The legislation states that the statutory acknowledgement will not affect the lawful rights and interests of persons not party to the deed of settlement, and will not prevent the Crown from providing statutory acknowledgement to other Māori groups in the area. The express limitation placed on the effect of a statutory acknowledgement is that it is held to not have the effect of granting, creating, or providing evidence of an estate or interest in, or rights relating to, a statutory area³. The effect of a statutory acknowledgement is further limited in that the acknowledgement may not be taken into consideration by a person exercising a power or function under a statute, regulation or bylaw. Neither can such a person give greater or lesser weight to the association of the relevant Māori group than they would normally give were the statutory acknowledgement not in existence (section 59).

In the legislative definition, a statutory acknowledgement in relation to waterways does not include a part of the bed of the waterway that is not owned by the Crown, or land that the waters of the waterway do not cover at its fullest flow without overlapping its banks, or an artificial watercourse, or a tributary flowing into the waterway. However, waterways do include rivers, which are defined as a continuously or intermittently flowing body of fresh water, including a stream or modified watercourse, and the bed of the river.

In summary, while statutory acknowledgements are important symbolically, they have little legal strength. If an area has a statutory acknowledgement attached to it, consent authorities must forward summaries of resource consent applications to the iwi. This at least gives the iwi knowledge of possible impending use of waterways, and the iwi can object to the proposed use, but the consent authority does not have to give any particular weight to the fact that the statutory acknowledgement exists. Overall, statutory acknowledgements help to create a platform for better communication between decision-makers and iwi and hapū in regard to the future use of fresh water.

Legal device (2): Joint management

Some of the Treaty of Waitangi settlements are proscribing a new management regime for fresh water, most notably the settlements relating to the Waikato River. The Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010 (and the companion statute Ngati Tuwharetoa, Raukawa, and Te Arawa River Iwi Waikato River Act 2010) has at its heart the Crown recognition that Waikato-Tainui regard the Waikato River as a tupuna (ancestor)⁴. Section 5(1) of the Act endorses that a new vision and strategy 'is intended by Parliament to be the primary direction-setting document for the Waikato River and activities within its catchment affecting the Waikato River'. Key components of the vision and strategy include: '(a) the restoration and protection of the health and wellbeing of the Waikato River; (b) the restoration and protection of the relationships of Waikato-Tainui with the Waikato River, including their economic, social, cultural, and spiritual relationships'⁵.

The Waikato River Authority is the new statutory body responsible for setting the primary direction through the vision and strategy for the Waikato River (section 22(2)). The Authority consists of 10 members, including one member appointed from each of the iwi that link with the river (Te Arawa, Tuwharetoa, Raukawa, Maniapoto), a member appointed by the Waikato River Clean-up Trust, and five members appointed by the Minister for the Environment in consultation with other Ministers such as Finance, Local Government, Māori Affairs (schedule 6, clause 2(1)). The Act gives power to the new Waikato River Clean-up Trust. The Trust's primary object is 'the restoration and protection of the health and wellbeing of the Waikato River for future generations' (section 32(3)). The Trust must also be involved in preparing a new integrated river management plan, along with relevant central departments, local authorities and other appropriate agencies (section 36(1)). The integrated river management plan must have conservation, fisheries, and regional council components (section 35(3)). Moreover, a joint management agreement must be in force between each local authority and the Trust in the near future (section 41(1)). The Waikato-Tainui Raupatu Claims (Waikato River)

Settlement Act 2010 sets a significant standard of co-management between Māori and local authorities and encapsulates the importance of recognising and providing for the Māori relationship with water.

These iwi were successful in seeking this co-management settlement for several reasons. The settlement reflects the Crown's contemporary acceptance that at 1840, the date when the Treaty of Waitangi was signed, specific Māori tribes possessed the Waikato River and that these tribes have consistently asserted their authority over the river. For example, the Act's preamble records an event in 1862 when a tribal chief warned the colonial Governor that the gunboat might not enter the river without his permission, using these words: 'E hara a Waikato awa i a te kuini, erangi no nga Māori anake'. (The Waikato River does not belong to the Queen of England, it belongs only to Māori.) The Waikato River settlement was also partly an acknowledgement of the horrendous events that took place in the 1860s when the Crown's military forces declared war on the Waikato tribes; and then used the law to legitimate the confiscation of large tracts of land from the tribes including lands adjoining the Waikato River. As the settlement legislation accepts, the iwi were excluded from decision-making concerning the river, and the Crown allowed the river to be used for:

“ Farming, coal mining, power generation schemes, the discharge of waste and domestic industrial abstraction. The wetlands were drained, flood protection schemes were initiated and sand and shingle were removed. While all of these uses of the Waikato River contributed to the economic growth of New Zealand, they also contributed to the pollution and deterioration of the health of the Waikato River and have significantly impacted on the fisheries and plant life of the River ”

Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2011 (preamble).

The 2010 settlement legislation is reflective of the strong political will of these iwi to seek justice for these past wrongs. Other iwi are also seeking like justice and more legislated settlements are likely⁶.

There are already other examples of cooperative management regimes too. For example, there is the Rotorua Lakes Strategy Group, which was established in law for coordinated management of the Rotorua Lakes. This group consists of members from the Rotorua District Council, the Bay of Plenty Council and the trustees of the Te Arawa Lakes Trust. The purpose of this group is to contribute to the sustainable management of the Rotorua Lakes, while recognising and providing for the traditional relationship of Te Arawa with their ancestral lakes⁷. Another example is the permitted establishment of the joint management for Te Waihora (Lake Ellesmere) pursuant to the Ngāi Tahu Claims Settlement Act 1998. The vision is that the lake be managed cooperatively between Te Rūnanga o Ngāi Tahu and the Department of Conservation by striving to restore Ngāi Tahu cultural identity through the rejuvenation of the mauri and life-supporting capacity of Te Waihora⁸.

