

# Learning and working together for the environment: applying the Integrated Systems for Knowledge Management approach

*Will Allen and Margaret Kilvington, Landcare Research, New Zealand*

## Introduction

A collaborative approach to decision making is essential if more sustainable natural resource management is to be achieved. This will require obtaining and improving the use of high quality information. The need for participatory or collaborative approaches to meet environmental challenges is especially important in communities where human and financial resources are limited. By focusing on improving information use within a collaborative approach, people can broaden the scope of their actions and solve problems previously beyond their capacity. Integrated Systems for Knowledge Management (ISKM) is one such approach. It is designed to improve links between research, management and policy to support the introduction of constructive change.

Effective collaborative management, or co-management, requires those participating in solving environmental problems to develop solutions cooperatively, instead of acting purely in their own interests. Participating in decision making encourages stakeholders to become involved in outcomes and in seeing them implemented. Since good decision making depends on the availability of sound supporting information, carefully managed participation is just as important for gathering information and developing the systems for managing it, as it is for the decision making itself.

However, effective participation in information management is not always easy to arrange, especially for environmental issues, which are often characterised by conflicting social perspectives. Managing the constructive involvement of stakeholders is a skill that requires as much emphasis as developing technical problem-solving abilities and designing information technology.

The Integrated Systems for Knowledge Management (ISKM) approach is designed to support such an ongoing process of constructive community dialogue, and to provide practical support for making decisions about resource management. This framework has been developed in New Zealand to help communities — in the widest sense of the term (for example, land managers, scientists and policy makers) — share their experiences and observations to develop the knowledge needed for sound resource management decision making.

It builds on principles of community participation (see Anyanwu 1988, Chambers and Guijt 1995), constructivism and experiential learning (see Michael 1995), organisational learning (see Malhotra 1997, Senge 1990), adaptive management (see Lee

1993, Gunderson et al 1995, and systems thinking (see Checkland 1981, Bawden 1991). This system can be used to develop the knowledge and actions needed to change situations constructively. Like these other participatory approaches, ISKM does not offer a recipe for desirable change, but rather a description of an action-oriented process that may enable change.

## The framework

The ISKM framework (Figure 1) promotes participation and self-help in managing natural resource projects by providing clear communication pathways for dialogue and action. This approach emphasises a number of key steps for developing the knowledge and action needed to change problem situations constructively. The framework consists of familiar processes used in other fields of cooperation, and was designed around basic management actions, which include:

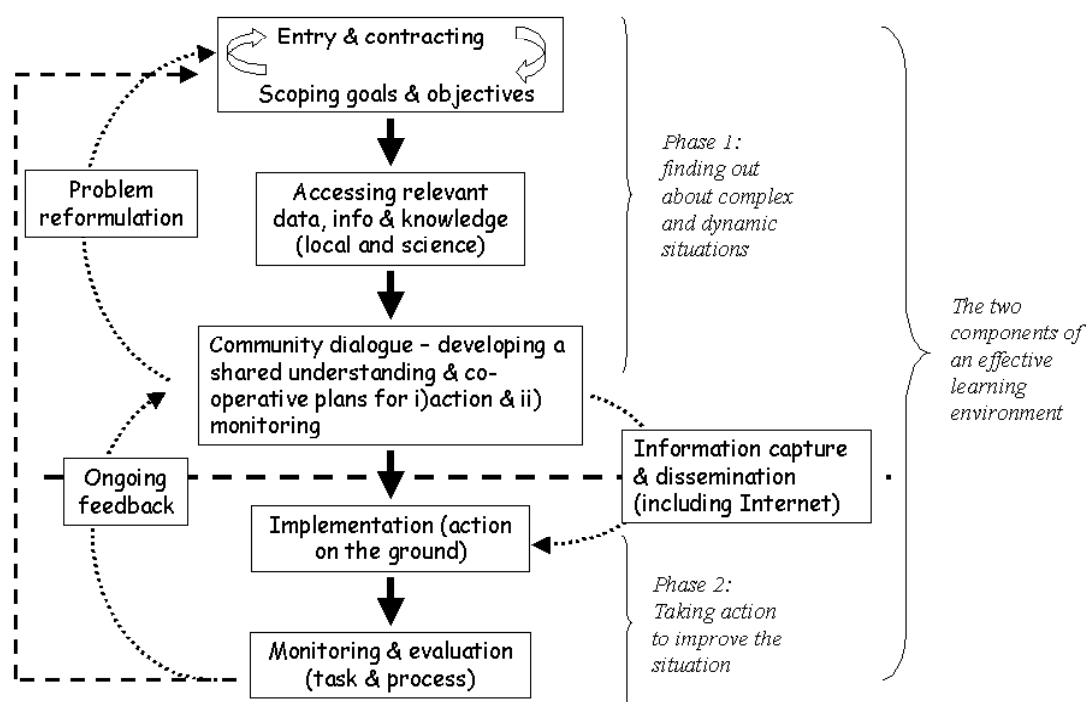
- identifying the problem and setting a management target,
- searching for information on how to achieve the target,
- implementing the best management practice available,
- evaluating the outcome, and
- adapting the management if required.

