SYSTEMIC EVALUATION OF COMMUNITY ENVIRONMENTAL MANAGEMENT PROGRAMMES

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ABSTRACT

Community environmental management (CEM) is increasingly seen as a solution to complex environmental issues facing regulatory authorities. Little is written in the literature about how CEM programmes should be evaluated given the complex relationship between community participation and environmental outcomes. CEM programmes have much potential, but the lack of evidence-base means that their role in resource management is not necessarily well understood. This paper reports on action research that developed and trialled a systemic CEM evaluation methodology that blends three evaluation paradigms: stakeholder, goal-based and organisational.

Keywords: Systemic evaluation, Community Environmental Management, Soft Systems Methodology, Developmental Work Research, New Zealand

INTRODUCTION

Community environmental management (CEM) is increasingly seen as a solution to complex environmental issues facing regulatory authorities (Martin, 1991). This approach gained popularity in the early 1960s and 1970s, amidst growing disillusionment with narrowly-focused mainstream environmental management which placed emphasis on large-scale, capital-intensive, centrally-planned conservation and development projects (Kellert et al., 2000; Kapoor, 2001). CEM is not a new approach; rather, it seeks to invoke traditional local and indigenous cultural and institutional mechanisms for managing and conserving the environment (Kellert et al., 2000). Typical CEM processes include participatory methods such as community meetings to identify issues and create action plans to enhance the management of natural resources.

Little is written in the literature about how CEM programmes should be evaluated given the complex relationship between community participation and environmental outcomes, and the inability of evaluation designs to address problems such as confounding (Kellert et al., 2000; Buchy and Race, 2001; McCallum et al., 2007). CEM programmes have much potential, but the lack of evidence-base means that their role in resource management is not necessarily well understood. In this paper we report on an intervention designed to generate the local evidence-base of a CEM programme in Canterbury, New Zealand, by developing a novel approach to CEM evaluation that blends three evaluation paradigms: stakeholder, goal-based and organisational (Boyd et al., 2006). The work was carried out between June 2006 and July 2008, and is part of a larger research programme

which aimed to develop systemic and participative methods to strengthen community involvement in environmental decision-making for sustainable development.

The paper is structured in four parts. The paper begins by describing the role that local government plays in managing natural resources in New Zealand and how a Regional Council ('Environment Canterbury') has institutionalised CEM in the Canterbury region ('Resource Care'). The paper then sets out a number of methodological challenges that lead to the development of an evaluation approach that drew on Soft Systems Methodology and Developmental Work Research principles and methods. The CEM evaluation methodology trialled in workshops with Resource Care staff, community stakeholders and indigenous persons (mana whenua – the iwi [tribe] or hapū [sub-tribe] who exercise customary authority in an identified geographical area) is outlined. A worked example is given. The paper concludes by contrasting the CEM evaluation methodology with traditional approaches and considering the contribution that systemic evaluation has made to development of CEM in Canterbury.

CEM AT ENVIRONMENT CANTERBURY, NEW ZEALAND

In New Zealand local government is responsible for the sustainable management of natural resources including water, land and air. Environment Canterbury specifically is charged with achieving "sustainable environment and sustainable communities, for the benefit of people, communities and future generations, at a reasonable level of monetary and personal costs" (www.ecan.govt.nz, accessed on 29/4/09). A Long Term Council Community Plan sets out Environment Canterbury's priorities for a ten year period.

Resource Care Groups (RCGs) constitute Environment Canterbury's approach to CEM. Beginning in 1999, the Resource Care Section which runs the Resource Care programme developed and piloted a community-based approach to restore local lowland streams known as 'Living Streams' (New Zealand Association of Resource Management, 2002). More recently, attention has shifted to community action in whole catchments to improve environmental indicators such as surface water quality and biodiversity, through provision of information about sustainable land management practices, stream enhancement strategies, and implementation of riparian zone management (Environment Canterbury, 2005). The work of the Resource Care Section is necessarily broad, responding to a wide range of environmental concerns. Despite the range of concerns, the aim is consistent: achieving environmental objectives through social processes, community partnership and engagement.