Legal device (3): Ownership

While the issue of whether fresh water can be owned or not remains politically tense and legally unresolved, the law does recognise that lake and river beds can be owned. The law does have capacity to recognise ownership of the *bed* of lakes or rivers and it is thus on this front that iwi and hapū have had some success in gaining legal recognition of their interests. For example, pursuant to the Te Arawa Lakes Settlement Act 2006, the fee simple in the Te Arawa lakebeds is vested in the trustees of the Te Arawa Lakes Trust. Yet, the ownership is restricted. For example, the Trust cannot alienate the lakebeds. The Act explicitly states that this vesting of the lakebeds does not include any rights in relation to the water in the lakes, or the aquatic life

(section 25). Another example includes the Ngāi Tahu Claims Settlement Act 1998 that vests the bed of Te Waihora (Lake Ellesmere) in Ngāi Tahu (see section 168).

A co-governance future?

To Māori, water is everything – an ancestor, a life force, the provider of food, and a meeting place full of history. In the past two decades, Aotearoa New Zealand’s legislation has developed to provide Māori some rights to be involved in the governance of water. This chapter and chapter three have explored the legislative framework for committing to recognising Māori interests in water. However, all present rights are vulnerable to being trumped by other competing interests. It is encouraging that the current government recognises that there exist both a challenge and an opportunity to better define and resolve Māori rights and interests in water. But in reforming water management and allocation models, the law may need to do something more than simply acknowledging that water is important to Māori. A co-governance future will require iwi and hapū being regarded as Treaty partners, not merely stakeholders, and thus having rights to better influence the decision-making concerning all aspects of water take and use. The Waikato River model is exciting but it may not be the appropriate governance model for other iwi and hapū. The issue is now critical for resolution.

Acknowledgements

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¹For more information on settlement legislation, including the list of completed settlements, see the Office of Treaty Settlements website at www.ots.govt.nz. Note that legislation can be viewed at www.legislation.govt.nz.

²For example, see Ngāti Mutunga Claims Settlement Act 2006 sections 49–60 for the legislative effects of a statutory acknowledgment.

³Ngāti Mutunga Claims Settlement Act 2006, section 61.

⁴See Preamble (1) and 17(f), section 8(2) and (3). For discussion see Linda Te Aho, 'Indigenous challenges to enhance freshwater governance and management in Aotearoa New Zealand – The Waikato River settlement' (2010) 20 *Journal of Water Law* 285.

⁵Schedule 2, clause 3. Note clause 3 is extensive and lists 13 objectives – only the first two are reproduced here.

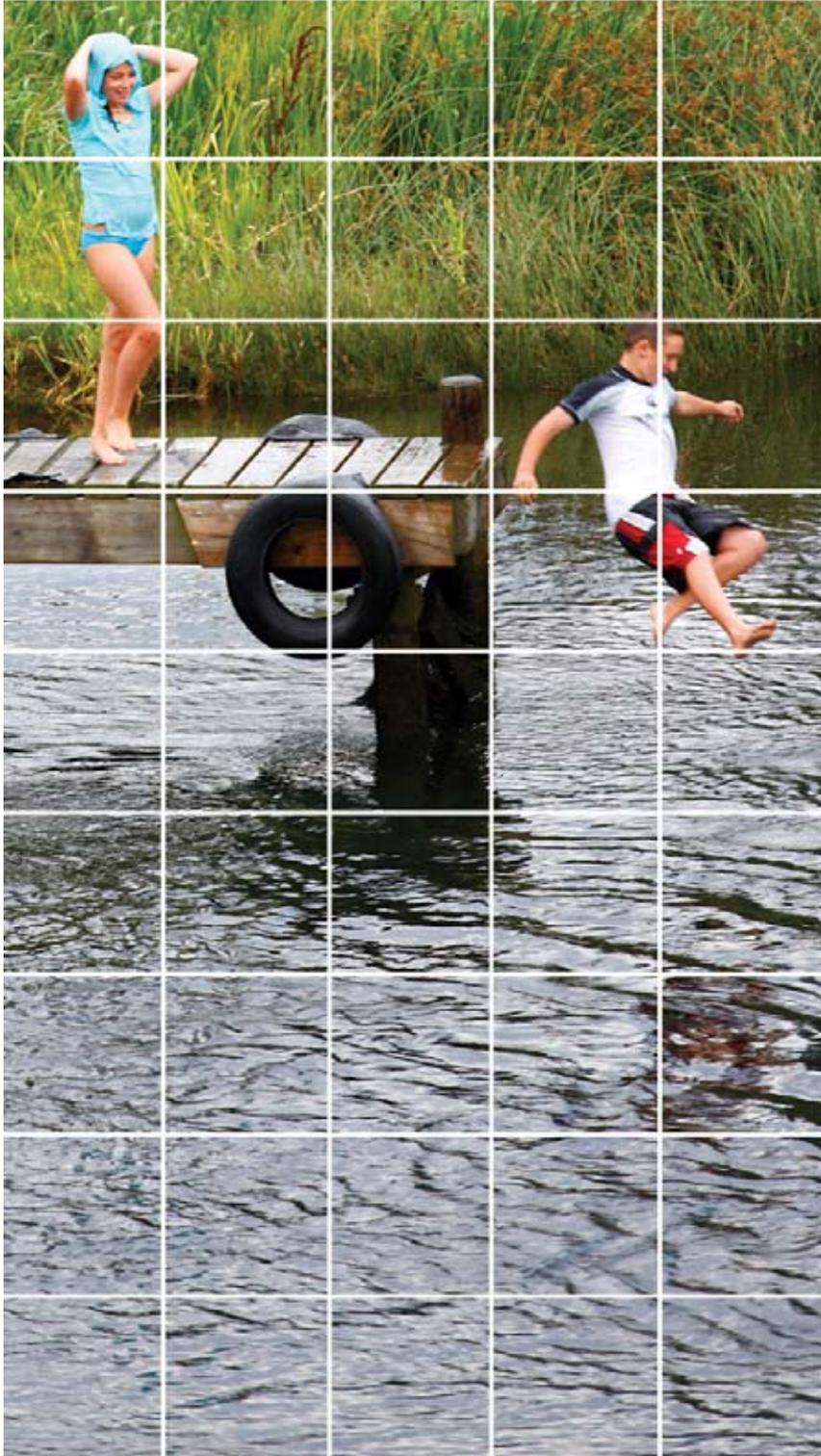
⁶For example, see the Nga Wai o Maniapoto (Waipa River) Bill, introduced into the House on 16 November 2010.