The approach (Figure 1, overleaf) comprises two phases, which combine to form an effective learning environment.

The ISKM approach can be applied for different purposes, and at different stages of the project management cycle. It can be used to construct a collaborative approach to a particular problem (for example, managing an invasive weed), or to adapt a community information system to identify, adopt and continue to refine best management practices (for example, for grasslands management). Equally, ISKM can be used as an evaluative framework for helping communities assess program effectiveness. In the latter, the framework helps by providing a list of key steps required for the success of community-based natural resource management programs.

This paper looks more closely at the steps involved in implementing an ISKM approach, and expands on the lessons that have emerged as the various steps have been applied in different environmental situations. These case studies draw on current work being done within integrated catchment management (see <http://

Figure 1 ISKM, a participatory research framework to facilitate the identification and introduction of more sustainable land management practices



(adapted from Bosch et al 1996, Allen et al 2001a and b)

/icm.landcare.cri.nz/science\_themes/human-dimensions/people\_social.htm>) and biodiversity restoration projects, as well as past studies in pest management (Kilvington et al 1999, Allen et al 2001b), waste management (Kilvington and Allen 2001), environmental conflict management (Allen et al 1998) and tussock grassland management (Allen and Bosch 1996 and 1997, Bosch et al 1996). Many of these papers are available online at <http://social.landcare.cri.nz>, and a number of links to other international literature in this area are also provided from this site.

## Contracting and scoping

The starting point for any successful collaboration or partnership is developing relationships that make it easy for people to talk about their needs, share information and work together. However, just as with personal relationships, one of the most important influences on community attitudes is previous experience. People are sometimes extremely reluctant to enter into a second participatory process, saying, 'We've already tried that and look what happened!'

A major part of this initial step is involving stakeholders in developing a common understanding of the perceived issue or problem, and deciding collectively on the project goals, and the different roles that groups will undertake. This entails an initial scoping process to determine the nature of the system under consideration, the needs and opportunities facing the different

interest groups involved, who should be involved, what could or should be changed, and so on. This is the single most important step involved in initiating any collaboration.

If the aim is to develop and strengthen a cooperative approach to environmental management, then the key to success lies in identifying and gaining the active involvement of the right people. This means taking care in selecting participants, and being sure to involve key stakeholders (for example, farmers, local communities, women and indigenous peoples), who have often been marginalised in collective decision making processes in the past.

Information gathering emphasis on problem formulation means that this stage of ISKM focuses on collecting and collating relevant information and knowledge. Formulating the problem provides a basis for designing appropriate processes (interviews, focus groups, questionnaires and so on) to access the relevant existing data and information. The problem is often not that we do not have enough information to address an issue, but rather that information and knowledge are fragmented across professional disciplines, economic sectors, government levels, organisations and others.

Helping people to make decisions, change behaviour and develop new perspectives also requires other kinds of information. Certainly, data and other research results are useful, but so is information about the political relationships between stakeholders, and why different people perceive things as they do. If such information is brought into the open, stimulating debate between the different participating groups, the social parameters neglected

in most analyses are automatically brought into the process. In this regard, people telling their own life histories or explaining pictures can be just as informative as those presenting more rigorously defended figures, graphs and reports.

## Community dialogue

The ISKM approach actively supports improved communication flows among all those involved, so that useful knowledge is shared and channelled to develop best management practices, and provide practical support for decision making.

Facilitated workshop formats provide a learning environment within which participants develop a shared understanding of how others see the world, and how that shapes the way they act in it (for example, how they manage their land, carry out their research or develop policy). Importantly, the process recognises the contextual nature of information. A strategy suggested by a conservator, farmer or environmental group will always have been derived within a particular social, economic and ecological setting. Scientific results are similarly framed by factors such as their scale and location, and the researcher's personal world view. Accordingly, the community dialogue process is designed to involve participants in developing a common understanding of the context in which any individual piece of information becomes relevant.

In this process, diversity is encouraged, rather than discouraged and undervalued. Consequently, it is less likely that useful information will be dismissed out of hand, and conflict over the value and relevance of information supplied by different sources is minimised. The presence of conflict need not discourage groups from pursuing a collaborative approach, although effective facilitation of meetings and expert mediation becomes more important as a result. In the end though, the aim is to produce useful outcomes that help all those involved in the process, such as those listed below.

### 1. Shared understanding and plans for action

The workshops are designed to provide those who participate in the process with immediate access to new ideas and perspectives that may help them re-evaluate their current management practices. At the same time, they help develop a shared understanding of resource management issues. The outcomes required at this stage are action plans containing clear goals, objectives and best management practices.