TOWARDS DEVELOPING A CEM EVALUATION METHODOLOGY

An essential first step in undertaking any theory-driven impact and/or outcome evaluation is the development of programme logic, which describes the relationship between programme inputs, activities, outputs and intended outcomes (Fielden et al., 2007). One of the key advantages of using programme logic is the ability to make informed choices about evaluation methods including the identification and measurement of relevant values

(Cox, 2000). Indeed, the difficulty experienced by the Resource Care Section in articulating the rationale for, and process of, working alongside communities to produce environmental outcomes was identified as a key problem for:

- Demonstrating the contribution of Resource Care activities to the goals identified in Environment Canterbury's Long Term Council-Community Plan;
- Determining the cost/benefit of funding invested in the Resource Care Section; and
- Identifying opportunities for Environment Canterbury to work more effectively with communities to achieve environmental outcomes.

In August 2006 the research team met with the Resource Care Section Manager to discuss how a systems approach might strengthen RCG programme logic (Figure 1).

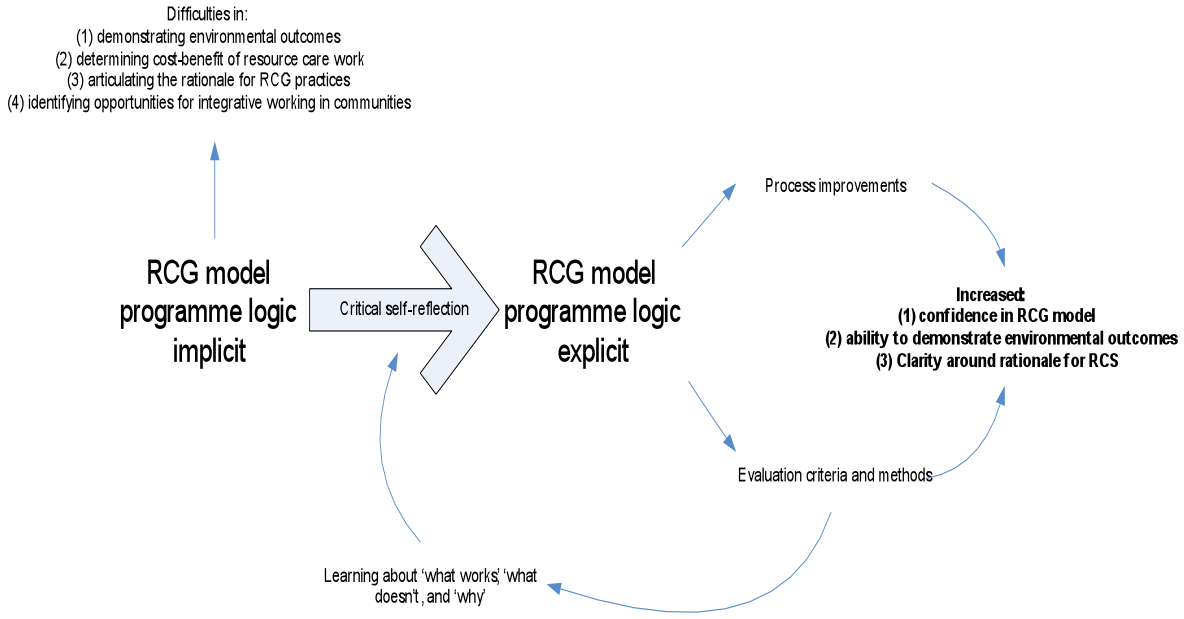

Figure 1. Intervention design to strengthen Resource Care programme logic

Scoping interviews with Resource Care Section staff members, community groups and mana whenua highlighted a number of difficulties in constructing a robust programme theory including:

- How to deal with the multiple perspectives about Resource Care resources, activities, outputs and intended outcomes?
- How to express the relationship between resources, activities, outputs and intended outcomes succinctly from a given perspective?
- How to model aspects of the programme logic where the assumptions about resources, activities, outputs and intended outcomes are uncertain and/or contested?