⁷See sections 43 and 49 of Te Arawa Lakes Settlement Act 2006 and the Bay of Plenty Regional Council website at <http://www.boprc.govt.nz/council/committees-and-meetings/rotorua-te-arawa-lakes-strategy-group.aspx> for more information.

⁸See section 177 of the Ngāi Tahu Claims Settlement Act 1998. See the Department of Conservation’s website at <http://www.doc.govt.nz/publications/about-doc/role/policies-and-plans/conservation-management-plans/te-waihora-joint-management-plan/> for a copy of the joint management plan.

CHAPTER 14

Concluding commentary



Bob Frame

Shona Russell

14. Concluding commentary

Bob Frame and Shona Russell

Summary

- In this concluding chapter we summarise more recent key moments in water governance and present some future lines of research inquiry.
- New Zealand has rapidly moved towards recognition that water governance is emergent, fluid and complex. As researchers, we see water governance as a wicked problem, a term used when dealing with complex social and ecological issues where different worldviews can shape both definition of the problem and the solutions that are developed – to address issues rather than attempt to solve them in an absolute sense.
- Ways forward include increased collaboration in decision-making, and New Zealand is increasingly adopting polycentric governance – where authority for decision-making is dispersed amongst actors in contrast to those systems where authority is centred in government agencies. This helps place water governance in New Zealand at the leading edge internationally and provides an opportunity for experimentation that should be carefully documented and analysed so that the full benefit of the investment is realized.
- As water governance unfolds and practices develop, challenges will remain as to how to best develop capabilities and capacities in communities, including those of researchers, to participate in decision-making. We see a response working with the wisdom of the crowds in a *collaborative* way; another that may disrupt normative ways of working *creatively* to explore ways of imagining fresh water and our relationship to it and each other; and yet another that takes a *critical* perspective in line with the increasingly congested world of academic theory. Yet, in our view, there is no choice between being collaborative or creative or critical as it is only through holding multiple perspectives and options that rich descriptions can be woven together.

Introduction

In this chapter we consider two more recent initiatives in some detail, particularly highlighting the emerging themes of wicked problems (complex, contradictory, persistent and insoluble) and polycentrism (an involvement of a wide range of stakeholders in decision-making). Following on from this we discuss possible future research directions.

Water governance initiatives (2010–2011)

Previous chapters have examined moments in water governance between 2007 and 2010 including court decisions, hui and stakeholder meetings, and key strategies. They have also examined more day to day practices of water management such as the issuing of consents and the monitoring of rivers. Some of the key moments marking the unfolding of water governance since 2010 are listed in Table 14.1. The table includes initiatives involving regional councils, central government and stakeholders; it excludes, however, many smaller initiatives and conversations that have occurred during the period, and which may also have marked shifts in how people are thinking about water, how it is managed, and their own role in such management. These smaller and less formal conversations are less easily identified and tabulated than those which are marked by formal events.

Moments, such as those listed in the table, have been happening and continue to happen in New Zealand both within and outside the cycles of planning and policy making¹. This table illustrates that multiple actors are engaged in decision-making for water management and that decision-making is distributed across scales – described as a 'nested system' by Jenkins in Chapter 6.

Table 14.1: Moments in water governance involving regional councils, central government and iwi (2010–2011)²

Date	Moment	Scale	Actors involved	Initiative
March 2010	CWMS vision and principles endorsed under legislation	Regional	Members of parliament	CWMS
June 2010 onwards	Zone committees and regional committee established with appointed members who are expected to work collaboratively to develop implementation programmes	Regional	Environment Canterbury (ECan) Members of zone and regional committees	CWMS
June 2010	Targets for Canterbury Water Management Strategy signed off by Canterbury Mayoral Forum	Regional	Canterbury Mayoral Forum, CWMS Steering Group, Stakeholders (farming, environment, recreation), Interest Groups, Public	CWMS
September 2010	Land and Water Forum announces recommendations for reforms and presents report to Government	Cross-sectoral	LAWF, Government	LAWF
April 2011	Land and Water Forum reports to Government following public consultation activities around the country	Cross-sectoral	LAWF, Government	LAWF
May 2011	Fresh Start for Water clean-up fund for projects to restore waterways affected by historical pollution, starting from July 2011	National	Minister for the Environment Minister of Agriculture and associated Ministries	Fresh Start for Fresh Water
	Irrigation Acceleration Fund established to support development of water infrastructure projects, starting from July 2011	National	Minister for the Environment Minister of Agriculture and associated Ministries	Fresh Start for Fresh Water
July 2011	National Policy Statement for Freshwater Management, issued under the Resource Management Act, which recognises freshwater management as a nationally significant issue requiring Central Government direction	National	Minister for the Environment Minister of Agriculture and associated Ministries	Fresh Start for Fresh Water
August 2011	Hurunui-Waiiau Zone Implementation plan endorsed by Hurunui District Council and Environment Canterbury under the CWMS	Catchment	Hurunui Waiiau Zone Committee, ECan staff, Hurunui District Council, Environment Canterbury	CWMS
	Te Waihora clean-up plan announced involving Government, Ngāi Tahu, Environment Canterbury, Fonterra, Selwyn District Council, Lincoln University and local community as part of Fresh Start for Fresh Water programme	Catchment	Government, Ngāi Tahu, Environment Canterbury, Fonterra, Selwyn District Council, Lincoln University and local community	Fresh Start for Fresh Water
	Minister for the Environment and Minister of Agriculture sign Cabinet Paper responding the LAWF recommendations and outlining a three-tranche work programme including continuing role for LAWF on areas that need reconciliation between stakeholders (setting of limits, decision-making structures for limit-setting, managing limits (including land use) and allocation	National	LAWF members, Minister for the Environment, Minister of Agriculture and associated Ministries	LAWF
	Interim co-governance arrangement, between Ngāi Tahu and Environment Canterbury signed for active management of Te Waihora and its catchment	Catchment	Ngāi Tahu Environment Canterbury	Fresh Start for Fresh Water

We now consider two of these recent initiatives in more depth: the Canterbury Water Management Strategy (CWMS)³ and the Land and Water Forum (LAWF)⁴. The CWMS focuses on the rivers and catchment of the Canterbury Region, while the LAWF is a national initiative; both, however, are reshaping water management practices by drawing attention to increased collaboration in decision-making, the formation of new agencies, the redefinition of responsibilities and increased prioritisation to constraining water use.

