Chapter 1

Social learning, environmental management and evaluation: the emergence of a research question

1.1   Introduction

Challenges of climate change, drought, sustainable food production and protection of biodiversity are some of the many environmental global concerns which require local and regional responses. They are increasingly recognised as complex or even 'wicked' problems that necessitate increased knowledge not only about the problems themselves but about the ways and means to address them. This thesis is fundamentally about the science and art of problem solving in the wide range of contexts in which environmental management professionals find themselves working. Specifically, I look at social learning as one of the emergent frameworks for understanding complex environmental problem solving, and through this study I investigate a potential role for participatory and developmental evaluation in building the capacity to address environmental management problems by supporting the social learning potential of the problem situation.

This focus for this thesis is the increasingly recognised problem of how to build capacity for social learning into environmental management initiatives that address complex multi-stakeholder issues. The proposition it examines is that participatory and development (P & D) oriented forms of evaluation, when integrated into environmental management initiatives, can be a useful vehicle for building this capacity. In doing so it addresses three specific challenges. The first of these is the competing definitions and purposes of the concept of social learning in the current academic and practice literature. The thesis responds to this with an analysis of literature and a proposed framework for translating this normative concept into practice. The second is an absence of an established connection between social learning and evaluation. The thesis again responds to this with an examination of the theoretical and practice literature on P & D evaluation and a proposed match with specific social learning capacity development needs of environmental initiatives.   The third challenge is the limited availability of case history and practice experience of either building capacity for social learning in environmental management

contexts, or using P & D evaluation to contribute to improving environmental management initiatives. This thesis remedies this gap by examining the practical experience of using P & D evaluation to support social learning through four case stories from the work of the Collaborative Learning for Environmental Management group (CLEM) based at Landcare Research. As work ongoing in conjunction with this thesis these cases represented an opportunity to integrate new ideas about social learning into practice. In this way this thesis grounds theoretical understanding of social learning within the limitations and possibilities of practice on-the-ground.

The constituency of interest for this thesis is twofold. In recent years the number of authors writing about social learning as either a normative concept or an outcome of various collaborative environmental management activities has swelled considerably. The divergence in their interpretations highlights a need for improved clarity around the concept, and an examination of some of the articulated claims for social learning in practice (Reed 2010). Similarly environmental management professionals in search of guidance in addressing complex, pressing environmental management issues are expressing interest in concepts such as adaptive management and social learning, and in particular seek ways to translate these ideas into practice.

In this chapter I begin with a discussion of the background to this research area, why it is a valid area for enquiry, and the key concepts involved. Following this I present the central argument of the thesis, summarise the scope of the research, and outline the research methodology. The chapter concludes with an overview of the thesis structure.

1.2   Background and key concepts

1.2.1   Environmental problem solving – a changing role for management agencies

Environmental management challenges come in many forms. They include contests over resources, such as competing land use, water allocation, and consumption of non-renewables; or pressures on systems, typified by fluctuating impacts over time, hidden thresholds, and multiple interrelated causes, such as non-point source pollution, biodiversity loss, or climate change (Pahl-Wostl & Hare 2004). Management of these problems is and needs to be ongoing.

However, what compounds the modern environmental dilemma is uncertainty. Information about the problem will most likely be incomplete –some crucial factors may even be undeterminable – and when available it can be debated by different stakeholders on the basis of its relevance or meaning. The proffered solutions to the problem may, when tested, fix one part of the problem only to reveal yet another. Moreover problem situations are frequently subject to multiple and contested values, as stakeholders dispute problem causes and remedies and their role in these, or maybe even the existence of a problem at all (Friedman & Abonyi 1976; Lee 1999).

In addition, the management of environmental problem systems frequently requires a focus of attention at scales and over boundaries of jurisdiction that differ from those of existing authorised management institutions. Accordingly, successful outcomes to environmental problems can depend on the coordinated actions of decision-makers at different levels, from paddock (land managers) to region (policymakers) (Allen 2001). Under such conditions, environmental problem solving becomes not so much a matter of determining the solution as mediating a course between the many possible perspectives. Such a process requires that many viewpoints and sources of information be shared among the different stakeholders concerned, and then integrated to find solutions that will guide the way forward (ibid.).

At the same time, any complex problem system (and these statements could indeed be true of other complex problem systems such as community health or social poverty) cannot be managed by relying on the accumulation of centralised banks of knowledge, and the Solomon-like dispensation of judgments and decisions. As O'Rourke and Eungkyoon (2004) note in their review of regulatory mechanisms to address pollution in the US manufacturing sector, a key limitation of command and control regulatory measures is the inability to gather information on complex and ever-changing industrial practices.

> *Contrary to the assumption in traditional regulation that the government can know the answer to pollution problems, regulatory agencies rarely have sufficient knowledge or information to deal with rapidly changing technical or managerial problems. Market based mechanisms face similar problems...As a number of analysts have noted, neither command-control nor market based approaches are well suited to institutional learning or adaptation to new information.* (O'Rourke & Eungkyoon 2004, p. 191)

While the limitations of applying rational comprehensive problem solving techniques to decentralised environmental issues have long been apparent, alternative processes have been slow to emerge. Pahl-Wostl (2002) provides an example of this in the area of water pollution. She notes successes across industrial nations in Western Europe in implementing measures to address point-source contaminants which contrast markedly with the absence of action in addressing the more substantive impact from diffuse pollution sources across the agricultural sector. However, despite the seeming lack of progress there is growing awareness among environmental management agencies about the limits of their regulatory processes, observing in many cases that regulation is not a linear process where policymakers enforce a particular policy with a distinctive and well-defined effect, rather it is *a learning process where the interaction between policy-makers and stakeholders is as important as the rules themselves* (ESRC 2000).

