

Evolution of Collaborative Governance in Canterbury Water Management

Bryan Jenkins¹

Abstract

Collaborative governance in Canterbury has evolved through stages beginning with an experimental stage at the tributary and catchment scale before proceeding to a second stage of regional strategy development. The third stage was developing implementation programmes through Region and Zone Committees. It is now entering a fourth operational stage focused on farmer collectives. The paper describes the characteristics of these stages and compares them in relation to their dominant spatial scale, their governance arrangements, communication with stakeholders and community, approach to decision-making, funding, and their objectives.

With the inability of resource management legislation to provide the basis for managing water at sustainability limits and the increasing adversarial nature of court-based decisions, the regional council began to introduce the principles of Ostrom's "self-governing communities" for water management issues. One programme, "Living Streams", had three stages: an investigation stage; an involvement stage with landowners and community groups, and, an improvement stage of undertaking actions. There were also collaborative catchment management programmes to resolve community water conflicts. The programme was often initiated by community concerns being brought to the council. The programme involved getting stakeholder engagement, compiling information, option development with stakeholders, reaching agreement, and statutory backing to agreements.

The success of collaborative approaches at the tributary/catchment scale led to a collaborative governance framework being adopted for a regional strategy. The focus was on the regional scale but also considered, subregions of interconnected catchments and groundwater zones, tributary catchments, and individual properties. A programme of structured stakeholder engagement and region-wide community consultation was developed. Decision-making was by a multi-stakeholder steering group informed by community input and endorsement by the Mayoral Forum.

The strategy defined the governance structure for developing implementation programmes with a nested system of a Regional Committee focused on regional issues and ten Zone Committees focused on subregional issues. The dominant component was the zone level. The operating philosophy was for a collaborative, co-operative, participatory and solutions-focused approach.

Water quality has been the focus for operational management. The main operational elements are adoption of good management practices, setting nutrient contaminant limits, linking limits to catchment nutrient loads, and, allocating catchment loads among existing users while creating headroom for new users. The primary governance element is farmer collectives. The compliance approach is based on audited self-management with an independent audit process of performance assessment and outcomes at the property level.

The first experimental stage was small scale. Then there is a trend in the collaborative governance arrangements as water management moved from strategy to implementation then operations of: decreasing dominant spatial scale (from region to subregional zone to tributary/irrigation district), increasing formality (from non-statutory to statutory), and decreasing scope of decisions (from all issues to ten target areas to selection of management approach). Multiple scales are relevant to all stages. One unresolved issue at the operational scale is how infrastructure beyond the scale of farmer collectives will be managed and funded. Other unresolved issues are around infrastructure development, ability of solutions packages to meet desired outcomes, and implementation progress.

¹ Dr Jenkins has recently retired from the position of Professor, Strategic Water Management at the University of Canterbury and Lincoln University in Christchurch, New Zealand. Prior to that he was chief executive of the Canterbury Regional Council and was responsible for introducing collaborative governance to water management in Canterbury.

Introduction

This paper describes the evolution of collaborative governance in water management in Canterbury, New Zealand. The introduction of collaborative governance was a result of the failure of the existing institutional arrangements based on effects-based management and legal process to resolve water quantity and quality issues when sustainability limits of water availability and the cumulative effects of land use intensification had been reached.

Collaborative governance arrangements have gone through four distinct stages (1) an experimental stage, (2) the development of a regional strategy, (3) the preparation of zone implementation programmes, and (4) an operational stage based on farmer collectives. These four stages have quite different characteristics with respect to (a) their dominant spatial scale, (b) their governance arrangements, (c) the means of communication with stakeholders and the community, (d) the approach to decision making, (e) the means of funding, and (f) their objectives.

In the next section of the paper the New Zealand institutional arrangements based on effects management and legal process are outlined. This is followed by the water management issues facing the Canterbury region, primarily due to the significant expansion of irrigation for land use intensification from dryland farming to dairying. After that, the four stages of collaborative governance are described. This leads to a comparative analysis in relation to spatial scale, governance, means of communication, decision making, funding and objectives.

The shift from effects-based management and legal process to collaborative governance has led to a paradigm shift in water management in the Canterbury region. However, there are still unresolved issues. The final section sets out some of the key issues to be resolved.

New Zealand Institutional Arrangements

There was a major reform of natural resource management in the late 1980s in New Zealand. The number of local and regional government units was reduced from 625 to 94. The most significant innovation for water resource management under the new arrangements was the creation of regional councils whose geographical boundaries were based on natural river catchments. Regional councils are elected local government bodies that coordinate, and set policy for resource management, including water and soil conservation, and transport. They also have roles in pest management, civil defence, navigation safety, coastal management, hazardous waste and more recently biodiversity management (Wallis and Dollery 2000).

Coincident with these reforms was the introduction of the Resource Management Act (RMA) in 1991. The purpose of the Act is to promote sustainable management. The legislation is “effects-based” and concentrates on the environmental effects of activities rather than the activities themselves. The focus is on environmental effects and leaves the pursuit of economic and social goals to other mechanisms. The legislation incorporates the principles of the Treaty of Waitangi.²

The reforms also led to the creation of the Ministry for the Environment. The Ministry of Works and Development which had a major water resource development role in building hydro-generation and irrigation infrastructure was abolished in 1988. There is no natural resources agency in central government in New Zealand. The Ministry for the Environment has responsibilities for National Environmental Standards and National Policy Statements. For 20 years, there were no standards or policies relating to water management at the national level. The first National Policy Statement on water was gazetted in 2011.