The Canterbury Mayoral Forum (CMF), supported by Environment Canterbury, established the CWMS. The CMF comprised elected mayors of the region and the chair of Environment Canterbury, as well as the chief executives of local government in Canterbury. The Forum's Charter of Purpose⁵ from February 2005 states that the forum was established in order to pursue a region-wide approach to addressing issues of mutual concern. The scope of the CWMS included providing long-term direction for the management of water resources with consideration of current and future projects and activities, alongside the integration of infrastructure, environmental flows, water quality, land use, water allocation, ecosystem protection and restoration, and demand management. The Strategic Framework for the CWMS, first published in November 2009 by the Canterbury Mayoral Forum, was subsequently updated with targets in July 2010⁶. Since June 2010, zone committees and regional committees have been established and implementation programmes developed, as Environment Canterbury and others implement the strategy.

In July 2009, the Minister for the Environment and the Minister of Agriculture asked the LAWF to advise on how water should be managed in New Zealand. Specifically, the LAWF was asked to conduct a stakeholder-led collaborative process to recommend shared outcomes, goals and long-term strategies for water management. The LAWF reported to the Ministers in September 2010 before embarking on a series of public consultation meetings around the country in October and November 2010 and February and March 2011. In August 2011, the Ministers responded to recommendations through the Fresh Start for Fresh Water programme and requested that the LAWF continue to work on generating consensus between groups concerning the setting of environmental limits⁷. Table 14.2 details some of the features of each of these initiatives, where elected representatives led the first and stakeholders led the second.

Table 14.2: Water governance initiatives⁸

	Canterbury Water Management Strategy	Land and Water Forum
What problems with water governance were identified?	<p>Regulatory action to deal with water problems has often proved ineffective and is imposing high compliance costs on the public and primary producers.</p> <p>Adverse affects caused by current land management practices often result in court proceedings.</p> <p>The system is becoming highly adversarial and there is a lack of trust and confidence between interests in the context of unprecedented pressures on water resources and lack of clear strategic approach to water management.</p>	<p>There were difficulties in establishing consensus about what constitutes sustainable land use and its implications for fresh water. Councils require additional resources and stronger governance.</p> <p>Iwi have no clear path to engage as a partner with regional councils.</p> <p>There is no strategic process by which to link water management with issues of agriculture, tourism, energy, biodiversity and land use.</p>
Who was involved in the initiative?	<p>Canterbury Mayoral Forum comprising mayors and chief executives of the territorial authorities and regional council</p> <p>Te Rūnanga o Ngāi Tahu</p> <p>Canterbury Water Management Strategy Steering Group</p> <p>Environment Canterbury councillors & staff</p> <p>Stakeholders from agricultural sector & industry; and environmental & recreational groups</p> <p>Scientists and researchers</p> <p>Officials from central & local government</p>	<p>The 58 participating organisations included:</p> <p>Major stakeholders from agriculture and electricity generation</p> <p>Active observers from central and local government</p> <p>Scientists and researchers</p>
What practices were undertaken?	<p>Examine potential demands & availability of water resources</p> <p>Investigate potential water storage options</p> <p>Conduct stakeholder evaluation of storage options</p> <p>Engage and consult stakeholders and communities on strategic options for regional water management</p>	<p>Establish a LAWf group of 21 major stakeholders plus 6 official observers</p> <p>Prepare option papers</p> <p>Report regularly to the larger 'plenary' stakeholder group of 58 participating organisations</p> <p>Develop a set of high level recommendations</p> <p>Submit recommendations to Ministers</p>
What solutions were proposed?	<p>Vision and principles developed</p> <p>Programme of work with milestones in the short, medium and long term</p> <p>Integrated management horizontally across the region and vertically from locality to central government</p> <p>A governance framework involving zone committees and regional committees, a water executive and water infrastructure and services entity</p> <p>Implementation plans for water management zones and the region as a whole that adapt to circumstances</p> <p>Measurable targets to enable monitoring progress over time</p>	<p>There were 53 recommendations including:</p> <p>Setting limits for water quality and flows using a standards framework</p> <p>Using tools and processes to manage limits or achieve targets</p> <p>Investigating allocation options for more efficient and effective use, and the transfer of water permits</p> <p>Regional planning to be done collaboratively</p> <p>National direction to be given through the issuing of a National Policy Statement for Fresh Water Management</p> <p>Establishing a National Land and Water Commission on a co-governance basis with principal function to develop a National Land and Water Strategy</p> <p>Improvements to regional governance through collaborative processes, iwi representation on water-related committees, and direction through national policy statements and national environmental standards</p> <p>Active process of monitoring and reporting on performance and outcomes of water management</p>

Statements about the importance of water are commonplace in policies, strategies, reports and public discourse. Both the above reports state that water is important for economic, social, cultural and environmental wellbeing (see quotes below). Alongside such statements about the importance of water were claims about the problems associated with current ways of managing water. The CWMS report claimed existing ways of managing water would lead to unacceptable water quality outcomes, while the LAWF report argued that, without consensus, economic development is hampered, the environment damaged and antagonisms created in society⁹. What remains uncertain is how proposed reforms incorporate different values, knowledges, and ways of relating to water, into decision-making processes.