Keen et al. (2005) sum up the impact of the changes to policy, planning and management as these come to grips with the implications of sustainability and the growing complexity of environmental problems:

> *Social and ecological sustainability ultimately depend on our capacity to learn together and respond to changing circumstances… [This requires an approach] that goes beyond existing methodologies and the conventional, and problematic traditions they bring with them.* (ibid., p. 6)

In essence Keen et al. are observing that the possibility to introduce fundamental change only arises when the causes and assumptions that lead to current conditions can be seen, not just by one group in society but by the many stakeholders whose influence is critical. This clearly requires learning, not just within one sector, or by a single agency, but across groups, within and between organisations. The foremost inference then that can be drawn from the character of environmental problems is that management can no longer be regarded as:

> *…a search for the optimal solution to one problem but an ongoing learning and negotiation process where a high priority is given to questions of communication, perspective sharing and development of adaptive group strategies for problem solving.* (Pahl-Wostl & Hare 2004, p. 395)

This changing context for environmental problem solving, where collaboration, networks and partnerships are crucial, in turn creates pressures for the actors in the system. Local, regional and national government bodies, and even those outside government, find themselves required to perform new and unfamiliar functions; and to engage with communities, stakeholders or sector groups in new ways. The agencies mandated (or obligated in some way) to take action in addressing complex environmental management problems are also changing. While these have traditionally included the different levels of government, NGOs and development agencies, increasingly they include environmental science research programmes.

In New Zealand, as in many other countries, science funding agencies have steadily signalled the need for 'outcomes' rather than 'outputs' from research in commercial and public good areas alike, in line with a more applied science research model. This shift in policy around science research has been of particular significance to the area of environmental science as it follows on reforms a decade earlier (in the 1980s) which privatised agricultural extension. Where once government extension agents (based in the Ministry of Agriculture) would have taken a lead role in supporting development and change in the agricultural sector, there was now a gap in capacity for the dissemination of ideas not easily marketable as technological innovation, or improvement of production (Allen et al. 2002). While regional councils, as the primary operational environmental management agencies in New Zealand, have worked to fill this gap by supporting various initiatives such as Landcare groups (Ritchie 1995), this has also prompted environmental science research programmes towards an uneasy shift in responsibility, moving from providing information to help solve problems, to providing the mechanisms by which these problems are addressed[1]. Consequently many now go to some lengths to ensure end-user involvement in the programme with the hope of greater uptake of the information and technologies being developed.

At the heart of the new challenge for all these agencies responding to the increasing complexity of environmental management is essentially how to develop a structure of learning and collaboration with wider stakeholder communities. For resource management agencies such as

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[1] In New Zealand the recognition of a lack of uptake of environmental science has resulted in the Foundation for Research, Science and Technology creating a specific fund – Envirolink – to enable some local and regional councils (those with more limited resources) to connect with research expertise.

regional councils this might take the form of what are termed integrated environmental management, or co-management programmes. For research institutions this means treading the new and unfamiliar territory of transdisciplinary research (Funtowicz & Ravetz 1993; Gallopin et al. 2001; Tress et al. 2005). Literature on the theory of these frameworks abounds (Berkes et al. 1991; Margerum 1999; Cash et al. 2006; Marshall 2008). However, while many authors stress the importance of collective and inter-organisational learning processes in contemporary society (e.g. Knoepfel & Kissling-Näff 1998), others note the lack in existing arrangements and the significant scale of shift that is necessary. Daniels and Walker (1996, p. 72), for instance, observe that the interdependence among *good science, good civic dialogue*, *good local knowledge, and good learning* has not always been well accommodated by natural resource management organisations and stress the need for environmental management agencies to reinvent themselves to better serve the public interest, with particular emphasis on the need for a learning basis to public participation approaches. Furthermore, while integrated, collaborative, or community-based approaches to environmental problems are increasingly advocated to help address environmental management issues, what agencies are perhaps less conscious of, and less prepared for, is that with these processes comes a significant challenge to their sense of control (Pahl-Wostl & Hare 2004). In other words, they may be asked to sacrifice a system of knowing and informing for one of mutual enquiry.

Recent research into the social processes of environmental problem solving has often been drawn to the largely externalised issue of behaviour change among the wider community than to the collective interactions of agencies and communities. In particular much effort has gone into 'view' or 'attitude' change as a presumed precursor to 'behaviour change'. However, inherent in behaviour change to support sustainable management is the cumulative and incremental learning of new ideas (Roling 1993 in Allen 2001) and the trialling and testing of possible approaches (Holling 1978 in Peterson et al. 1997). Facilitating this learning goes beyond the common information dissemination role adopted by agencies such as regional councils. Instead, it requires such agencies to change status in decision-making arenas from educators to facilitators of learning processes and even co-learners (collaborative learners) with a range of communities including scientists and landowners. To achieve such shifts in their own behaviour agencies themselves have the same requirements of a supportive learning

environment needed by those 'out there in the community', where learners can confidently expose their vulnerability in 'not knowing' and 'changing their minds' (Allen 2001).

Furthermore, it becomes apparent that for environmental management agencies to embrace adaptive, learning-based approaches to the complex environmental management issues that are their sphere of responsibility, they require characteristics and capacity across the institution, not just within sporadic pockets or within particular individuals. Such characteristics include being permeable, absorbing concepts and views from outside and building partnership with other stakeholders (Nicholls et al. 2000). Since the nature of adaptive management is experimental and experiential, what is also required is an organisational acceptance of 'making mistakes' as a necessity of learning (ibid.).

Factors that work against environmental management agencies developing such characteristics include historical hierarchies and power relationships, public expectations, a growing culture of accountability (O'Neil 2002) and the immediacy of pressures that lead to reactive decision-making. Significant also is the considerable inertia in adopting new policy making structures. To learn to do things differently the learning process itself must be suitable for institutionalising, and must have characteristics that are acceptable and recognisable to agencies and the individuals within them.

1.2.2   Programmes to tackle environmental management issues

Setting up specific programmes, either intervention oriented, research oriented or a mixture of the two, is a common way to carry out what is perceived as a needed change in an environmental problem system. These programmes may be aimed at addressing one or more (rarely all) of the characteristics of environmental problems discussed above. For instance they can be about enabling stakeholders to come together to exchange information and collaborate on a response to a problem situation; undertaking research to improve understanding of the intersecting factors contributing to a problem situation; or trialling the implementation of a designated policy instrument, such as on-farm effluent budgeting as a tool to manage nutrient runoff and water contamination. As programmes are such a critical pathway to improving complex environmental situations it is important to consider some of their common and more

problematic aspects. The comments included here arise from my own observations, and those of colleagues, from interviews conducted through this research and from the literature.

