

Application of a systems deliberative process to inform solutions to the cumulative effects of land uses on fresh water quality

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In the last few decades, environmental management has become increasingly challenging because of the complexity of the issues. These issues are characterised by significant uncertainty; a lack of consensus on their definition and the most “appropriate solutions” and “the associated governing system is a complex network of political interactions between stakeholders pressured by urgency and high stakes” (Bremer, 2010; Stave, 2002). The dynamic between human actions and environmental responses and the associated high degree of uncertainty and unpredictability of future directions means that science centric management alone will not be enough to address the issues. In response there has been a movement to include legitimate stakeholder perspectives within new governance models and the creation of adaptive settings to allow inclusive and integrated dialogue across the stakeholders (Bremer, 2010).

Over the last two decades, there has been increasing evidence that some of Canterbury region’s freshwater resources are at, or over, their assimilative capacity limits and are becoming degraded (Environment Canterbury, 2008). It is clear that the mix of regulatory and voluntary approaches currently being used to deal with point and non-point source discharges is not sufficient when the limit of capacity is reached. Increasingly, addressing the problem has become highly adversarial and it is evident that a different approach is needed. A collaborative project to develop a “preferred approach” to addressing cumulative impacts was initiated by Environment Canterbury and we describe here a systems deliberative process (fig 1) that supported an integrated management approach that sought improvements not only in the health of the region’s water resources but also linked improved economic social and cultural outcomes.

We adopted the six-step iterative schema “Intégraal” as per O’connor et al. (2007, 2010) and tested it in the Hurunui catchment through a series of five catchment workshops. The problem to be addressed was the cumulative effects of land uses on fresh water quality in Canterbury. We then organised the problem into a deliberation matrix in terms of: eleven stakeholder groups each assessing the acceptability of three scenarios against five value criteria and three indicators per value criteria for each of four well beings; environment, economic, social and cultural. These values and indicators were obtained from a range of sources: long term community council plans, Canterbury Water Management Strategy, international literature and stakeholder group’s deliberation.

The following stakeholder groups participated: Iwi, Pastoral food and fibre, Dairy, Arable, Agribusiness, Recreation, Environmental NGO’s, Rural woman, Energy, Tourism, Hurunui district council, community health and Hurunui zone committee. The following three scenarios were developed and their impacts on a range of value criteria analysed by a team consisting of policy analysts, water, land and farm system science social scientists and economists: Scenario 1 – current land use. This scenario was based on the best assessment of current land use in the catchment; Scenario 2 – business as usual, this assumed intensification in line with historic trends, and an increase in irrigation using efficiencies in existing water use; Scenario

3 – extensive Irrigation, this assumes almost full irrigation of suitable land and includes efficiency gains and new water. After the first deliberation there was a request from the stakeholders for development of two further scenarios based on achieving certain water quality limits, these were: Scenario A – conservative modelled, this scenario was based on achieving a very high certainty that the Natural Resource Regional Policy (NRRP) water quality objectives would be met; Scenario B – 1990-95 Hurunui water quality aimed to achieve approximately the same water quality as existed in the period 1990 – 95, immediately post the introduction of the irrigation scheme.

To assist in building a common understanding of the working of the Hurunui catchment the workshop participants were brought up to date by the research team on the current state of: the hydrology, and land use within the catchment; the current socio-economic status of the catchment and the impact of land use on nutrient loss. This was followed by the development of a system representation of the land, water and people of the Hurunui catchment (Maani & Cavana 2007).

Following the presentation of the scenarios and their impacts to the stakeholders they adjourned into their groups with a facilitator and assessed the acceptability (yes, no, don't know) of the scenario impacts across their value criteria. These assessments were then shared collectively creating an environment for learning what was important for each group.

The key messages to come out of the work were that: the systems deliberation process is an excellent means of stakeholders learning from each other and making transparent reasons for the choice of options, building trust and informing the process of catchment management; mechanisms that had the potential to turn unacceptable consequences of a scenario into acceptable were identified; there was agreement that agricultural development could take place with a process in place to meet the agreed water quality targets and taking account of the impact on social, cultural and economic values; the management objectives (environmental limits should be at current levels; a requirement for future agricultural development and maintenance and enhancement of recreational and ecosystem outcomes) and more work will be required to fully understand the tradeoffs that will be accepted when the detail of the implementation is developed and deliberated. Partnerships between community, industry, and farmers are the key to successful implementation.

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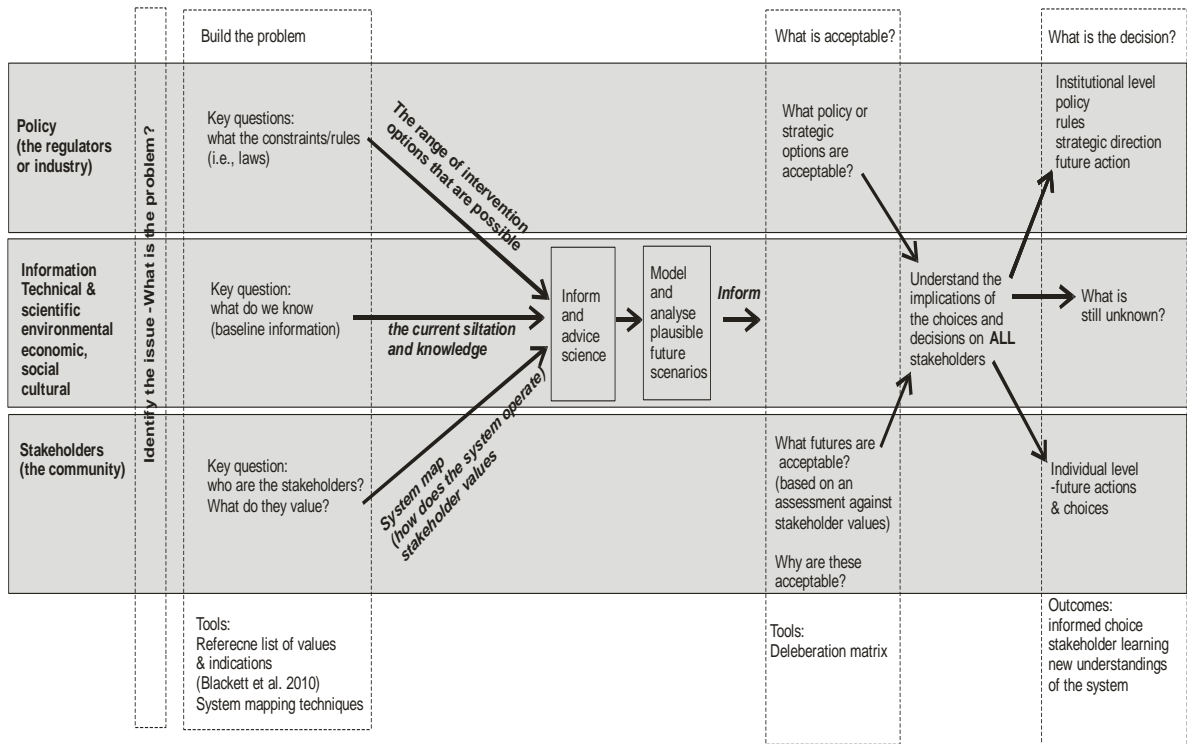


Figure 1 System Deliberative process