“ Canterbury’s water resources are vitally important to the region and to the nation. Lakes, rivers, streams and aquifers are used for hydroelectricity generation, agricultural production and drinking water, as well as for a range of customary and recreational uses ... Water is an essential and integral part of the connection between Ngai Tahu, as indigenous peoples of the region, and their tribal territory.”

Canterbury Mayoral Forum, 2009, p. 5

“ We all agree that water is one of New Zealand’s major national advantages. It sustains life; it is part of our heritage and identity and a special taonga to Māori; it supports our unique ecosystems and species; it is widely valued for pleasure and recreation. At the same time, it is a key economic advantage. It is essential to key industries, including the generation of power, the production of food and wine and the manufacture of goods. It underpins tourism, and it is part of our brand.”

Land and Water Forum, 2010, p.vii

Despite agreement on the importance of water, there was acknowledgement of the lack of strategic direction of water management, which both initiatives suggested should be integrated with land management and economic development. Both initiatives identified problems around achieving consensus for decisions and each indicates some shifts in responsibilities amongst actors when considering water management in relation to national concerns and the concerns of communities, respectively. Alongside specific recommendations for water management, both initiatives propose establishing new agencies responsible for developing and implementing land and water management strategies. Regulation may not be effective in terms of engaging with partners (as Ruru highlights in Chapters 3 and 13 with regard to iwi).

Since the CWMS Strategic Framework report, ten targets have been developed providing measures of progress in the short and long term. These are being connected to the development of implementation programmes for each of the water management zones. Following the LAWF report to Ministers, the National Policy Statement for Fresh Water Management was issued in July 2011 and further work is to be conducted by the LAWF following Ministerial direction in August 2011. Rather than solutions being proposed then implemented in a linear process, both initiatives take a more flexible approach.

The CWMS and LAWF are not just about the development of strategic options or making recommendations for policy. Their initiatives unfold across aspects of water management and engage with stakeholders and communities as well as Ministers. They can involve practices such as the writing of policies and plans, but also

participation and facilitation of deliberative activities, and commissioning reports from researchers and scientists concerning the development of water resources. As water governance opens up to involve stakeholders and communities as well as regulators, policymakers and lawyers, practices for decision-making may differ depending on the problem, who is involved, and how they understand the problem.

Having detailed recent initiatives, we now discuss the emergence of an increasingly polycentric approach to water management in New Zealand.

The polycentric turn

In Australia and Canada¹⁰ those investigating water governance have asked who should be involved in the process, and how is that decided? In addition, who is ultimately accountable when governance occurs through multiple organisations at various scales? Our research shows that water governance needs to be responsive to changing contexts and needs; should include multiple stakeholders with varying responsibilities; and has many of the characteristics of a wicked problem, making it important to address, but difficult to comprehensively solve. In this section, we discuss how this takes place through the increasing use of polycentric approaches in New Zealand.

As water governance unfolds across multiple scales, it is emergent, fluid and complex; and it is situated in social, cultural and political contexts. The widely varying contexts and characteristics of catchments around the country may present difficulties in realising a national strategic vision but provide a frame in which actors, such as regional councils, respond to specific water issues. Responses may need to evolve as situations change and develop in different catchments and communities. The emergence of various and different approaches may enable communities and regional councils to develop innovative responses alongside national direction¹¹.

The evolution of approaches along different pathways is evidenced through the development of the CWMS and LAWF, as well as examples in earlier chapters. These include the emergence of co-governance arrangements between iwi and the Crown; collaborative approaches to water management; tools, processes and models to assess multiple values and evaluate policy options; and the engagement of stakeholders in decision-making. All of which, in our opinion, are covered by the definition of wicked problems, where:

“ 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 Camilluse 2008¹² ”

Wicked problems – a term originating from public policy¹³ – is now used in relation to dealing with complex social and ecological issues where different worldviews can shape both definition of the problem and how solutions are developed to address the problem. These have been described as being:

- symptomatic of deeper problems
- unique opportunities that cannot be easily reversed
- unable to offer a clear set of alternative solutions
- characterised by contradictory certitudes
- containing redistributive implications for entrenched interests
- persistent and insoluble¹⁴

Solutions strategies for wicked problems must include responses that simultaneously include aspects that are:

- hierarchical (simplifying issues and applying routine)
- competitive (relying on expertise to control resources)
- market-based (using market based instruments to manage resources)¹⁵
- collaborative (opening the problem to more stakeholders for possible ways forward)

Yet, as Camilluse's statement suggests, the problems can never be completely solved and capacity and capabilities to address such problems may be lacking.

We see water governance as a wicked problem involving uncertainty and unpredictability, plurality of perspectives and interests, complex problems of scale, and scientific uncertainty. Freeman (2001) suggested that water policies are wicked on the basis that they present challenges of becoming more effective in interdisciplinary collaborations, of integrating types of knowledge, and working across several socio-political units and hydrological watersheds¹⁶.

“ Water decision-makers and managers are currently not prepared to fully realise the development potentials of new forms of governance, such as facilitating inclusive decision-making processes, coordination and negotiated outcomes ”

Tropp, 2007, p. 19¹⁷

Far from Tropp's assertion above, water decision-makers, managers and stakeholders *are* realising different forms of governance. Preceding chapters indicate solutions are developing that involve hierarchical, competitive, market-based, and collaborative elements. As actors negotiate pathways forward using these different elements, moments of transitional conflict can occur. However, as Verweij points out, the negotiated pathway can also allow each actor to formulate their 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 ”

Verweij et al 2006¹⁸

Increasingly New Zealand is adopting a polycentric governance approach to water – where authority for decision-making is dispersed amongst actors in contrast to systems where authority is centred on government agencies¹⁹. In this approach the practices and knowledges of many actors with responsibilities for water management can be drawn upon, and this approach is used in both the CWMS and LAWF. Rather than there being normative and prescriptive stipulations on who should be involved in governance, networks of regulators, scientists, policymakers, hydrologists, engineers, environmental and recreational groups, communities and others are responding to water challenges. The roles and responsibilities of the different actors may be specified; however, in collaborative processes these may shift as processes develop and with moves towards inclusive and pluralistic approaches to decision-making²⁰.