Firstly, environmental management programmes can be almost entirely devoid of any working theory around the processes of social change which they are nevertheless dependent on to meet their objectives. It is not unreasonable to suggest that many environmental programmes do not in fact regard themselves as programmes of social change, identifying more strongly with desires to change the biophysical environment (e.g. improve water quality, or protect biodiversity) or implement new environmental technologies (e.g. divert energy use to renewable sources). They consequently regard the means to achieve these aims as largely a communication challenge. Further, where there is some recognition that processes beyond social marketing are required to initiate changes in target communities this is often accompanied by a search for recipes or standard procedures to guide the change process element of the programme. Failing that, it may be that the programme proponents seek the input of a change specialist upon who will fall the responsibility to drive a process of change largely circumscribed within the existing programme objectives. For instance a programme set up by a local council to ensure planting of indigenous vegetation along erosion-prone coastal land may find it needs to employ a community coordinator to increase volunteer involvement. This is a valid approach to delivering a programme about planting, which will nevertheless maintain a status quo in the relationship between the local council, the community and the coastal area. However, if the wider aim of the project is to achieve 'community based coastal management' (as it often is), this requires a more sophisticated understanding about the barriers and opportunities for empowering communities which will at least include some alteration in the way agencies work with communities and view their role in management.

Secondly, and in common with many programmes aimed at some form of social intervention (e.g. youth crime prevention, or community health), environmental management programmes frequently concentrate on outcomes that are large in scale, and future focused (A. Clark, personal communication, October 2009). In many ways this is understandable, as support and funding for these initiatives can often be contingent on the promise of substantive changes in a problem situation. However, what is frequently lacking is a connection between the objectives and activities of the programme and these broader goals. In short the programmes I have

observed can either say what they are going to do (e.g. form a group with 12 community stakeholders; discuss a particular problem; or monitor a particular environmental factor) and what they intend to achieve (e.g. better management of the environmental problem), but are often short of means to connect the two (i.e. in what way will forming a group of stakeholders improve the management of a problem, and what other steps are needed to ensure this outcome?). Such a deficit in programme logic can mean that programme participants and proponents alike find themselves without any way of tracking what stage of the programme journey they are on, whether they are making progress in the right direction or indeed in any direction at all! The programme proponents can find themselves in a predicament when they are subsequently evaluated on their achievements in relation to these large-scale goals, when more realistically the programme could only ever have contributed to improvements in aspects of the problem system.

This highlights a third common problem, the lack of oversight of the problem system that would enable programmes to be recognised as interacting and contributing to a collective system improvement. Understanding the relationship between programmes in terms of how they relate to a whole problem situation enables them to specialise in a more limited range of activities, while making the necessary links to other actions that complement their work. Lack of cogent programme planning is not unique to environmental management and the role of evaluation in supporting the development of programme logic is discussed further in Chapter 3.

My final observation about environmental management programmes relates to the capacity for programmes to monitor their performance in a way that is constructive and contributes to the programme development. Environmental management programmes can be subject to evaluations that appear at the end of the programme and are framed primarily in terms of accountability. Again this not unique and is understandable. These programmes are largely funded through public money for which there is much contest, and there is a need for transparency regarding how they are managed. However, accountability-oriented evaluation, particularly where goals have been only loosely connected to objectives and activities, can end up with the programme proponents and participants trying to justify or excuse the divergent directions the programme has taken. These programmes are often moving into uncharted territory, trying to achieve changes for which there are no clear precedents. In such

circumstances they would be better served by evaluation that is formative[2], which assists programmes to develop their logic and purpose, enables them to better deliver on their objectives, and moreover increases the store of knowledge about what are key transformational elements in environmental management programmes.

1.2.3   Social learning: an emerging concept

The increased awareness of both the uncertainty and unpredictability that characterises modern environmental management, and the consequent need for agencies to develop new ways of working with communities and sectors that have a stake in the problem situation, suggests that central to the environmental problematique is an increased capacity to learn and adapt. Therefore the ability to more consciously learn their way through problem situations is relevant for environmental management agencies, problem 'experts' such as science researchers; as well as land and resource users, and other stakeholders. This can be summarised as a demand for learning at four different levels. Firstly, the problem situations themselves need to be learnt about – what are the boundaries of the problem system, what are the key influences? What do we know about these? Secondly, the solutions or responses need to be tested and learnt about – what are the consequences intended and unintended? Thirdly, the social processes of change inherent in environmental management programmes need to be learnt about – do they involve and motivate people effectively? Finally, the environmental programmes themselves need to be learnt about –how do we move from situation 'a' to situation 'b' and how can we tell that we are making progress?

In the last decade, social learning has emerged alongside other frameworks that support understanding around the social problem solving processes and knowledge management needs of environmental management. These include adaptive management, collaborative learning, community-based environmental management, and integrated environmental management (e.g. Gunderson 1999; Lee 1999; Margerum 1999; Berkes et al. 1991). Many of these speak to the recognised need for collective and inter-organisational learning processes for resolving complex environmental issues, and also the widely acknowledged lack in existing arrangements discussed above. Social learning has increasingly appeared as an overall framework for

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[2] Sometimes called 'developmental evaluation', formative evaluation is aimed at improving how a programme operates – see Chapter 3.

interpreting the demands of complex environmental problem solving. In this thesis, therefore, where I am looking at how to improve the capacity for problem solving I first look to social learning to help understand the nature of the environmental problem solving challenge (Chapter 2). Subsequently, in my analysis of the case stories in this thesis I have taken 'building capacity for social learning' as a proxy for 'building capacity for addressing complex environmental problem situations'.

1.2.4   Building social learning capacity: participatory developmental evaluation

While social learning, as a modern concept relating to environmental management, has been widely examined in a variety of contexts, it has most commonly been treated as an outcome, or phenomenon of problem-solving processes. Indeed a few authors have looked at measuring or assessing social learning as an outcome of community engagement in public planning (e.g. Hayward 2000; Schusler et al. 2003), but fewer have looked at how the social learning potential of any given situation can be improved. An exception would be the doctoral work of Christine King, which has specifically investigated a model and theory for facilitating social learning (King 2000b; King & Jiggins 2002).