CEM EVALUATION METHODOLOGY

To address these methodological challenges, we followed Midgley's (2000) creative design of methods to develop a tailored approach to formulating programme logic using Soft Systems Methodology (SSM) (Checkland, 1981; Checkland and Scholes, 1999; Checkland, 2001) and Developmental Work Research (DWR) (Engeström, 1987, 2000). Creative design of methods "involves understanding the situation in which an agent wishes to intervene in terms of a series of systemically interrelated questions, expressing the agent's purposes for intervention. Each purpose might need to be addressed using a different method, or part of a method. The purposes are not necessarily determined as a complete set in advance, but may evolve as events unfold and understandings of the situation develop" (Midgley, 2000, p. 226). Individually, these approaches have been widely used to tackle real world problems in a variety of problem domains, but the synthesis described in this paper is specific to the problems faced by the Resource Care Section.

SSM is "an organised way of tackling perceived problematical (social) situations … it organizes thinking about such situations so that action to bring about improvements can be taken" (Checkland and Poulter, 2006, p. xv). SSM is organised around four core principles, which support the Resource Care Section's reflections about "what works, what doesn't and why":

(1) Identification of a problematical real-world situation requiring action for improvement. Specifically, what issues need to be addressed through evaluation including the importance of ongoing learning for the Resource Care Section;
(2) Creation of conceptual models – "system[s] of activities that could be undertaken by human operators" (Wilson, 2001, p. 12) – useful for detailing how the Resource Care programme logic operates according to espoused theories by Resource Care staff;
(3) Comparison of the conceptual models of what is known about how Resource Care works *in practice*; and
(4) Structured debate about desirable/feasible change, and potential process improvements in light of conceptual models of purposeful activity, how Resource Care works *in practice*, and the evaluation criteria and methods needed to judge whether Resource Care practices are working.

SSM principles were supplemented with DWR, an approach that addresses practice-based theorising, knowing and change (Engeström, 2005). DWR principles such as intellectual and emotional confrontation were used given that these provided strong rationale for the participation of stakeholders and mana whenua whose role was to challenge the perspectives of Resource Care staff. These challenges act as stimuli to thinking about Resource Care activities *in practice*.

The CEM evaluation methodology set out in Figure 2 was trialled in a series of workshops with Resource Care staff, mana whenua and community groups. The workshops aimed to demonstrate a systemic evaluation approach to CEM, develop evaluation criteria and tools to support ongoing learning about Resource Care activities, and explore any potential improvements to Resource Care practices. For ease of

communication, Figure 2 presents the evaluation approach as a step by step process but in practice there is considerable overlap and jumping between steps. Figure 3 includes some of the major feedback loops between steps. The remainder of this section illustrates the steps with a worked example from workshop discussions regarding how the Resource Care Section could more effectively manage the following key output: development of a community action plan to manage environmental issues.