Capacity and capabilities are being developed amongst certain government agencies and stakeholders to facilitate and participate in collaborative decision-making and to negotiate outcomes. Efforts to collaborate can facilitate the discovery of common ground in communities and create ownership in shared decision-

making²¹. However, common concerns about collaborative governance processes remain. Time frames, commitment and resources required to be involved in such processes remain problematic²².

While relationships are being created between stakeholders, negotiation of settlements between iwi and the Crown are creating opportunities for new management regimes between responsible authorities and iwi and hapū. Policy developments at central government regarding relationships between the Crown and iwi are developing around water as partners in accordance with the Treaty of Waitangi, rather than as stakeholders. However, as Ruru highlights in Chapters 3 and 13, the question of ownership of fresh water remains unresolved and there may not be a single, ideal, co-governance model. While there is recognition of rights of Māori in natural resource governance, the transposition of these rights into reality has yet to be fully resolved.

In the transition from governance characterised by regulation and top-down decision-making to polycentric governance, there are opportunities to imagine and realise alternatives to how water is managed. Fenemor and colleagues (2011) suggest that an effective system of water governance in New Zealand would establish and deliver outcomes, and be able to explain and justify how decisions were made and what values are being taken into account²³. As New Zealand attempts to move towards such a system, the following section presents some possibilities for how researchers may be involved in imagining and realising alternatives to improve water governance.

Research possibilities

As water governance unfolds and practices develop to suit the contexts of water problems, challenges remain in developing the capabilities and capacities to meet evolving needs. Complex and ever-changing issues are both a challenge and an opportunity for research. Emerging requirements of researchers and scientists include participation in decision-making and action for sustainable water management. Researchers are being asked to respond more rapidly to global change processes at the same time as science attempts to become more transparent in addressing uncertainties²⁴.

As scientists and researchers, our training directs us to look for patterns and themes to provide recommendations for research, for policy, and for environmental management. Our usual inclination is to provide one clear explanation and synthesis of these turbulent times for water governance in Canterbury, and New Zealand. Alternatively, we may enter into a theoretical discussion about the complexity and wickedness of social and ecological problems, identifying and documenting multiple stakeholder perspectives, then concluding that context is everything and generalities are impossible. Our path perhaps lies between these two alternatives.

Research questions, subjects and practices, and the associated institutional arrangements, are not static. Our engagements were situated in the context of unfolding water governance and connected to fluid and unpredictable events, including the Canterbury earthquakes. Here, we reflect on our recent experiences, discuss some of the directions outlined in strategies and literature, and present some possible lines of inquiry contributing to building capacity and capability in future²⁵.

Reflecting on the past

Research on wicked problems can be a messy process with clumsy solutions just like water governance itself. Looking over the chapters, it is clear that researchers are connecting their work to particular policy problems, forging relationships with end-users, and working together to respond to water management challenges. Our research activities examined aspects of water governance through reviews and analysis of documentary

evidence, conducted interviews and focus groups, and developed models and processes to support analysis of policy options and examine stakeholder participation in decision-making. Each activity was underpinned by disciplinary approaches and reported through workshops, conference papers, and journal articles. These activities were conducted in accordance with the practices of research involving collection, analysis, interpretation and reporting of results. In these fluid times, we were required to understand and adopt different ways to make sense of problems and build relationships with policymakers, planners, facilitators, farmers, and others.

An all-encompassing project involving multiple researchers and various components might seek to integrate and create a single ideal solution – an answer to solve everything accompanied by recommendations for particular audiences and communities in accordance with stipulated measures of success, to be reported in prestigious titles. Traditional examples of such grand narratives can be seen in the elaborate experiments in astronomy or the search for fundamental particles. Our much more modest aspirations were to engage in research that would be perceived as strategic. By connecting to the declared needs of some end-users, we built relationships that enabled discussion on insights with researchers both within and outside the statutory water governance processes.

There were valuable moments that highlighted the evolving role of the researcher in the wider discourse around complex issues. They provided points in time where we were involved in practical developments and at the same time reflected on changes in society. Our getting involved centred on the possibility of establishing a role that differed from the more typical detached academic stance which privileges independent conscience, providing critique. It sought a role whereby we could engage with the issues, with acute awareness of our being embedded within the process and the politics of problems and their solutions.

Taking direction from elsewhere

In charting future pathways for research, our training calls us to reflect on experiences and findings to identify gaps, to refer to the latest literature, and to identify opportunities aligned to developments in the water governance literature and policy. Possible lines of research inquiry identified in the literature include:

- examining how water resources management impacts on the development of nations²⁶
- identifying enabling and critical factors for implementation of integrated approaches where ideas of collaborative governance are informing and being informed by action²⁷
- recording the experiences of water scientists and engineers²⁸ as they seek to realise aspirations of sustainable water management
- experimenting with ways to deepen deliberative spaces so that stakeholders and the public can engage in decision-making while pursuing sustainable use of water resources²⁹
- understanding how people make sense of water challenges and respond to these³⁰

While future lines of inquiry have been signposted in literature, what directions have been outlined for research concerning water in New Zealand?

Research into water in New Zealand has been subject to review by policymakers with recommendations of what research should be done, how research can be done and how researchers can contribute and work with others to develop and implement solutions. In 2009, the Foundation for Research, Science and Technology

and Ministry for the Environment stated that the role of science was to 'progress from knowledge gaps to delivery of solutions'. Moreover, the scientific community is being relied on to support 'development of the decision-making processes and deliver potential solutions'³¹. In recognition that use and uptake of research are dependent on others (such as the government, private sector and community), the Strategy observed that there are gaps in effective communication and technology transfer between those involved including between scientists, policymakers, water and land-use managers, and within knowledge bases of biophysical science and other knowledge bases. In 2010, science and knowledge (including that of mātauranga Māori) and the social sciences and economics have been recognised as '*critical to water management and a vital element in its governance*' by the Land and Water Forum³². The report elaborated on this by stating that knowledge systems should be based on reliable data; be an integral part of freshwater and land-use management, including collaborative and strategic processes; should be disseminated in an accessible form; and underpinned by research strategies for land and water that draw on different disciplines.