Since the fundamental premise of social learning is self-evident in its name (i.e. learning that is social in nature, embedded in social context, and influenced by social arrangements) it is a logical assumption that any capacity building approach needs to be able to contribute to the learning potential and work with the important social conditional elements. However, while I have suggested that the context of environmental management calls for an increased learning capacity at multiple levels, it is questionable whether much appetite for this learning exists, given the tendency for environmental management programmes to be outcome oriented (even constrained to be so by their funding and resource context) and to favour action over reflection. Further, I would argue that environmental management programmes have not always been well served by social research that has taken a 'post experience' (ex-post) approach to examining case studies. While these may have built a stock of knowledge based on the successes or failures of practice, which contribute to academic literature, they have not necessarily added value to the way these programmes have been run or the development of expertise in the sector over time. Consequently, developing social learning capacity in environmental management programmes has to work with an existing antipathy towards activities that detract from the

central task, and yet meet the need for increased knowledge and skills set within real-time problem solving contexts.

The central line of reasoning in this thesis rests on the idea that evaluation – particularly participatory and developmental (P & D) oriented approaches – have something to contribute to this challenge of building capacity for social learning. The links between social learning and P&D methodologies are palpable. The principles of each rest in context-based learning practices. However, while social learning is emerging and far from widely or consistently understood (let alone applied), the converse could be said of evaluation practices per se. Evaluation – principally post-event-based evaluation processes – has a long-established institutional role in supporting policy development. Consequently, while the challenges of developing an 'evaluation culture' in organisations are recognised widely in the evaluation field (Duignan 2001), there is at least a base level of understanding of evaluation in some form within government organisations generally. In an era that places increasing emphasis on environmental management agencies being responsive and accountable, techniques that contribute to an organisation's ability to meet these requirements may find some purchase.

My own interest in participatory and developmental forms of evaluation and their relationship to social learning is through their potential to support both reflection and collaborative learning. The role of evaluation (specifically P & D forms) in supporting capacity for reflective and contextual learning for organisations dealing with complex problem solving experiences has been explored in the field of development studies (e.g. Davies 1998). Furthermore evaluation practice and theory has much to say on ways in which particular approaches can be used to provide direction in the overall structure of a programme by offering insight on what is going on, what is meant to be happening, and what actually is, at the same time as enhancing the learning capacity within the programme.

However, social learning is also about social practices and institutional arrangements. Intervention programmes, whether they are discrete projects or long-term endeavours, are a manifestation of existing social norms, and theories of action. In order to build capacity for social learning it is important to also have some influence on these wider social and institutional settings for environmental problem solving. Again evaluation potentially has something to offer

as an accepted format for learning and instigating programme change. Although, the question remains: does evaluation practice actually lead to changes in institutional settings? In Chapter 3 I examine recent developments in evaluation practice and theory for what they may have to offer the challenge of building capacity for social learning and environmental management.

1.3   Thesis scope

The principal question explored in this thesis is 'what can be learnt about using participatory and developmental evaluation techniques to build capacity for social learning in environmental management?' To address this question I firstly investigate the literature around social learning and participatory, developmental evaluation. Secondly, I examine four case stories from the work of the collaborative learning for environmental management group (CLEM) based at Landcare Research (a New Zealand Crown Research Institute). I was a researcher with this group, which, from 1997 to 2008, worked as a small social-research-oriented community of practice operating within a much larger agency focused on biophysical research into terrestrial ecosystem management. Thirdly, I compare the understandings gleaned from the literature and cases with experiences of evaluators and environmental management practitioners working across New Zealand.

The thesis therefore contributes to the field of environmental management through two avenues: linking literature and reviewing practice.

1.3.1   Linking literature

Evaluation and monitoring have recognised roles in community development, programme management, and a variety of fields where long-term, complex social change is sought. To a lesser, but increasing extent it has been integrated into environmental management programme initiatives. In this thesis I provide a specific link to the role a subset of evaluation practice and theory (participatory, developmental evaluation) can play in building the social learning capacity of environmental management programme initiatives. To do this, firstly, I review the literature on social learning (Chapter 2) – asking the questions: 'How is social learning to be understood in the environmental management context? What are regarded as core elements of social learning? and What are the capacity building implications of this?' Secondly, I examine

branches of evaluation theory and practice that hold most promise for supporting social learning capacity (Chapter 3); looking particularly at advances in response to the perceived need for evaluation to support learning within programmes. In this I am guided by the question: 'What approaches to evaluation practice can help build social learning capacity in environmental management programmes?'

1.3.2 Reviewing practice

The review of practice in this thesis has two parts. The dominant part looks at four cases where evaluation approaches are used to support learning within environmental programmes (Chapters 4–7). These are not randomly sampled; rather they are the personal experiences of my work with CLEM over the past ten years. As such each case offers a progression of thinking and learning about the potential role of evaluation to support social learning.

A second part of the practice review has been to test ideas of how evaluation practices can work with social learning by talking with environmental management practitioners and evaluators. There have been six semi-structured interviews over the length of the thesis (see Appendix 1) and numerous informal exchanges through attendance at meetings, workshops and conferences, in particular through the ANZEA (Aotearoa New Zealand Evaluation association) network.

1.3.3 Establishing a field of inquiry for this research

The four stories presented in this thesis can be regarded as case studies in that they have distinct boundaries in terms of time, location and participants, but they could also be seen as components of one single case study – the actions, reflections and learning of a community of practitioners (CLEM) whose focus has been to build capacity for social learning in a number of different contexts and through varying opportunities. Consequently, this thesis does not stand alone as a research project; rather it is part of the ongoing and collective experience of CLEM. In this section I will describe the work of CLEM as fundamental background and, in essence, the generator of the field of inquiry for the empirical work in this thesis.

CLEM is a small social research group, working within a larger environmental research institution – Landcare Research (LCR), a Crown Research Institute (CRI)[3] whose primary focus is biophysical research on terrestrial ecosystem management. The work of CLEM has emerged from an increased interest in the social aspects of resource management problems. In consequence integrated research across disciplines and including social research components became an increasingly popular genre of research programme. At the same time, the social research within these programmes also changed, and has extended from an almost exclusive focus on descriptive, semi-anthropological understandings of the 'human dimension' to an interest in influencing the intersection of science, policy, management and decision-making.