Regional councils are required to prepare Regional Policy Statements identifying environmental issues and responses of significance for its region. Regional councils also have the authority to prepare Natural Resources Regional Plans which can include water management. Territorial authorities (city and district councils), the next tier of local government, are required to prepare District Plans which cover land use and subdivision. Regional councils have the authority to issue

² The Treaty of Waitangi is the treaty first signed on 6 February 1840 by representatives of the British Crown and various Māori chiefs. It resulted in British sovereignty over New Zealand and is generally considered the founding document of the nation. There is a preamble and three articles. The first article addresses Crown sovereignty. The second article addresses Māori rights in land and other resources. The third article guarantees Māori the same rights as other British subjects (Waitangi Tribunal 2016).

resource consents for the taking and use of water, and for discharges to water, and, to monitor compliance with those consents. Territorial authorities have the authority to issue consents for land use.

The reforms also created an Environment Court. The 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 made resource management in New Zealand a highly legalistic process. It has also led to an adversarial style of decision making.

Furthermore, there was also a marked change in the role of government. The previous role of government involved directing economic activity and making trade-offs in the interests of the wise use of resources. As stated by Simon Upton, the Minister responsible for the passage of the Act through Parliament: “the Government moved to underscore the shift in focus from planning for activities to regulating their effects” (Upton 1995).

The Resource Management Act was also designed on the premise that people know best what it is that they are after in pursuing their well-being (Upton 1995). Thus, the responsibility for defining proposals was left to proponents. The RMA was designed on the basis of “effects management”, i.e. that choices by applicants would be constrained by bottom lines of effects that were not to be exceeded.

This approach may be suited to circumstances where there is an abundance of resources. However, when resource use approaches sustainability limits, either in terms of resource availability or in terms of cumulative effects of resource use, then the actions of one user can harm all others. Indeed for a common pool resource (i.e. a resource that is readily accessible and difficult to exclude access to, and, is in limited supply so that resource use by one user diminishes the availability for others), allowing all users to act in their own self-interest leads to degradation of the resource for all users (Hardin 1968).

While “sustainable management” is the purpose of the RMA, the Act provides no elaboration on how decision makers can apply this purpose. Amendments to the RMA since its enactment have been focused on efficiency of process rather than address the definition of sustainable management. It has been left to the courts to make an interpretation. The position from several court cases is that the application of Section 5³ (the purpose of the Act) involves an “overall broad judgement” of whether a proposal will promote sustainable management of natural and physical resources (Skelton and Memon 2002).

Skelton and Memon argue “the fundamental tensions that underpin Section 5 arise from the challenge of crafting a definition of sustainable management that can enable decision makers (elected councils, the Environment Court, the Minister for the Environment) to reconcile the spectrum of values different groups accord the environment in a plural social setting. Such a definition needs to be sufficiently clear, procedurally fair and focused on the substantive goal of protecting and improving environmental quality” (Skelton and Memon 2002).

Water Management in Canterbury

With 58% of New Zealand’s water for consumptive use allocated in Canterbury, water allocation is a significant issue for the region. With an area of 507,000 ha under irrigation, Canterbury has 70% of New Zealand’s irrigated land and has land suitable to double that area. Water also creates and sustains Canterbury’s world-famous braided rivers, high country and coastal lakes, as well as lowland streams and wetlands. However, with current methods of abstraction (primarily run-of-river offtakes and groundwater bores) reaching sustainability limits for many parts of the region, water allocation has

³ RMA s5 (1) The purpose of this Act is to promote the sustainable management of natural and physical resources. (2) In this Act, **sustainable management** means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and (b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and (c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

also become contentious. In addition, cumulative effects of use are contributing to the declining ecological health of lowland streams and water quality in surface and ground water.

There has been a significant increase in irrigation in Canterbury. It was estimated in 1982 there were about 100,000 ha irrigated area in the region (Dommissie 2005). In 2015, this has increased to 507,000 ha (Brown 2016) - a five-fold increase in those 33 years. In recent years, there has been an 11% growth per annum in consented irrigated area.

Reliance on RMA processes has led to long, drawn-out and acrimonious processes to address water management issues. Also, the “overall broad judgement approach” has enabled arguments for resource use to be given preference to environmental protection by consent hearing commissioners and the Environment Court against the advice of the regional council. This has resulted in overallocation of surface and groundwater as well as degradation of water quality.

As well as the effects of water abstraction on reduced river flows and aquifer drawdown, there are concerns about the effects of storage particularly on the mainstems of alpine rivers, such as the reduction in braided river character, intrusion on areas of high naturalness, algal blooms downstream of storage, de-oxygenation in reservoirs, weed growth in reservoirs, reduced sediment transport and increased coastal erosion from decreased sediment supply (Jenkins 2007a). Principal concerns with land use intensification are water quality degradation in lakes, rivers and groundwater from increased nutrients (nitrogen and phosphorus), increased bacterial contamination, and increased sediment in the beds of rivers and lakes as well as suspended sediment.