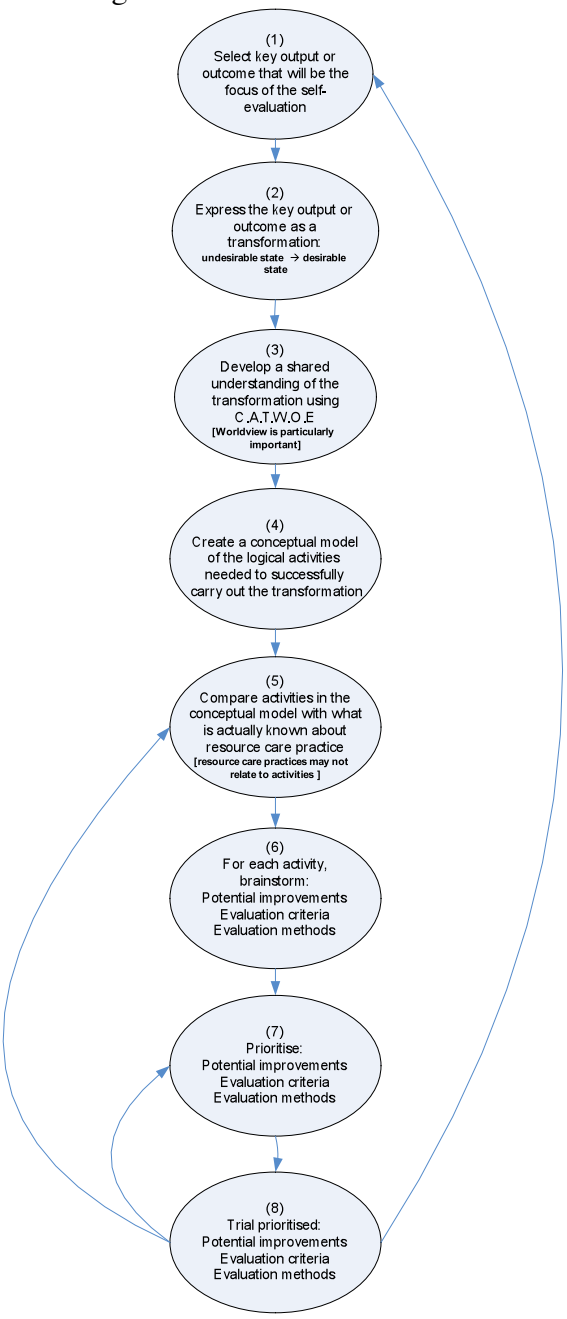

Figure 2. CEM evaluation methodology

(1) Select key output or outcome that will be the focus of the self-evaluation

Every Resource Care Group is unique given the particular biophysical and social characteristics of the stream or catchment. The work reported here centres on unpacking the logic for common practices such as the "stream walk". The resulting programme logic is for a generic RCG. This has a number of advantages including the ability to develop 'standard' evaluation criteria and tools, and relative ease of communicating to others what activities are involved in Resource Care activities.

Workshop participants were asked to brainstorm positive/desirable outcomes and then prioritise them. A nominal card storming technique was used (Taket and White, 2000) but outputs and outcomes of interest could also come from:

- Debriefings about critical incidents, both negative or positive;
- Community complaints or compliments;
- Ongoing problems that are difficult to resolve and require in-depth exploration of the underlying issues before satisfactory solutions can be determined;
- Outcomes identified in the Long Term Council Community Plan; and
- Positive or unpleasant 'surprises' which puzzle Resource Care staff, stakeholders and/or mana whenua.

The workshop participants selected two key outputs and/or outcomes:

- The development of a community action plan to manage environmental issues; and
- That Resource Care work is recognised, respected and seen as a key tool to achieving regional council environmental outcomes within Environment Canterbury.

(2) Express the key output or outcome as a transformation

The transformation "changes some defined input into some defined output" (Checkland, 2001, p. 74) and can reflect 'primary tasks' (e.g., community need for environmental education → community need for environmental education met) or be 'issue based' (e.g., Resource Care workload is unreasonable → Resource Care workload manageable).

Key output:	Development of a community action plan to manage environmental issues
Transformation:	Few people understanding the environmental 'big picture' → more people understanding the environmental 'big picture'

There are many ways that the above outcome could have been worded as a transformation, e.g. need for community action plan → need for community action plan met.

(3) Develop a shared understanding of the transformation using C.A.T.W.O.E mnemonic

The mnemonic C.A.T.W.O.E provides a methodologically coherent way of dealing with multiple perspectives held by different actors regarding what it 'is all about' and elucidates the complexity of factors involved in a desired transformation. Worldviews were surfaced by asking what assumptions make the transformation meaningful. For example:

- ***(C)ustomers*:** Fish and Game, mana whenua, community members, conservationists, recreationalists, farmers, individual landowners, environment;
- ***(A)ctors**:* Resource Care staff, community leaders, other Environment Canterbury staff (e.g. engineers, scientists), government agencies, interest groups, business, mana whenua, individual landowners, community members;
- ***(T)ransformation*:** Few people understanding the environmental 'big picture' → more people understanding the environmental 'big picture';
- ***(W)orld-view:*** The role of Environment Canterbury is to support community - 'on tap, not on top';
- ***(O)wners:*** Powerful (articulate/loud) actors with negative view of the plan, government agencies, politicians; and
- ***(E)nvironmental constraints:*** Finance, time, lack of information or understanding, willingness of participants to resolve issues, resources (computers, coordinators).