In this context CLEM has negotiated an often tenuous but consistent role over the last ten years, working in a variety of capacities to facilitate and develop understandings around collaborative learning approaches to complex environmental problem solving. The collective work of the group has rested on two premises: (1) that collaborative and adaptive processes are important components of addressing complex environmental management problems; and (2) that an engaged, action-reflection-based (action research) approach is most appropriate to employ to both better understand and support the improved capacity for such processes.

While through its history CLEM has often been without true formal status in the overall organisational arrangements of Landcare Research it has unquestionably worked as a 'community of practice' (Lave & Wenger 1991; Wenger 1998, 2007). When I began this PhD the group had a membership of five researchers, employed in various capacities and locations across Landcare Research[4]. They were linked together in a largely virtual organisational structure which crosses existing real boundaries of teams and locations. Indeed, while

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[3] A CRI is a state-owned, corporate scientific research organisation. Each CRI has a focus on the perceived research needs of a given sector. For Landcare Research this is terrestrial environmental management. CRIs are also charged with promoting the transfer and dissemination of science & technology, i.e. ensuring that research makes a valid contribution to the activities of their target sector.
http://en.wikipedia.org/wiki/Crown_Research_Institutes.

[4] In the year ending 2008 CLEM was effectively disbanded. Members were relocated to different teams across the organisation, one member had resigned and another taken maternity leave. The website was subsumed within the overall LCR website. With my own PhD work taking me away from the group, the barriers to a functioning community of practice became all but impossible to overcome and CLEM could be regarded to be in abeyance. CLEM website: http://www.landcareresearch.co.nz/research/research_details.asp?Research_Content_ID=38

organisational arrangements and group members' roles have often changed, the CLEM group has remained a consistent home base.

The shared field of concern and distinguishing competence for CLEM members is the theory and practice of collaborative learning, and its application to environmental management. Action research, capacity building, information systems, empowerment, dialogue and participatory evaluation are all mutual areas of interest and practice. Members did not always work together on projects, but relied on opportunities, formal and informal, to discuss experiences and develop expertise. The common tools for collective learning are formal and informal reflection, and collaborative outputs. Because members typically worked independently on projects not conceived or directed by CLEM (and therefore often with tangential goals to those of the CLEM group), opportunities to develop learning and practice in the areas of interest to CLEM have often been surreptitious and opportunistic (even regarded as subversive by some within the wider LCR organisation). The creation of a collaborative learning website has been a focal point for research and project outputs and in itself created a virtual community of interest in the wider national and international arena – in turn strengthening the identity of CLEM.

There are two important aspects to the status and functioning of CLEM (and the work of group members) that have heavily influenced the opportunities for developing a coherent body of research in the field of building capacity for social learning. These are project determination; and the positioning of social research in integrated research. The fortune of all science research, whether social or biophysical, is subject to a mixture of influences. These include the proclivities and priorities of funding agencies; the available skills, networks and interests of researchers; opportunities; and access to cases and data. For any group looking to build knowledge in an area, the task of doing so could be regarded less as a matter of determining when and where to work as responding to the sheer serendipity of these factors coming together in time and space. Over time CLEM members have often been accommodated within research programmes where they have had limited input on location and overall direction of research. To counter the drawbacks of working 'in service' to other research programmes, or as 'jobbing researchers' pulling together short-term contracts which have little to link them together, CLEM members have established an independent research agenda. The compromise for CLEM members then is to undertake work in such a way that it can contribute to this agenda while

meeting required outputs for the overall research programme or contract. This can be tantamount to pursuing multiple and at times conflicting goals, and the success or otherwise of this practice is often dependent on the ability to negotiate with programme leaders. Experience has shown that 'who you work with' is a manifestly important criterion in being able to determine useful and productive project direction.

1.3.4   Significant stories – cases of building capacity for social learning

The case stories presented in this thesis have been both opportunities to explore aspects of emerging themes around building capacity for social learning and the progenitors of those themes. In other words we learnt as we went and developed more ideas about what was important and what questions to ask. Combined they represent a rich field to develop skills and ideas around capacity building for social learning. Individually, they are separate cases with differing prospects for what can be learnt.

I refer to these as 'case stories' to distinguish them from the formal construct of case studies and the assumption that I would be strictly following the precepts commonly associated with case study research[5]. The main distinction is that the common denominators in each of the case stories is not their context, the methods employed, or even the intended outcomes of the work. Rather each case represents a cycle of learning for me as a researcher within the overall inquiry that forms the basis for the work of the CLEM group. In short I and, via consequent group reflection and analysis, CLEM as a whole learnt something from each case experience about the way in which the capacity for social learning could be developed and supported. This went on to influence our collective research interest and practice.

The case stories used in this thesis are: the Whaingaroa Catchment Management Project (Chapter 4); the Target Zero programme (Chapter 5); integrated environmental research – the ICM and IRAP programmes (Chapter 6): and Watershed Talk – a subproject within the ICM programme. Their relationship to one another and to the development of the emerging areas of enquiry for CLEM is illustrated in Figure 1.1. A brief introduction to each case story follows.

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[5] As outlined by social research methodologists such as Robert K. Yin (1994).

The Whaingaroa Catchment Management Project **[1995–1999]**	The Whaingaroa catchment is situated on the west coast of the North Island. From 1995 to 1998 a pilot project on community-based environmental management was funded in the catchment with support from the Ministry for the Environment's (MfE) Sustainable Management Fund (SMF), and the regional environmental management agency – Environment Waikato. My involvement with this project was in the first instance to observe and document the process. I subsequently undertook a goals-free participatory evaluation to meet reporting requirements from MfE.
The Target Zero programme **[2000–2002]**	Target Zero is an initiative set up by the Christchurch City Council (CCC) to promote and support reduction of environmental impacts by businesses. In the late 1990s, the programme took the form of encouraging industry and manufacturing organisations to set up teams of people to implement waste minimisation efforts across their company. Early on the CCC recognised that the functioning of the teams was critical to the impact of their programme and sought more information about how they were performing. Consequently I was involved in an evaluation of the teams. This evaluation was renegotiated to include a self-reflective development-focused approach that supported teams in their activities as well as assessed how well they were doing.
Integrated environmental research – ICM & IRAP **[2000–2010]** **ICM =** integrated catchment management) **IRAP** = integrated research into aquifer protection	ICM is a 10-year programme that began in July 2000. Based in the Motueka catchment in the Nelson region, the goal of this programme has been to conduct multidisciplinary research to improve the management of land, freshwater, and near-coastal environments in catchments with interacting, and potentially conflicting, land uses. Comparatively unique among integrated research programmes has been the inclusion of a substantial strand of work in 'social learning'. The initial purpose of this work was to improve interactions between science providers and stakeholders and to maximise the uptake and use of new knowledge and tools developed from scientific research. As the understanding of social learning changed over time, two interrelated strands of activity evolved: (1) the introduction of frameworks for seeing across complex systems and (2) the trialling of platforms for dialogue, reflection and systems thinking. Chapter 7 looks at the first of these, reviewing the specific example of the social spaces framework and its use in a participatory evaluation exercise. It is compared with a parallel initiative used in another integrated research programme, IRAP.