Strategic investigations into water management commenced after droughts in the late 1990s indicated issues with water availability based on an analysis of future demand and supply (Morgan et al. 2002). This planner-led technical investigation indicated that, under low flow conditions in rivers from which irrigation water is taken, current peak demand cannot be met by current abstraction methods. Most irrigation abstraction was based on run-of-river schemes relying on direct withdrawals from rivers. On an annual basis, however, water is available to meet future demand but would require major water storages for water to be available in the irrigation season. This finding led to further strategic investigations to identify sites for major water storage options for the region with respect to their hydrologic feasibility (Dark et al. 2008). This was also a planner-led technical investigation by consultants.

This was followed by an evaluation phase of the potential storage options by a 20-person multi-stakeholder group. This group was supported by sub-regional groups (for north, mid, and south Canterbury) who provided input to the evaluation. The multi-stakeholder group used a sustainability framework for comparing storage options. However, the multi-stakeholder group also expressed concerns about broader water management issues, and the multi-stakeholder group recommended that before strategic water storage and water management decisions are made, rigorous scientific and public consideration is required of:

- the impacts of land use intensification and its effects on water quality;
- mitigation and management systems for water quality; and
- methods for maintaining or improving flow variability and low flows in major rivers (Whitehouse et al. 2008).

The planner-led technical process with its limited focus on major storage to address the single issue of water availability had been found by the stakeholder response to be insufficient to address the broader water management issues, such as water quality and environmental flows. Furthermore, under the RMA, the process-led legal processes had been unable to effectively resolve the conflicting perspectives for water development in the region. For many planning decisions which involve multiple stakeholders with different values, the planner is unlikely to be the most appropriate person to identify all the issues to be addressed, the most appropriate way of addressing those issues, how the different interests can be reconciled, and, the appropriate weighting of multiple decision criteria. It is the stakeholders themselves that are better qualified to perform these tasks (Jenkins 2013). Thus planner-led technical decision-making is unlikely to be appropriate. Furthermore, in terms of process, planning authority processes to assess planning proposals typically involve consultation with affected parties, but the planning authority (or planning tribunal or court) is the arbiter between proponents and those affected (both supporters and opponents). However, these formal legal processes are unlikely to achieve reconciliation between proponents and affected parties. Indeed there is a tendency for these

processes to be adversarial (Lomax et al. 2010). Thus process-led legal decision-making is unlikely to be appropriate. A different paradigm was needed.

Alternative approaches to designing decision-making processes which directly involve the range of stakeholders affected by planning decisions include collective choice arrangements described by Ostrom (Ostrom 1990) and deliberative democracy described by Dryzek (Dryzek 2010).

Collaborative governance approaches involve multi-stakeholder decision processes. There is not a “one-size-fits-all” formula; rather there is a framework of matters to be considered.

Work on collaborative approaches such as the Living Streams Programme had been initiated in 2004 by the Canterbury Regional Council at the scale of tributary catchments with considerable success at resolving water management issues at this scale (Gunningham 2008). It was clear that the Canterbury water management issues needed to be considered at multiple scales. For Canterbury, there were at least four spatial scales:

- the regional level where the key issues are water availability and land use intensification;
- the catchment level at which the sustainability levels of water use, the cumulative impacts of water use, and, the reliability of supply for irrigation are the main issues;
- the subcatchment level, where environmental flow requirements in river reaches and the management of stream water quality and riparian margins are the main issues; and
- the property level, where the land use practices that influence water quantity and quality are defined.

This led to the development of the Canterbury Water Management Strategy (CWMS). An overall strategic framework was formulated (Jenkins, 2007b) based on Ostrom’s self-managed community approach to governing common pool resources⁴ and Gunderson and Holling’s concept of nested adaptive systems for managing natural resources.⁵ One of the key elements of Ostrom’s design principles for managing common pool resources, such as water, is the ‘collective choice arrangements’. The community engagement process was based on Ostrom’s concept of collective choice arrangements that was undertaken to facilitate collective decision-making for the CWMS.

Key elements of community engagement for the CWMS were: (1) The public engagement meetings throughout the region to identify stakeholder views on the uses and benefits of water in Canterbury. This led to defining ten target areas for water management.⁶ The approach differs markedly from planner-defined objectives for regional plans or proponent-defined proposals for projects which, under RMA processes, limits public input to reactive comments. (2) The development of strategic options by the stakeholder steering group that were put out for public comment and feedback. This approach differs from the RMA where public input occurs after proposed plans or projects have already been defined. (3) The use of sustainability appraisal of the strategic options rather than effects assessment of a proposed development (Jenkins and Henley, 2015).