(4) Create a conceptual model of the logical activities needed to successfully carry out the transformation

All the activities *logically necessary* to create a community action plan in an *ideal world* were brainstormed, expressed as imperative verbs, and related in the order that they would have to occur (Figure 3). The activities 1 – 8 that make up this conceptual model include "select an appropriate setting for community meetings", "present appropriate update information (by credible people)", "identify community, community leaders and networks", "bring people together to build relationships", "identify issues concerning the community", "gain commitment to developing an action plan", "reach marginalised people and keep people informed about activities" and "develop an action plan".

(5) Comparison and structured debate

For each activity in the conceptual model the following questions were asked:

- Is the activity being done?
- If not, should the activity be done?
- If yes, how well is the activity been done? By who – Resource Care Section, other parts of Environment Canterbury and/ or community stakeholder(s)?
- How do we know if the activity is being done well?
- What are the possible improvements to the activity?

Figure 3 was scrutinised by the workshop participants and close analogies for each activity could be found in current Resource Care practices, giving the Resource Care Section and participating stakeholders confidence that the thinking around this key output is robust and reflected wider understanding.

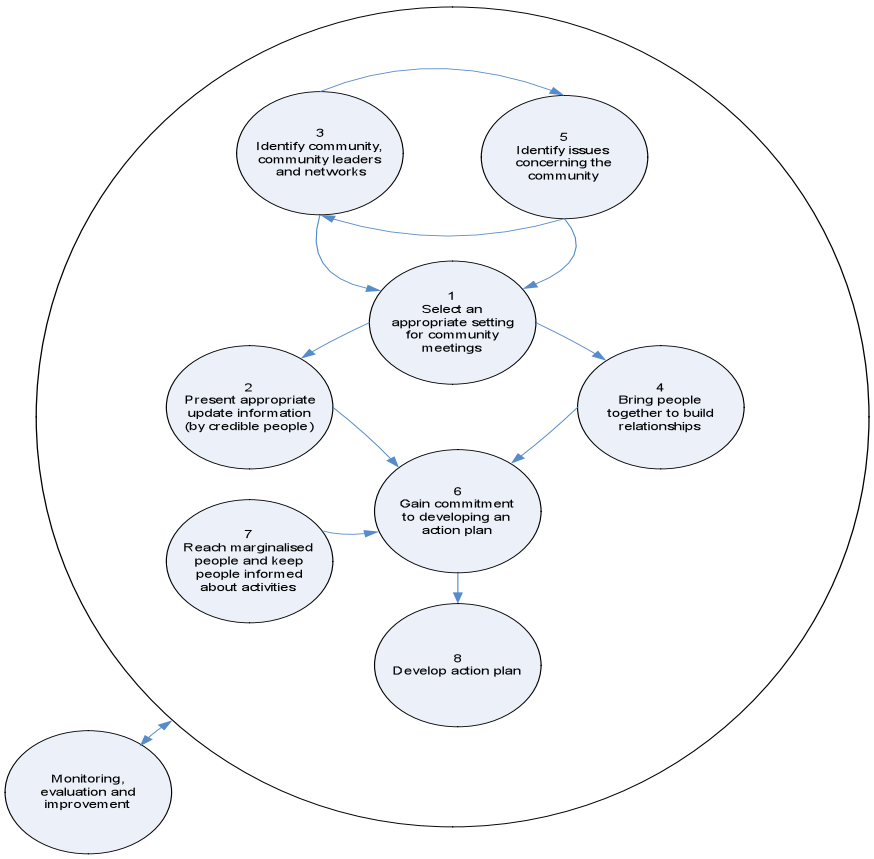

Figure 3. Conceptual model

(6) Brainstorm potential improvements, evaluation criteria and evaluation methods for each activity

Through interactive discussions between the Resource Care Section and stakeholders, a number of potential improvements, evaluation criteria and methods were brainstormed (See Table 1 for an example). In particular, a key learning for the RCS staff centred on the importance of mana whenua engagement and how to undertake this effectively and meaningfully.