However, because the future is uncertain, action plans must be adaptive and allow for continual 'learning by doing'. This requires appropriate monitoring tools and processes to help managers check that the action plans are working and guide their responses if changes are needed. Two sets of monitoring plans covering results and process will be required: results monitoring focuses on whether the group is getting what it wants, while process monitoring focuses on how efficiently it is getting it (see Allen 2000). Both sets of plans are best developed in conjunction with the people who will carry them out, and who are then more likely to actually follow them.

## 2. Relevant research initiatives

As knowledge gaps are identified, the process automatically aids in identifying new and relevant research. Importantly, the workshops also provide land managers, conservators and others with the opportunity to prioritise their information and technical needs as they work more closely with researchers.

## Information capture and dissemination

Using ISKM and similar community-based approaches provides all those directly involved with a learning environment in which useful knowledge is developed through a participatory process. At the workshops, the participants clarify questions, sort information on the basis of its applicability to addressing these, and identify the starting points for all of the stakeholders and their consequent information needs. Essentially, this provides a way of understanding information relevant to the entire problem, and with this it is possible to develop an information management system so that the knowledge may benefit all those who have not had the opportunity to be directly involved.

The Internet is emerging as a useful platform for knowledge sharing, particularly for managing complex environmental information. A major strength of the Internet is that it allows people to create, annotate, link together and share information from a variety of media, including text, graphics, images, audio and video. Moreover, involving people in developing hypermedia-based systems helps to promote collaborative learning and problem solving (Allen et al 2001b). Not only are users of a system likely to have a greater commitment to one they have helped to develop, but they are also likely to have a greater understanding of any changes needed to make it work.

An ongoing process — implementation and review — ISKM framework allows for the substance and context of the required information flows to be updated as more knowledge becomes available. As resource managers and policy makers adopt new strategies and measure the results of their actions (adopting the linked concepts of monitoring and adaptive management), they will continually gain new information, which can be added to the data pool. In a similar way, the pool will receive a constant flow of new data and information from science activities.

The process is iterative, with each cycle serving to maximise the knowledge available at any point in time to support decision making by those in the community. The addition of different modules and issues will arise from the need to meet community objectives, which may be financial, ecological, social or some combination of these. As those involved cooperate to develop the necessary knowledge and knowledge-based tools, new issues will be raised and the whole learning process expanded.

The need for social capital when technological information has been developed with a high degree of awareness of stakeholder needs, encouraging the use of this information to support decision making at a wider level is still a major challenge. Research and other agency or community teams can, at best, only work with a

few representatives of stakeholder groups. This is particularly true of environmental management issues characterised by large geographic scales, many players, multiple perspectives, and in which science and other information is subject to diverse and contested interpretations.

While information is central to this process, learning also has to be supported by other conditions. Key among these is the need to build and maintain trust between the different parties involved. Other processes will also be required to manage wider communication that enables shared understanding, so that participants can quickly and effectively place problems and information in their wider context. Such processes require trust, shared norms, reflective individuals and strong networks.

In the development and organisational learning literature, the networks, norms and trust that facilitate cooperation for mutual benefit are referred to as 'social capital'. Social capital can be thought of as the framework that supports the process of learning through interaction. It requires the formation of networking paths that are both horizontal across agencies and sectors and vertical (agencies to communities and individuals). The quality of the social processes and relationships that social capital supplies especially influences the quality of the learning outcomes of collaborations.

This suggests that social capital plays an important role in influencing change and in sustaining a social and institutional environment that is ready to adapt and change. Equally, it shows why change can be much harder to achieve in some situations than others. In many cases, groups of stakeholders will lack the culture of participating in processes involving many stakeholders. Building the capacity to participate (or social capital) should often be seen as a first step: it is not wise to assume that the capacity already exists.

Capacity building is not just for science alone. It is something that should be built into all development activities: public health, education, environmental management and so on. Each sector will contribute to the development of social capital, which will, in turn, provide a richer social environment in which subsequent efforts can operate.

Process improvement guidance in refining ISKM and intervention based approaches we can look towards the body of knowledge that has been generated through participatory action research, a family of research methodologies that aims to pursue action and research outcomes at the same time (Allen 2001). In action research, 'action' is undertaken to improve a situation, and the 'research' is the formulation of public knowledge within the process, adding to theories about actions that promote or inhibit learning.

However, even within the project itself, it is important to provide opportunities and resources to continually evaluate progress. Constant re-evaluation is particularly important in long term projects, not only to ensure that the project stays on track, but also to help reinforce the value of continuing involvement. Tracking successes can be combined with a number of other initiatives to prevent burnout and maintain the partners' enthusiasm and motivation.