From a starting position where there was polarization of community views about whether water storage and associated land use intensification should proceed, there developed widespread support for the strategic framework for integrated water management that delivers on multiple targets. The strategy development process shifted from a focus on water availability and storage to identification of community values and the wide range of uses and benefits associated with water. Furthermore, the

⁴ Ostrom (Ostrom 1990) considers institutional designs for common pool resources such as water. She compares different governance models: government direction, privatisation and self-managed communities. Her research indicates self-managed communities as the most enduring form of institutional design for common pool resources and identifies eight institutional design principles for self-managed communities: (1) Define clear group boundaries; (2) Match rules governing use of common goods to local needs and conditions; (3) Ensure that those affected by the rules can participate in modifying the rules; (4) Make sure the rule-making rights of community members are respected by outside authorities; (5) Develop a system, carried out by community members, for monitoring members’ behavior; (6) Use graduated sanctions for rule violators; (7) Provide accessible, low-cost means for dispute resolution; and (8) Build responsibility for governing the common resource in nested tiers from the lowest level up to the entire interconnected system.

⁵ Gunderson and Holling (Gunderson and Holling 2002) provide an operational framework for defining sustainability on the basis of an ‘adaptive cycle’ of exploitation of resources, accumulation of material, disturbances to the system and its potential to reorganise after disturbance. Adaptive cycles are ‘nested’ — operate at different spatial and time scales — but are linked.

⁶ The ten target areas were: (1) Ecosystem Health/biodiversity; (2) Natural character of braided rivers; (3) Kaitiakitanga (Māori stewardship); (4) Drinking water; (5) Recreational and amenity opportunities; (6) Water-use efficiency; (7) Irrigated land area; (8) Energy security and efficiency; (9) Regional and national economies; and (10) Environmental limits.

sustainability appraisal indicated that the status quo was not acceptable and that in order to achieve sustainability there is a need to improve management by existing users in relation to water use efficiency and land use practices with respect to their effects on water quality (Jenkins et al 2014). The acceptance of the strategy appeared to be related to the ability to be involved in and to influence the strategy development, as well as the outcomes of the process.

The implementation component of the CWMS Strategic Framework document (Canterbury Water 2009) contained the three key elements⁷: (1) a set of proposed immediate actions, e.g. the establishment of nutrient limits; (2) a set of investigations to deal with important areas of uncertainty, e.g. setting of catchment load limits; and (3) definition of the way that deferred choices would be made, i.e. the continuation of the collaborative approach, at the local level through 10 Zone Water Management Committees, and at the regional level through a Regional Water Management Committee, with the development of zone and regional implementation programmes.

The implementation of the Canterbury Water Management Strategy was based on the parallel development of proactive implementation programmes to achieve the multiple targets defined in the strategy framework document.⁸ A nested system of a regional implementation programme (RIP) and ten zone implementation programmes (ZIPs) was created. The implementation programmes were not designed to be hierarchical. Rather the RIP was to address regional issues such as regional storage and distribution while the ZIPs were to address catchment issues such as land use practice improvements.

Zone Committees were joint committees of the regional council and the district and city councils in the zone. They comprised 6-7 community members who were locally based or had a special relationship with the zone, members of the *rūnanga*⁹ within the zone, and council representatives. The Regional Committee was a committee of the regional council with representatives of local government, central government, Ngāi Tahu¹⁰, community, a member from each zone committee, and an independent chair.

Like the Canterbury Water Management Strategy, the recommended programmes of the committees were non-statutory. Statutory backing of the Strategy was provided by a new Regional Policy Statement (Environment Canterbury 2013) and statutory backing for the implementation programmes is being provided by a new regional plan – The Canterbury Land and Water Regional Plan (Environment Canterbury 2015) – which is a nested document to match the regional and zone implementation programmes with a regional component for region-wide requirements and specific sections for each zone.

ZIPs have been progressively generated by Zone Committees within 12 to 18 months of being established and the Regional Committee produced a RIP. More recently a number of Zone Committees have prepared Addenda to their ZIPs. These documents have been focused on “solution packages” for some of the more difficult issues (primarily water quality issues for lakes) in the respective zones that had not been addressed in detail in the initial ZIPs. These Addenda are generating Plan Changes to the Canterbury Land and Water Regional Plan to incorporate the statutory components of the agreements reached in the zones as set out in the Addenda.

Operational management was also changed from the RMA approach of the regulator setting consent conditions that are inspected for compliance by the regulator, to an approach reflecting Ostrom’s principles. The new approach was based on farmer collectives spatially defined by catchment boundaries or irrigation district command areas. It is a nested system based on the achievement of water quality targets in rivers and lakes which lead to catchment contaminant load limits defined as a collective responsibility; and with each farmer developing a farm environment plan to describe specific on-farm actions to meet farm management objectives and targets within an

⁷ Note that these elements are the elements of a “commitment package” following the approach of “Strategic Choice”, a decision-making methodology developed by John Friend (Friend and Hickling 2005) that was designed to address complex problem situations with multiple objectives, multiple stakeholders and incomplete information; this methodology was applied in CWMS decision making.

⁸ This contrasts with the approach envisaged under the RMA of relying on applicants’ proposals for water resource development.

⁹ Māori groupings centred on the whanau (family) and hāpu (sub-tribe) of marae (tribal meeting place) based communities.