Table 1. Activity 1 - Select an appropriate setting for community meetings

Activity 1	Possible evaluation criteria	Measurement method	Audience*
Select an appropriate setting for community meetings	• Check that key people are there • Are meetings the most appropriate mechanism? • Evaluate how good your address list is • Who is missing and why? E.g. women, mana whenua • Demographic data • Positive feeling	• Why friends are not coming • Ask key leader • Check registration list • Direct feedback • Ask participants why they are here, how they have found the community meeting • Do people come back? • Councillors' viewpoints • How long people stay • Address list	• Resource Care Section • Environment Canterbury Politicians

* Those thought to be interested in evaluation result

(7) Prioritise potential improvements, evaluation and evaluation methods

Given the number of potential evaluation criteria and methods brainstormed for each activity, the three most important activities for the "development of a community action plan" were prioritised.

- Activity 2: Present appropriate up to date information (by credible people);
- Activity 5: Identify issues that concern the community; and
- Activity 7: Gain commitment to developing an action plan.

The "monitoring and evaluation" activity was not prioritised as it was felt that more could be learned about Resource Care practices by evaluating at the level of activity given the close relationship between conceptual model and actual Resource Care practices.

Three of the most promising evaluation criteria within each activity were selected. An example of prioritised evaluation criteria is highlighted in Table 2. The robustness of selected evaluation criteria and methods relating to prioritised activities was assessed by considering strengths and weaknesses. To aid further prioritisation, workshop participants were also asked to vote for the evaluation criteria they felt best captured the essence of the activity by assigning 'sticky dots'. Prioritisation of the activities and evaluation criteria and consideration of strengths and weaknesses enabled the workshop participants to determine the most appropriate way of evaluating Resource Care practices for their contribution to the "development of a community action plan" outcome.

Table 2. Prioritised activity and evaluation criteria

Activity 2	Prioritised evaluation criteria	Measurement method	Target
Present appropriate update information (by credible people).	Demand for information is evident.	Ask key stakeholders what information they would like to receive in relation to the issues they see as important.	All information that is deemed important by stakeholders has been collated.
	Background information regarding the catchment is presented (including mana whenua perspectives). Strengths: Provides good foundation to build upon and sets the scene and can jog peoples memory Weaknesses: Possibly disengage people because of the timely nature involved.	*Conduct brief overview of catchment history, in consultation with key stakeholders and informants including mana whenua.*	*All relevant historical and current developments are summarised and presented.* Strengths: Gets everybody up to same speed, puts everyone on level playing field. Weaknesses: Could take a long time, which could disinterest people and could be an expensive process
	Group agreement on development of community action plan and schedule for presentation of topics to inform this. Strengths: People buy-in and evidence of moving forward, acceptance of process and to do something (action)	*Ask meeting attendees for agreement on community action plan goal and related presentation of topics.*	*Topics reach 'saturation point' and cover all relevant views and issues according to stakeholders and meeting attendees.* Strengths: Covers all bases Weaknesses: If you wait for saturation point you may have lost a significant part of the community because it gets too drawn out.
	Coordinator briefs speaker and assesses their presentation prior to the meeting. Strengths: Ensures consistent approach and relevant to community, speakers know what they should present on (this should only be for guest speakers), speakers should be talked to, it is not about seeing their presentation beforehand, and speakers are given 'key messages' that community want to know about. Weaknesses: Chance that the RCG coordinator could 'vet' the presenters to what information they want out in the community, not always possible because of time constraints for RC coordinators and speakers	*RC coordinators document briefing and assessment process.*	*All speakers are briefed and all presentations reviewed prior to each RCG meeting.* Strengths: Reduces the extent of the challenge, helps cement the group Weaknesses: Speakers being offended at having to give presentation over before their presentation May not have enough time

In the course of developing key evaluation criteria, several key measurement methods emerged. The vast majority of these were based on and will build on current Resource Care activities, including:

- Compiling meeting attendance registers;
- Recording participant address lists;
- Recording numbers present at meetings;
- Documenting/reporting invitations to other fora;
- Conducting and documenting Stream Walks 1 and 2; and
- Monitoring of action plans.

(8) Trial prioritised potential improvements, evaluation criteria and evaluation methods

At the end of the workshops, the research team met with the Resource Care Section manager to discuss action planning, trial prioritised evaluation criteria and methods and more importantly (in terms of the aims of the research project) to help embed the evaluation approach into the work of the Section. The manager reported the Resource Care Section's satisfaction with the evaluative criteria developed in the research and internal developments involving the categorisation of key projects under six programme areas: land and biodiversity; urban sustainability; education for sustainability; industry initiatives; living streams/water; and integrated catchment (and coastal) management.