The Watershed Talk project **[2007–2009]**	Watershed Talk was an action-research subproject within the ICM research programme that designed and trialled a platform for multi-stakeholder dialogue, information sharing and collaborative learning. Participants were recruited from the Motueka catchment, and from a range of backgrounds, to form two groups who would collectively share their knowledge and interpretations of how care and responsibility were manifest in their community and environment. P & D evaluation approaches were fully integrated throughout the project and a number of creative devices (e.g. photography) were used to support individual and group reflection and learning.

To tell these case stories in a way that is meaningful, and which extracts from them critical learning and experience, inevitably involves casting them in a different light to the one in which they were undertaken in the first instance. My methods for doing this are outlined in section 1.4. However, it is worth noting that as I undertook research that has spanned a decade there have been substantial shifts in research focus. To illustrate this Figure 1.1 places the chronology of the case stories against a broad timeline of changes in the overarching themes that occupied the minds of the researchers in CLEM (myself included).

Each of these themes brought with it a particular inclination to the research focus. Accordingly when multi-stakeholder processes were foremost in our minds our interests lay in participatory processes and conflict management. This coincided with my work in the Whaingaroa Catchment Management Project. Moving towards collaborative learning meant an expansion of research interest in group development and the formation of networks, and this influenced the work undertaken in the Target Zero project. Expanded interest in the wider definitions of social learning has brought with it a concern with frameworks for understanding social processes, capacity building evaluation practices and approaches to support reflection, which in turn has influenced work undertaken in the ICM programme. The work for this thesis, which explored social learning theory and practice more fully, was highly influential in the Watershed Talk project. It is important to note that each shift builds on, rather than replaces, previous areas of research interest.
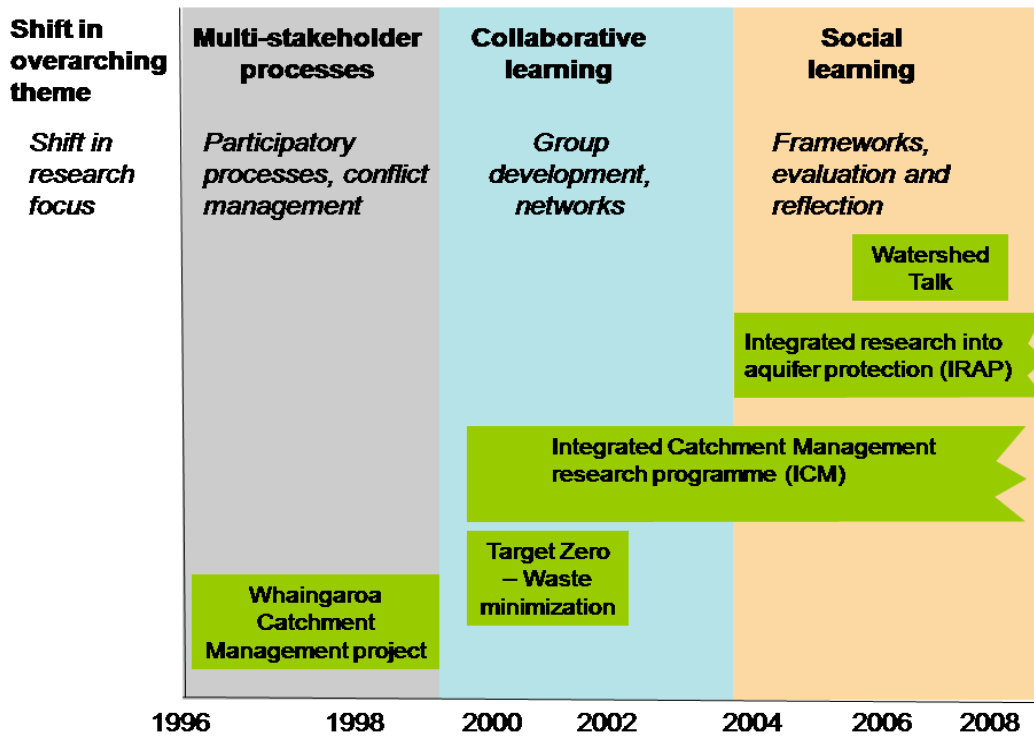
Figure 1.1 Case stories and evolving research focus in CLEM.

1.3.5   Relationship with other work

As mentioned earlier the literature has shown that few people examining social learning and its relationship to environmental management have explored how the actuality of social learning in any given problem situation can be improved. The cumulative action research case study approach in this study is therefore not only contextually unique but makes an uncommon link between theory and practice. However, it is important to clarify what this thesis does not attempt to address. Foremost, although it involves some critique of environmental management programmes as part of the case study analysis, it is not a review of any particular type of environmental management intervention (such as community-based environmental management cf. McCallum et al. 2007), nor is it an assessment of the social learning proficiency or achievement in environmental management programmes or planning settings (cf. Hayward 2000). While evaluation clearly plays a central role in this work it also cannot be regarded as an evaluation thesis in that it does not offer new directions in theory and practice of evaluation per se but rather comments on the issues associated with the location of evaluation in a new role and context. In this it is most closely aligned to PhD work by Irene Guijt (2008) who

has examined monitoring practices to support adaptive management/sustainable living initiatives; and Christine King, who has developed a model and theory of facilitation to support social learning (King 2000).