¹⁰ Ngāi Tahu is the Māori tribe whose rohe (tribal territory) includes the Canterbury region.

environmental management system for the collective. Each farmer is responsible for monitoring the actions undertaken and achievement of the targets which are audited by a certified farm plan auditor.¹¹

The Four Stages of Collaborative Governance

The use of collaborative governance in Canterbury has evolved through several stages. It began with an experimental stage at the tributary and catchment scale before proceeding to a second stage of regional strategy development leading to the Canterbury Water Management Strategy. The third stage was the development of implementation programmes through the Region and Zone Committees. It is now entering a fourth operational stage focused on farmer collectives. The characteristics of these different stages are described below and then compared in relation to their dominant spatial scale, their governance arrangements, communication with stakeholders and the community, approach to decision making, funding, and the objectives they are trying to achieve.

Stage 1: Experimental stage at tributary and catchment level

With concerns about the inability of the RMA to provide the basis for managing water at sustainability limits and the increasing adversarial nature of court-based decisions, Environment Canterbury began to introduce the principles of Ostrom's "self-governing communities" to address water management issues. One programme was "Living Streams" commencing in 2003 that was targeted at tributary catchments with degraded water quality (Jenkins 2009). It was a council-led process of interaction with the community that had four phases (1) engaging the community and awareness raising, (2) achieving understanding within the community, (3) the community taking actions, and (4) monitoring and reviewing success. The work programme had three stages: firstly, an investigation stage involving data compilation and stream walks to produce a catchment report to identify water and land management issues; secondly, an involvement stage with landowners and community groups to develop an action plan for voluntary projects; and thirdly, an improvement stage of undertaking actions, securing funding, monitoring outcomes and reassessing the need for further action. For example, a five-year programme in the Pahau catchment including on-farm projects, riparian management projects and irrigation management improvements led to a three-fold reduction in bacterial contamination and a two-fold reduction in phosphorus concentration in the Pahau River. Participation was voluntary and decisions on actions were made by landowners and community groups. Participants funded the projects, often with financial assistance from the Council's Environmental Enhancement Fund. Monitoring of outcomes was by the regional council.

There were also collaborative catchment management programmes focused on resolving community conflict around water management issues. The programme was often initiated by community concerns being brought to the council's attention. The programme involved the following steps (1) getting stakeholder engagement to define issues and request information, (2) compiling information for stakeholder evaluation, (3) option development in consultation with stakeholders, (4) responding to requests for analysis and means of resolving differences, (5) reaching agreement and negotiating compromises, and (6) where needed, giving statutory backing to the agreements. This was achieved through open public meetings and in some cases with a community steering group. Agreed actions were implemented through funding by key participants and in some cases with council assistance. For example, to address algal blooms downstream of Opuha Dam, an agreement was reached between irrigators, the dam operator, conservationists and fishermen to provide flushing flows from the dam while allowing reduced minimum flows. The flow management actions were undertaken by the dam operator.

¹¹ This is based on the concept of audited self-management where (1) The environmental performance requirements were set by the regulator but industry was able to determine how to meet the requirements; (2) Industry was required to have an environmental management system (EMS) with independent certification (by either the regulator or independent certifier); (3) Industry was required to undertake measurements to demonstrate environmental performance requirements had been met with the measurements audited by an independent auditor (either the regulator or an independent auditor); and (4) The results of the measurements were to be publicly reported (Jenkins 1996).

Stage 2: Strategy development at the regional level

The success of the collaborative approaches at the tributary and catchment scale noted above and the recognition of the need for community engagement in the forming of a regional strategy led to the Canterbury Water Management Strategy being developed in a collaborative governance framework. There was recognition of the need for a nested approach with four spatial scales of: the region, subregions related to interconnected catchments and groundwater zones, tributary catchments, and individual properties. However, the focus was at the regional scale and the governance structure was at the regional scale with oversight by the Canterbury Mayoral Forum (the mayors of the city and district councils in the region, the chair of the regional council, and the chief executives of the councils) and a multi-stakeholder group with members selected from across the region.

Reliance on open meetings for community engagement was not logistically possible for a region about 400km in length and 100km in width. A programme of structured stakeholder engagement and region-wide community consultation was developed (Jenkins and Henley 2014). Decision making was by the multi-stakeholder steering group informed by community input and then endorsement by the Mayoral Forum. Funding of the strategy development was by the regional council with some minor assistance by central government in the latter stages of strategy finalization.

Stage 3: Implementation programme development

The CWMS defined the governance structure for the development of implementation programmes for the strategy. It was a nested (rather than hierarchical) system with a Regional Committee to recommend programmes relevant to regional issues (such as water storage and distribution across the region) and ten Zone Committees to recommend programmes relevant to subregional issues (such as changes in land use practices to improve water quality).

The Zone Committees are joint committees of the regional, district and city councils in the zone area and each council is represented on the Zone Committee. Rūnanga whose rohe is in the zone area are represented on the committee. Applications are sought for 4-7 community members. Applicants are assessed on skills, expertise and experience as well as their ability to work together to develop water management solutions that deliver economic, social, cultural and environmental values. The community members need to include people with a range of backgrounds and interests in the community. The purpose of the committee is to facilitate community involvement in the Zone Implementation Programme (ZIP) and monitor progress of the ZIP implementation (Canterbury Water undated). The objectives of the Zone Committee include developing the ZIP and overseeing its delivery, as well as engaging stakeholders and ensuring community input to the ZIP. Decisions are by consensus. If consensus cannot be reached, then the committee is to be replaced. There is a code of conduct which defines the operating philosophy for a collaborative, co-operative, participatory and solutions-focused approach by all members (Canterbury Water 2014). The operations of the Zone Committees are funded by the regional council with contributions from the city and district councils.