The prioritised evaluative criteria and methods were considered relevant to all six programme areas, and evaluation has been designated a key programme output. Implementation issues were also discussed including being careful not to overload programme leaders with additional work. Although those working in the Resource Care Section intuitively and anecdotally understand the impact of their work in communities, having evaluative criteria and measurement methods as part of a more formal approach will support more comprehensive evaluation.

DISCUSSION AND CONCLUSION

This paper has presented an evaluation methodology to support the development of community environmental management programmes. Most current approaches for developing programme logic fail to tackle the non-linear and highly uncertain nature of community environmental management, with relationships between inputs, activities, outputs and intended outcomes described using linear cause and effect. Such models account mechanistically for "how and why the program is addressing a specific customer need and how measurement and evaluation will assess and improve program effectiveness" (McLaughlin and Jordan, 1999, p. 65).

In a recent expert anthology, Williams and Imam (2007, p. 4) note that a systems approach to evaluation:

"…

- Links the local and global, across silos, sectors and disciplines,
- Provides tools to work with different opinions of stakeholders,
- Pays attention to coalitions,
- Pays attention to properties that emerge unexpectedly,
- Acknowledges the richness and interdependence of real life,

- Helps identify leverage points; the differences that make a difference to a program and signal where best to intervene,
- Allows for measuring or accounting for dynamic changes in a program or system,
- Provides practical guidelines for using theory-of-change techniques, and
- Recognises the evolutionary nature of programs."

By synthesising methods from SSM and DWR, the research team and the Resource Care Section developed and trialled an approach that encourages learning at the individual, group and institutional levels, which is not only critical but is lacking in CEM literature. In doing so, the CEM evaluation methodology blends approaches from different evaluation paradigms ('stakeholder', 'goal-based' and 'organisational') into a single innovative framework that represents an advance in systemic evaluation.

Key outcomes sought included:

- Making the rationale for Resource Care activities, processes and methods explicit, helping to communicate 'what resource care is' to community, mana whenua and other sections within Environment Canterbury;
- Developing a greater understanding of the strengths and weaknesses of the Resource Care model (vis-à-vis statutory tools), and as a result increasing stakeholder confidence in Resource Care activities, processes and methods; and
- Providing a discipline and mechanism to build on the strengths of Resource Care practices and address weaknesses that limit opportunities for Resource Care engagement with communities to produce environmental outcomes.

To what extent did the ESR-Environment Canterbury intervention achieve these aims? Comments from workshop participants included:

> *The workshops were useful for putting some sort of theory behind our everyday practice and reinforcing key steps*
>
> *The workshops were useful to reflect on processes as often we do not get a chance to do this*
>
> *Useful in terms of developing evaluation monitoring criteria – somewhat lacking at present in Resource Care*

Two significant improvements to the Resource Care model were identified by workshop participants: engaging more effectively with mana whenua and working more closely with other sections within Environment Canterbury to coordinate activities within communities.

Previously, the Resource Care Section appeared to have related to mana whenua primarily as stakeholders and this had resulted in low levels of participation. Through workshop discussion (with mana whenua present) it became apparent that alternative processes such as face to face meetings prior to community meetings could facilitate more effective participation. Comments from Resource Care staff included:

> *It was good having mana whenua ideas and feedback as this is an area I have been wondering about how to improve.*

A strength of the workshop approach is that it provides targets for evaluating cultural perspectives.

The need for the Resource Care Section to work closely with other Environment Canterbury sections was considered important, given that Resource Care draw on wider Environment Canterbury resources but there has traditionally been tension between 'community development' and 'compliance' worldviews. The workshops helped to focus Resource Care thinking about its relationships with its parent organisation, and stimulated action planning for an Environment Canterbury wide workshop on integrated catchment management. Other workshop outcomes included assisting new Resource Care staff to develop an appreciation of what is involved in working with communities and the importance of evaluation. As a whole, these positive outcomes support the application of a systemic CEM evaluation methodology, ultimately as a means of strengthening efforts towards the achievement of both social and environmental gains.

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