1.4 Research methodology

Action research forms the overarching methodological framework for this research. In its most straightforward sense, an action research study reviews a problem situation, devises appropriate interventions to change factors in this situation, makes them, observes their impact in situ, reflects on the consequences and revises future decisions and past assumptions (i.e. plan, act, observe, reflect). Action research has emerged as a form of enquiry that links the generation of theory to practice in situations of active intervention to create change (Bray et al. 2000). It naturally lends itself to this research as what I am inquiring into is a practice (specifically my own experiences of using P & D evaluation) and that practice is about influencing a situation (improving the social learning capacity of an environmental problem situation).

Since the aim of action research is to generate strategic improvements in a given situation, extracting general principles for use in the development of theory, the rigour of such research rests on its structured approach, standard of critical reflection and the use of peer review, rather than on being replicable. Consequently declaration of assumptions and existing knowledge starting points, coupled with staggered and purposeful reflection, are fundamental to good action research technique. Dick (1997, 2002) sees the spirals of action research as particularly significant in the question of rigour, noting that each turn of the spiral provides a change to test interpretations of data so far developed as well as the assumptions that guided action.

I have drawn particularly on action-research methodology described by Jean McNiff and Jack Whitehead as 'action research for professional development' – designed to formalise practitioner learning around their practice (particularly for use in education and teaching) (McNiff 2002). In this approach, the idea of self-reflection is central. While it rests on a basic problem solving process of identifying a problematic issue, imagining a possible solution, trying it out, evaluating it (did it work?), and changing practice in the light of the evaluation, it

becomes research when the assumptions, purpose and values associated with the issues are exposed and data are gathered and used as evidence to track and assess progress. It is an intentionally incremental approach to building understanding and changing practice, relying on cycles of action and reflection so that the practitioner's actions embody the learning, and the learning is informed by the practitioner's reflection.

Specifically I have incorporated two methodological devices derived from McNiff's work (2005). The first is the reflective questioning technique employed in my review of each case story. In each of the cases I use a standard set of four questions (derived from McNiff 2005) to reflect on what occurred and the significance of this. In addition two further questions were added to test the cases against ideas derived in Chapters 2 and 3 respectively (see Table 1.1). These questions were asked upfront to set the context for the further four.

Table 1.1 Questions for case stories

Questions from McNiff (2005)	**Schema of questions for case stories**
What did you do?	*What is the social learning challenge of the situation?*
What happened?	*What aspect of social learning was supported by the*
What did you learn from this?	*evaluation?*
What is the significance of this?	*What evaluation approach was chosen?*
	What happened/results/outcomes?
	What was learnt?
	What is the significance of this?

The second methodological device is the use of 'critical friends' and 'validation groups'. McNiff (2002) describes critical friends (also termed colleagues or learning partners) as someone whose opinion is valued and who is able to critique the work, helping to evaluate its quality and helping the researching practitioner see things in a new light. A validation group is drawn from the professional circle associated with the work, and may not be entirely familiar with the research but is able to make professional judgements about validity and offer critical feedback. In this thesis I have used colleagues from CLEM and others who I have worked with in the case studies (particularly Will Allen, Chrys Horn and Maggie Atkinson) as critical colleagues. The idea of a validation group I have interpreted more widely and used the following: the online Intsci dialogue site

(http://learningforsustainability.net/research/intsci_subscribe.php); participants at ANZEA conference and local group meetings; and interviews with evaluators and environmental management practitioners (see Appendix 1).

1.4.1   Learning cycles

While learning cycles are an important part of the action-research approach they are neither succinct nor particularly edifying to read about. In this thesis I have therefore presented my research in a predominantly linear format, starting with an outline of the problem statement, drawing together a review of relevant theory, examining empirical work, and ending with discussion and conclusions. For transparency in methodology I will briefly outline the six principal cycles of research and learning that sit behind this account (see Figure 1.2).
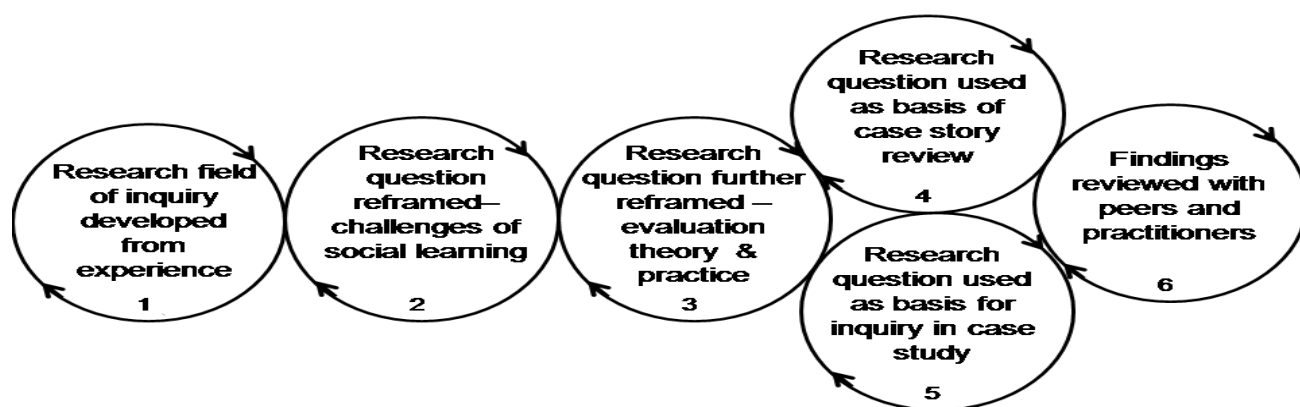

Figure 1.2   Learning cycles in the research process.

Cycle 1 represents a series of reflections on the cumulative and generalisable understandings from work undertaken through CLEM. It has formed the starting point for this work, i.e. what more could be learnt about building capacity for social learning in complex environmental problem situations, and in particular the part that participatory developmental evaluation processes might play in supporting this?