The Regional Committee is a committee of the regional council with 2 regional council members, a member of Christchurch City Council, 3 district council members (one from a southern, central and northern district council), one representative from Ngāi Tahu, three rūnanga representatives (one from South, Mid and North Canterbury, 5 to 7 community representatives bringing expertise related to fisheries, energy, biodiversity, agriculture, recreation and regional development, with observers from central government and Canterbury District Health Board. The purpose of the Regional Committee is to monitor progress of CWMS implementation and provide advice on regional issues. It has a similar decision making and operating philosophy as the Zone Committees.

The dominant component of the implementation programme development stage has been at the zone level.

Stage 4: Operational management

In relation to operational management the focus has been on water quality in rivers and lakes. The main operational elements are having farmers adopt good management practice, setting nutrient contaminant limits with respect to rivers and lakes, linking these river and lake limits to catchment

nutrient loads, and, allocating the catchment loads among existing users while trying to create headroom for new users. The primary governance element is the establishment of farmer collectives based on irrigation districts, tributary catchments (or stream allocation zones), or farm enterprises. Collectives need an approved Environmental Management System (EMS) that defines water quality outcomes for the collective consistent with regional plan requirements. The EMS also requires an inventory of nutrient loss rates, identification of the nutrient risks and how those risks will be managed including a statement of best nutrient management practices. The EMS also defines the contractual arrangements with members including a Farm Environmental Plan (FEP) consistent with the EMS, and, how the FEPs will be audited and compliance achieved. The FEP has to address irrigation management, soils management, nutrient management, effluent management as well as wetland and riparian management. The compliance approach is based on audited self-management. This includes an audit process of assessing performance against management actions and outcomes at the individual property level. The EMS sets out the record keeping requirements, how audit results will be fed back to members and shared with the wider community and how issues of poor performance are to be managed.

Comparison of Collaborative Governance Stages

The four stages are compared in Table 1. In terms of scale, the evolution has been from the first experimental stage as small scale (tributary and catchment) addressing specific issues to the second stage of region-wide strategy looking at multiple issues. For the third stage of implementation programme development, the dominant scale was at the sub-regional zone scale focused on achieving the ten target areas identified in the CWMS. The fourth stage of operational management involved farmer collectives at the tributary or irrigation scheme scale with an emphasis on management practices for water quality management.

The governance arrangements were relatively informal at the first experimental stage with Living Streams based on voluntary council-led informal meetings and slightly greater formality with catchment groups. The second stage strategy development was non-statutory but with increasing formality under the Mayoral Forum (a non-statutory body) and the multi-stakeholder steering group as well as structured stakeholder engagement and community consultation across the region. The CWMS, although non-statutory, has been influential over the last seven years in framing water management in the region. The third stage of implementation programme development was more formal as the Region and Zone Committees were constituted under the Local Government Act. The RIP and ZIPs, although themselves only advisory documents, led to statutory backing under the Land and Water Regional Plan. Even greater formality characterizes the fourth operational stage with the Land and Water Regional Plan requiring the formation of Collectives, setting water quality outcomes, and defining the contents of EMSs and FEPs.

With respect to decision making and funding, for the Living Streams programme in the experimental stage there was a need for sufficient landowner support for a programme to proceed. Decisions and funding of actions was a voluntary decision of landowners albeit with the possibility of a contribution from the regional council's Environmental Enhancement Fund. Decisions for catchment groups were by consensus among the stakeholders participating, with funding typically borne by the stakeholders with some funding of components by the regional council. For the regional strategy, the decisions were made by agreement among the multi-stakeholder steering group influenced by community input and endorsed by the Mayoral Forum. Funding of the process and investigations was primarily by the regional council. Similarly funding and staffing for the Region and Zone Committee processes was primarily by the regional council. The recommendations of the Region and Zone Committees on ways to achieve the ten target areas are advisory. The statutory components have to be drafted by the regional council and are then subject to RMA hearing processes. The funding implications of the implementation of the decisions were borne by water users (in relation to land and water management requirements) and by the regional council (in relation to biodiversity programmes and further investigations). For the farmer collectives, the members could define their own governance arrangements within the requirements of the regional plan and could choose the management approaches to deliver the outcomes specified in the regional plan.