Drawing together these insights from the literature and reviews, possible lines of inquiry include:

- providing information to inform those developing plans and taking action, for example in relation to biophysical limits³³
- developing models and scenarios to imagine the implications of decisions
- developing monitoring and evaluation programmes to report on progress against targets
- exploring the use of tools and processes for sharing information and engaging in decision-making processes
- examining how water issues are framed and articulated in discourse
- observing how collective groups build relationships and engage with the communities around them to address problems, identify opportunities and realise aspirations
- establishing ongoing monitoring, evaluation, and the communication of uncertainty
- investigating the design of relevant and effective institutional arrangements, regulatory interventions, and decision-making arrangements

As water governance unfolds, actors from different disciplines, often holding multiple perspectives, are adapting and learning to work collectively, to achieve outcomes for current and future generations. In this context, models, frameworks, tools and processes perform their functions admirably. For example, water can be accounted for in terms of cumecs, ppm, flushing flows, or amenity scales. It can have monetary values assigned, negotiated and discounted. Non-financial values can be attributed by the many different users along a catchment and water's public and private qualities can become assets for the present and for the future. Linton (2011)³⁴ contends that actors, including biophysical scientists, economists, lawyers, planners, sociologists and practitioners, all help render the highly complex world manageable through a reduction from intense complexity to a rational state, though each discipline inhabits its own, often discrete, state.

Clearly, accounting of water using metrics and indicators to be collated and reported, as specified in the LAWF's recommendations (see Table 14.2), is important for the current political projects of economic growth and prosperity as well as the sustainable management of water resources. This may result in water's complexity being conveyed and considered through decision-making processes with the help of scorecards, charts and illustrations, models and scenarios. Practices such as managing water, making policy and conducting research render water knowable but may also overshadow the complex, irreducible and essential nature of water that makes it such an important subject for individuals, communities, industry and government. It is equally valid that other accounts, those of the less immediate, more visceral qualities of

water, are held in high regard. Its cultural importance to Māori and more recent immigrants, its social relevance in both rural and urban contexts, and, of course, its environmental integrity in the mountains, on the plains and out to sea, will not be eclipsed. As these qualities become more widely discussed, represented and re-presented through initiatives involving multiple perspectives and actors (such as those discussed above), it becomes increasingly difficult for these qualities to be reduced to numbers and for understandings of water to be limited to that of a resource. In considering how practices render water manageable we wonder, is anything to be left once water is seen merely as a resource which, if not used, will flow unchanged into the sea?

Stepping into the flow

If research is to be an integral part of the framework of freshwater and land-use management, research has multiple roles, incorporates different practices and is likely to work with a variety of other actors to progress lines of inquiry. We work in the context of current and recent policy provisions, including those discussed above such as direction from the Ministry for the Environment and Foundation for Research, Science and Technology (now Ministry of Science and Innovation), and the Land and Water Forum and Canterbury Water Management Strategy. In the context of this and the identification of gaps in literature and past experiences discussed above, we ask 'how can we improve research in the water governance space so that it is relevant and responsive to the needs of those involved?' We question how research can creatively engage in different practices, moving away from the view that there are standardised approaches for science, towards exploring the mess of research around generating and interpreting data and sharing and disseminating findings, in accordance with John Law's observation that:

“ The world is not a structure, something we can map with our social science charges. We might think of it, instead, as a maelstrom or a tide-rip ... Begin to imagine what research methods might be if they were adapted to a world that included and knew itself as tide, flux and general unpredictability ”

Law, 2004, p. 7³⁵

Just as water governance moves from regulation to collaboration, researchers may well move away from prescribed or traditional roles as expert providers of knowledge to learn with others, building capacity and capability together. As roles, responsibilities and activities change in response to concerns about water quality, water storage and agricultural development, what role and practices can research best adopt? Various pathways are possible – all of which may be informed, influenced and aligned to the strategic direction and requirements of policy, industry and communities. Research might retain its role as provider of certain knowledge for evidence-based policymaking through increasingly sophisticated models. It might take on the responsibility to support action by groups; inform practices of facilitation; develop collaborative research arrangements to support existing initiatives. Or it might become a trusted confidant(e) to discuss sensitive, complex and highly political issues such as the ownership of water and other topics usually destined for the 'too hard' basket.

Here we take an opportunity to imagine the kinds of research that would arise if we take Law's view and adapt it to the specific 'tide, flux and general unpredictability' of water governance in New Zealand. We see a response that works with the wisdom of the crowds in a *collaborative* way; another that may disrupt normative ways of working *creatively* to explore ways of imagining fresh water and our relationship to it and

each other; and a final way that takes a *critical* perspective in line with the increasingly congested world of academic theory. By examining how water problems are understood and articulated through processes and practices of decision-making, solutions may emerge. All may provide a part of a new solution; none will be the whole solution. Individually each can be classified, in other words, as adequate but not sufficient. Collectively they are our way of mixing a solution and we test their ability to provide meaningful responses to our lines of inquiry, those stipulated in policy and mapped out in the literature, and the many other initiatives for knowing water that occur far from the official cycles of policy and research.

Given that water governance will always be contextual and contingent, all problems and solutions will be intertwined in political, social and cultural systems. However, as the nature of water governance unfolds, the institutional arrangements for research are also changing. As collaborative governance is developed and implemented, the need to engage with others and develop shared lines of research inquiry increases. In so doing, we, as researchers, may have to review our established standpoints, acknowledge the horizons of our knowledge and identify spaces to engage in conversations and ways to bridge disciplines and work at the interface of science and policy³⁶. We can seek insights from similar projects in other domains, and we can immerse ourselves in the wider discourse of, and explore innovative different approaches to, water governance from around the country or elsewhere, synthesising and reporting findings.