Cycles 2 and 3 both represent engagement with the literature. In the first instance this was the literature on social learning itself. In exploring what had been written about social learning I searched for definitions of social learning, and related theory; contexts where the idea of social learning was being used, and the purposes to which it has been put. I looked into what was regarded as core components of social learning, and the challenges and opportunities for those engaged in facilitating social learning. What emerges from this review is a strong set of common ideas around social learning in environmental management, and elucidation of the theoretical and praxis needs of working with the concept. These formed the basis for cycle 3 – a review of what evaluation theory and practice might have to offer the demands of building capacity for social learning. To constrain the wide range of options to consider in the substantive field of evaluation, I chose to look at evaluation developments that were associated with three broad trends:

1. Expansion of the core drivers of evaluation from client concern with accountability and information generation to evaluator interest in learning and organisational change
2. Expansion of focus from producing evaluation outcomes that are valued and used to developing evaluation processes that are valued and used
3. Increased cognizance of the power issues and potential for learning and development associated with evaluation knowledge

Cycles 4 and 5 are the analysis and reflection on each of the four case studies. Collectively this can be regarded as a meta-analysis of four evaluation projects. In each case the evaluation methodologies used to support the social learning potential of the situation differ. However, the analysis of each case follows a common format outlined above (Table 1.1). Thus each case story begins with an analysis of the critical factors that frame the social learning challenge. Then I outline the way evaluation was designed to contribute to building capacity for social learning and consequently what evaluation approach was chosen. Following this I examine how the evaluation process was implemented, and the outcomes from this (intended and unintended). Finally it examins what was learnt and the significance of this for understanding how evaluation can support social learning in environmental management.

Cases 1 and 2 (Whaingaroa and Target Zero) have both been assessed entirely retrospectively, using a mixture of existing material generated during the project and, in the case of Whaingaroa, a subsequent meta-analysis that included a critique of the Whaingaroa evaluation (Greenaway et al. 2003a, 2003b). Cases 3 and 4 have been conducted simultaneously with the work of this thesis, and Case 4 particularly presented an opportunity to further emerging ideas. The final cycle – cycle 6 – represents the reflection on the learning from the case studies as a whole. This includes discussion with other practitioners (Appendix 1) and a return to the literature. The practitioners I interviewed were not randomly selected. The field of practitioners in evaluation and environmental management is vast, although the field of those who combine the two is not. What I was seeking were the experiences of those at least broadly familiar with the concepts of social learning and deliberately using practices they believed were contributing to it. This is effectively a purposeful sampling approach where I selected participants who could confirm, contradict or elaborate on the findings from the research.

1.5   Chapter outline

Chapter Two – Social learning and environmental management
This chapter examines the theoretical basis, core concepts, varying contexts, and potential value of the social learning concept. In it I outline how social learning has emerged as a useful framework for understanding the social process demands inherent in the management of complex environmental issues. I propose that social learning can be regarded as a set four core elements: social and institutional elements; elements of group participation and interaction; elements that are critical to learning; and elements of thinking. From reviews of current literature on social learning I also conclude that more has been written about the meaning of social learning, or whether social learning has occurred, than about the 'how to' of social learning. Therefore a key question about building capacity for social learning is how to introduce and embed social learning in ongoing and institutionalised processes of decision-making.

Chapter 3 – Building capacity for social learning: What evaluation has to offer

This chapter looks into the literature on evaluation, seeking out particular branches of evaluation theory and practice that hold promise for supporting social learning capacity in environmental management programmes. I first outline what is meant by building capacity for social learning, and then explain why the field of evaluation is relevant to this challenge, and what we might take from developing forms of evaluation in recent years. Finally I propose four arena where participatory, developmental evaluation approaches and social learning can intersect. These are:

1. Scoping the environmental management problem situation
2. Supporting the capacity to enquire and problem solve
3. Supporting the management of programmes or interventions in the problem situation
4. Research and development that facilitates the growth of theoretical and practical knowledge about addressing complex environmental management situations

Chapters 4, 5, 6 and **7** each cover case stories that explore the potential role of P & D evaluation in supporting social learning in a range of environmental management contexts. Each case differs in perceived problem scope, the system in which it is situated , and the programme of activity aimed at addressing it. In each case I use the framework of ideas about social learning derived in Chapter 2, coupled with a SWOT analysis, as a standard basis to critique their specific social learning challenges. Coupling evaluation and social learning theory in this way tests out the first of the proposed arena of intersection between evaluation and social learning, i.e. scoping the environmental management problem situation.

Case one – The Whaingaroa Catchment Management Project	Chapter 4 – Social learning in community-based environmental management
Case two – The Target Zero waste minimisation programme	Chapter 5 – Critical thinking in teams
Case three – The social spaces of the Integrated Catchment Management programme	Chapter 6 – Frameworks for seeing across complex systems
Case four – Watershed Talk	Chapter 7 – Platforms for dialogue and reflections

Chapter 8 – Discussion: social learning and participatory developmental evaluation

This chapter returns to the core enquiry of the thesis 'what can be learnt about using participatory and developmental evaluation techniques to build capacity for social learning?' I report on the general trends in social learning challenge across each of the case stories and comment on the value of the Social Learning Framework / SWOT analysis as a tool for critiquing complex problem situations. Next I present a review of the collective experiences of applying the various P & D evaluation approaches to support social learning across the cases. From this I highlight emergent success or limitation factors for applying P & D evaluation approaches to complex environmental management problem situations. In the final part of the chapter I comment on the value of the case story approach and on future research directions.

Chapter 9 – Conclusions

In this concluding chapter I consider the implications of the research findings for New Zealand environmental management practice. Drawing on the results of the case story research, and the theoretical discussions I take a second look at social learning and its proposed partner participatory, developmental evaluation, asking: 'What is their potential contribution in both a theoretical and pragmatic sense?'

1.6   Summary

This research looks into the science and art of problem solving amid the complexity posed by tackling global environmental challenges at a local and regional level. More specifically it investigates a means to support the capacity for social learning in these situations through the use of participatory and developmental evaluation. The central question explored in this thesis is 'What can be learnt about using participatory and developmental evaluation techniques to build capacity for social learning in environmental management?' To address this I firstly investigate the literature around social learning and participatory, developmental evaluation. Secondly, I examine four case stories from my work with the collaborative learning for environmental management group (CLEM), based at Landcare Research from 1998 to 2009. Thirdly, I compare the understandings gleaned from the literature and cases, with experiences of evaluators and environmental management practitioners working across New Zealand.