Table 1 Four Stages of Collaborative Approaches in Canterbury Water Management

Collaborative programme	Dominant spatial scale	Governance	Communication	Decision making	Funding	Objective
<i>Experimental Stage</i>						
Living streams	Tributary	Regional council led informal meetings	Voluntary participation	Participant decision on actions taken	Participant assisted by Environmental Enhancement Fund	Water quality improvement in degraded streams
Catchment groups	Catchment	Regional council led regular meetings	Open meetings	Community consensus	Participant and Council funding	Resolution of conflict or community concerns
<i>Regional Strategy Development</i>						
Canterbury Water Management Strategy	Region	Mayoral forum led. Appointed stakeholder Steering Group	Structured stakeholder engagement. Region-wide community consultation	Steering Group informed by community with Mayoral forum endorsement	Regional Council	Regional water management strategy
<i>Implementation Programme Development</i>						
Regional Implementation Programme	Region	Regional council appointed committee	Open public meetings	Committee consensus which is subject to RMA processes	Regional council	Regional Implementation Programme
Zone Implementation Programme	Sub regional zones	Regional and district council appointed committee	Open public meetings and community engagement	Committee consensus which is subject to RMA processes	Regional and district councils	Zone Implementation Programmes
<i>Operational Management</i>						
Farmer Collectives	Tributary or Irrigation District	Collective and farmer audited self-management	Collective	Collective strategy and farm plans to meet Regional Plan limits	Farmer/Collective	Achieve water quality outcomes

There is a clear trend in the collaborative governance arrangements as water management moves from strategy to implementation programme to operational management of (1) decreasing dominant spatial scale (from region to subregional zone to catchment/irrigation district), (2) increasing formality (from non-statutory to statutory), and (3) decreasing scope of decisions (from all issues to ten target areas to selection of management approach).

Even with the decreasing dominant spatial scale moving from strategy to operations, multiple scales from the region to the individual land parcel are relevant to all stages. The solutions packages from the Zone Committee addenda include major infrastructure components at the catchment scale (e.g. augmentation of Wainono Lagoon with high quality Waitaki River water, managed aquifer recharge in the Hinds catchment, a sedimentation basin in the Wairewa catchment, and, constructed wetlands for water quality improvement in the St Leonards catchment). There is not a funding mechanism identified or an implementation agency specified for this infrastructure.

Furthermore the Regional Committee recognized that while new water supply and distribution projects must be economically viable, these infrastructure elements need to be developed in a coordinated way to achieve an integrated regional approach (Canterbury Water 2012). This concept is given statutory support in Policy 4.8 of the Land and Water Regional Plan that “the harvest and storage of new irrigation or new hydro-electricity generation schemes contribute to or do not frustrate the attainment of the regional concept for water harvest, storage and distribution...” (Environment Canterbury 2015). The Regional Committee also saw the potential for water quality improvements and other benefits through the development of ‘environmental infrastructure’ such as constructed wetlands and on-farm treatment swales that can be incorporated into water storage and supply networks (Canterbury Water 2012). However, there is not an operational programme for implementing and funding the regional concept.

Also, the solutions packages being developed by the Zone Committees fall short of the targets defined in the CWMS. Furthermore, while the progress of the implementation of the CWMS has been significant, not all the milestones identified for completion by 2015 have been achieved. These unresolved issues of infrastructure development, ability of solutions packages to meet desired outcomes, funding of infrastructure and solutions packages, and implementation progress are discussed further below.

Unresolved Issues

The change to collaborative governance has led to a paradigm shift in water management in Canterbury with the constructive development of Zone Implementation Programmes to deliver on the ten target areas of community outcomes associated with water, and of solution packages to address degraded water quality. However, there are still unresolved issues with respect to delivering sustainable outcomes.

Each of the Zone Committees in presenting their solution packages have indicated that water quality will improve or at least the rate of degradation will decrease, but the levels of intervention proposed are not sufficient to achieve the desired water quality targets. One key consideration is the cost to farmers of implementing land management changes to achieve lower contaminant discharges. While more advanced mitigation approaches are available, the Zone Committees (many of whom are farmers) were reluctant to recommend measures greater than what was considered “affordable” to farmers.¹² It is unresolved how additional interventions will be achieved.

The solution packages also include catchment level infrastructure (e.g. managed aquifer recharge, constructed wetlands and diversions of clean water for contaminant dilution). It is unresolved as to who would be responsible for implementing this infrastructure. Central government has no water management agency (only an environmental policy ministry). Regional government has a regulatory role. There is no incentive for private sector implementation. In addition, the question of the method

¹² Note that the impact of water quality impairment is not borne by farmers but by downstream in-river users (e.g. fishermen and kayakers) and the environment (e.g. algal blooms and nitrate toxicity). This is a different “commons” management issue compared to the issue considered by Hardin and Ostrom of a resource whose availability is at sustainability limits affecting all users.

of funding is unresolved. No recommendations for funding have been developed either on a polluter pays basis or a taxpayer/ratepayer basis.

Another unresolved issue is the uneven implementation of actions identified in the Canterbury Water Management Strategy to address the ten target areas. The activities related to increased irrigated area and economic outcomes are being actively progressed but the activities associated with recreational and ecological objectives are behind the agreed implementation schedule in the Strategy (Canterbury Water 2015). The agreement reached in the Strategy is seen as a “social contract” with the multiple interests around water (Henley 2014) and all activities cited in the Strategy need to be implemented for an equitable outcome.

Managing power imbalances can be an issue for effective collaborative governance (Fung and Wright 2003). There is concern that the Zone Committee process favours the well-resourced farming interests over the less resourced recreational and ecological interests. Some community interests have withdrawn from the collaborative process.