Research seeks to build on its historical theories and constructs and make modest iterative contributions until, possibly, some large-scale shift occurs. This is normal practice and often the underlying assumptions are so deeply embedded that they are not aired and questioned. Indeed to do so would mostly be seen as backpedalling and of little practical value. However, as research moves out of its comfort zone into the new terrain of increasingly complex problems, the theoretical foundations may be subject to shocks and disturbances of varying forces not all of which will be significant – though their effects may be cumulative. For any science system to maintain its pedigree it must not lose sight of its theoretical constructs and methodological practices even if only viewed from the wing mirrors as the research projects drive headlong into the next set of important, pressing and critical issues. This is not an easy task but one that, by engaging with the integrative and collaborative processes underway, documents and critically assesses what happens through the doing of all of these to ascertain a way forward.

Possibilities for action

In responding to complex problems, research can be both connected and disconnected from the activities of policymakers, planners, facilitators, lawyers and community groups. Developing collaborative projects between researchers and others could incorporate mapping out who is involved, the history of the issues, where and when action is being undertaken, the horizons and boundaries of research activities, and discussing the roles of researchers. As these projects unfold, knowledge will be created and shared amongst participants and wider networks through research specific outputs and other activities at the edges and interfaces of research and policy. Such activities could be linked to research outputs such as reports and journal articles, to conference presentations and workshops, to interviews with the media and conversations with specialised groups, and there could even be YouTube videos, blogs or online discussions around the topics. Each of these possible activities and outputs may well contribute to strategic visions for New Zealand, regions, organisations and individuals.

In outlining characteristics of the possible engagements and techniques through social media and artistic endeavours, we hope to inspire and undertake research engagements that connect with others, to imagine the future for New Zealand's fresh water and for ourselves, in ways that celebrate the multiple understandings and meanings that connect us to the world. This will not be easy. Researchers, especially

those in the biophysical sciences, are currently steered towards reducing complexities so that sense can emerge and be utilised through models and tools to inform policy and practice. This must continue. They must retain their credibility and their legitimacy. But so must attempts to create conversations about how complex issues are understood and imagined. And these need to be highly innovative. They need to make use of traditional forms of narrative and to exploit the best of new social media. They need to link with media events and artistic ventures. They need to adopt and adapt contemporary culture in an informed way. And as ever they need to document and critically assess what happens when knowledge is produced in these ways.

Essentially, in our view, there is NO choice between being collaborative or creative or critical. It is not a question of one or the other. It is not right or wrong. Nor is it black or white (or even wet or dry...). It is only through holding multiple perspectives and options that rich descriptions can be woven together – never static, always fluid. These in turn provide balanced, nuanced interpretations that might inform decision-making processes. Of course, traditional scientific evaluations and modelling will have their place. They will have crucial roles to play. However, it is only by embracing perspectives that do not close off alternatives and which don't limit possibilities that new possibilities will be enabled to emerge. Here, we take inspiration from the commitment of participants in collaborative processes in the realm of water governance that are doing just that in an ongoing journey.

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- 1 For example, a forum for regional council staff and researchers to discuss water management was established in March 2011 under the joint research programme 'Values, Monitoring and Outcomes' (CogX1003) led by Landcare Research with NIWA, Cawthron Institute, Lincoln University and Nimmo-Bell. Also, Irrigation New Zealand held workshops to build knowledge and understanding of audited self management with support from the Primary Sector Partnership and the Ministry of Agriculture, Forestry and Fisheries in August 2011. Further details available at <http://www.irrigationnz.co.nz/events/audited-self-management/>, Accessed 10 September 2011.
 - 2 These initiatives are a compilation from preceding chapters and recording of recent developments under the Fresh Start for Fresh Water reforms. See Endnote 9.
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 - 4 Land and Water Forum 2010. Report of the Land and Water Forum: A fresh start for fresh water. Further details available at <http://www.landandwater.org.nz>. Accessed 10 September 2011.
 - 5 Canterbury Mayoral Forum. 2005 Charter of Purpose. Dated 23 February 2005. Details available at <http://www1.ccc.govt.nz/BanksPeninsula/HistoricalAgendas/Agendas/20050317/Charter.pdf>. Accessed 10 September 2011.
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 - 7 For further information on Fresh Water Reforms available at <http://www.mfe.govt.nz/issues/water/freshwater/fresh-start-for-fresh-water>. Accessed 10 September 2011.
 - 8 This table was compiled from analysis of each of the reports (see Endnotes 15 and 16).
 - 9 See Endnote 5, p. 59.
 - 10 See for example, Bakker K 2007. Conclusion: Governing Canada's waters wisely. Chapter 18 in Bakker K ed. 2007. Eau Canada. The future of Canada's Water. Vancouver, UBC Press; de Loë RC, Armitage D, Plummer R, Davidson S, Moraru L 2009. From government to governance: a state-of-the-art review of environmental governance. Final report. Prepared for Alberta Environment, Environmental Stewardship, Environmental Relations. Guelph, ON, Canada, by Rob de Loë Consulting Services.
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- 19 See Huitema D, Mostert E, Egas W, Moellenkamp S, Pahl-wostl C, Yalcin R 2009. Adaptive water governance: assessing the institutional prescriptions of adaptive (co-) management from a governance perspective and defining a research agenda. *Ecology and Society* 14(1).
- 20 See Endnote 17 p. 20
- 21 Weber E, Memon A, Painter B 2011. Science, society, and water resources in New Zealand: recognizing and overcoming a societal impasse. *Journal of Environmental Policy & Planning* 13: 49–69 for discussion of how 'civic science' may contribute to collaborative governance of water.
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- 25 Landcare Research's Statement of Corporate Intent specifies that we will 'drive innovation in New Zealand's management of terrestrial biodiversity and land resources in order to both protect and enhance the terrestrial environment and grow New Zealand's prosperity'. We seek to achieve this through our ongoing work in water management. For further information, see Landcare Research 2011. Statement of Corporate Intent 2011–16. Available at <http://www.landcareresearch.co.nz/about/documents/sci1116.pdf>. Accessed 10 September 2011.
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