Concluding comments

In Canterbury, there has been a paradigm shift to collaborative governance leading to more effective water management for a resource at sustainability limits compared to the effects-based approach in New Zealand’s resource management legislation. Different institutional structures for different stages of the water management process have been used but all reflect the principles of self-governing communities. However, there are still issues to be resolved to achieve sustainable water management.

References

- Brown P (2016) Canterbury detailed irrigated area mapping. Aqualinc, Christchurch
- Canterbury Water (2009) Canterbury Water Management Strategy Strategic Framework. Environment Canterbury, Christchurch
- Canterbury Water (2012) Canterbury Water Management Strategy Regional Implementation Programme including Annex. Environment Canterbury, Christchurch
- Canterbury Water (2014) Canterbury Water Management Strategy Zone Committees: Code of Conduct. <http://ecan.govt.nz/publications/General/code-of-conduct-all-committees-2014.pdf>.
- Canterbury Water (2015) Canterbury Water Management Strategy Targets: Progress Report June 2015. Environment Canterbury, Christchurch
- Dark A, Bright J, Sigle S (2008) Canterbury Strategic Water Study (Stage 2). Aqualinc, Christchurch
- Domuisse J (2005) A review of surface water irrigation schemes in Canterbury. Their development, changes with time & impacts on the groundwater resource. Environment Canterbury, Christchurch
- Dryzek J (2010) Foundations and Frontiers of Deliberative Governance. Oxford University Press, Oxford
- Environment Canterbury (2013) Canterbury Regional Policy Statement 2013. Environment Canterbury, Christchurch
- Environment Canterbury (2015) Canterbury Land and Water Regional Plan December 2015. Environment Canterbury, Christchurch
- Friend J, Hickling A (2005) Planning under pressure: the strategic choice approach. 3rd edn. Elsevier, Oxford

- Fung A, Wright E (2003) *Institutional Innovations in Empowered Participatory Governance*. Verso, London
- Gunderson LH, Holling CS (2002) *Panarchy: Understanding Transformations in Human and Natural Systems*. Island Press, Washington
- Gunningham N (2008) *Innovative Governance and Regulatory Design: Managing Water Resources*. Australian National University, Canberra
- Hardin G (1968) The Tragedy of the Commons. *Science* 162:1243-1248
- Henley G (2014) Review of Limit Setting Process in four zones - Hurunui, Selwyn/Waihora, Hinds, and Southern Coastal and Streams. Network, Wellington
- Jenkins B (1996) Best Practice Environmental Regulation - The Western Australian Approach. Paper presented at the Environmental Management Beyond 2000, Griffith University, Brisbane, 5-6 December 1996
- Jenkins B (2007a) What role for storage in Canterbury? Paper presented at the NZSOLD/ANCOLD Conference "Dams - Securing Water for Our Future", Queenstown, 19-20 Nov 2007
- Jenkins B (2007b) Water Allocation in Canterbury. Paper presented at the NZ Planning Institute Conference 2007, Palmerston North, 27-30 March 2007
- Jenkins B (2009) Best Practice Partnerships at the Local Government Level for the Environment. Paper presented at the Community Boards' Conference, Christchurch, 19-21 March 2009
- Jenkins B (2013) The Development of Sustainable Alternatives to Applicant's Proposals using Collaborative Approaches. Paper presented at the New Zealand Planning Institute 2013 Annual Conference, Hamilton, 30 April to 3 May 2013
- Jenkins B, Henley G (2014) Collaborative management: community engagement process as the decision-making process. *The Australasian Journal of Natural Resources Law and Policy*, V 17 (2) pp 135-153.
- Jenkins B, Russell S, Sadler B, Ward M (2014) Application of sustainability appraisal to the Canterbury Water Management Strategy. *Australasian Journal of Environmental Management* 21 (1):83-101. doi:10.1080/14486563.2014.880383
- Lomax A, Memon A, Painter B (2010) *The Canterbury Water Management Strategy as a Collaborative Planning Initiative: A Preliminary Assessment*. Lincoln Ventures. https://researcharchive.lincoln.ac.nz/bitstream/10182/2463/1/CWMS_Appraisal_Report_20_May_2010.pdf>.
- Morgan M, Bidwell V, Bright J, McIndoe I, Robb C (2002) *Canterbury Strategic Water Study*. Lincoln Environmental, Lincoln
- Ostrom E (1990) *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press, New York
- Skelton P, Memon A (2002) Adopting Sustainability as an overarching Environmental Policy: a Review of section 5 of the RMA. *Resource Management Law Journal* X (1):1-10

Upton S (1995) Purpose and Principle in the Resource Management Act. *Waikato Law Review* 3:17-55

Waitangi Tribunal (2016) Meaning of the Treaty. <http://www.waitangitribunal.govt.nz/treaty-of-waitangi/meaning-of-the-treaty/>. Accessed 6 July 2016

Wallis J, Dollery B (2000) Local Government Reform in New Zealand. Working Paper Series in Economics. University of New England, Armadale

Whitehouse I, Pearce A, McFadden G (2008) Final Report: Canterbury Strategic Water Study Stage 3 Environment Canterbury, Christchurch