Collaborative approaches should not be seen as developing and strictly applying a plan or set of rules; rather they are processes that require ongoing review and improvement. The most important results of these approaches are not plans or solutions, but working partnerships, capable of responding to changing needs in an effective way.

Finally, it is important to remember that these collaborative initiatives should be flexible and designed to grow. There is no need to involve reluctant stakeholders in the beginning, and in some cases new stakeholders may be identified along the way. What is important is that those already working together can change to accommodate this growth. Community involvement leads to communities feeling that they are owners of projects and having a sense of accomplishment in working together to solve problems. This dynamic will, in turn, encourage other individuals and groups to participate.

## Acknowledgements

The authors acknowledge the support and funding provided by the New Zealand Foundation for Science, Research and Technology, and Landcare Research. Participatory action research such as is described here is not possible without the support and goodwill of all those involved.

## References

- Allen, WJ and OJH Bosch 1996, 'Shared experiences: the basis for a co-operative approach to identifying and implementing more sustainable land management practices', proceedings of a symposium on *Resource management: issues, visions, practice*, Lincoln University, New Zealand, 1–10.
- Allen, WJ 1997, 'Towards improving the role of evaluation within natural resource management R&D programmes: the case for "learning by doing"', *Canadian Journal of Development Studies*, xviii (special issue), 625–638, <<http://nrm.massey.ac.nz/changelinks/cjds.html>>.
- Allen, W 2000, 'NRM changelinks: participatory monitoring and evaluation', <[http://nrm.massey.ac.nz/changelinks/par\\_eval.html](http://nrm.massey.ac.nz/changelinks/par_eval.html)>.
- Allen, W 2001, 'Working together for environmental management: the role of information sharing and collaborative learning', PhD thesis, Massey University, New Zealand, chapter 3, 'The role of action research in environmental management', <[http://nrm.massey.ac.nz/changelinks/thesis\\_ch3.html](http://nrm.massey.ac.nz/changelinks/thesis_ch3.html)>.
- Allen, W, K Brown, T Gloag, J Morris, K Simpson, J Thomas and R Young 1998, 'Building partnerships for conservation in the Waitaki/Mackenzie basins', Landcare Research contract report LC9899/033, Lincoln, New Zealand, <<http://www.landcareresearch.co.nz/research/social/partnerships.html>>.
- Allen, WJ, and OJH Bosch, MJ Kilvington, D Harley and I Brown 2001a, 'Monitoring and adaptive management: addressing social and organisational issues to improve information sharing', *Natural Resources Forum*, 25(3), 225–33.

- Allen, WJ, OJH Bosch, MJ Kilvington and J Oliver 2001b, 'Benefits of collaborative learning for environmental management: applying the integrated systems for knowledge management approach to support animal pest control', *Environmental Management*, 27(2), 215–23, <[http://nrm.massey.ac.nz/changelinks/ahb\\_envmngmt.html](http://nrm.massey.ac.nz/changelinks/ahb_envmngmt.html)>.
- Anyanwu, CN 1988, 'The technique of participatory research in community development', *Community Development Journal* 23, 11–15.
- Bawden, RJ (1991) 'Towards action researching systems', in Zuber-Skerritt, O (ed), *Action Research for Change and Development*, Centre for the Advancement of Learning and Teaching, Griffith University, Brisbane.
- Bosch, OJH, WJ Allen, JM Williams and A Ensor 1996, 'An integrated system for maximising community knowledge: integrating community-based monitoring into the adaptive management process in the New Zealand high country', *The Rangeland Journal*, 18, 23–32, <<http://www.landcareresearch.co.nz/research/social/monadman.html>>
- Chambers, R and I Guijt 1995, 'PRA — five years later: where are we now?', *FTP Newsletter*, 26/27, <<http://www.trees.slu.se/news/26/26chambe.htm>>, accessed 4 October 2000.
- Checkland, PB 1981, *Systems Thinking, Systems Practice*, Wiley, Chichester, UK.
- Gunderson, LH, CS Holling and SS Light (eds) 1995, *Barriers and Bridges to the Renewal of Ecosystems and Institutions*, Columbia University Press, New York, USA.
- Kilvington, M and W Allen 2001, 'Effective teams in target zero waste reduction programmes: an evaluation approach and report', Landcare Research contract report LC0001/62, Lincoln, New Zealand, <[http://www.landcareresearch.co.nz/research/social/teams\\_tz2.html](http://www.landcareresearch.co.nz/research/social/teams_tz2.html)>
- Kilvington, M, W Allen and C Kravchenko 1999, 'Improving farmer motivation within TB vector control', Landcare Research contract report LC9899/110, Lincoln, New Zealand, <<http://www.landcareresearch.co.nz/research/social/monadman.html>>.
- Lee, KN 1993, *Compass and Gyroscope: Integrating Science and Politics for the Environment*, Island Press, Washington DC, USA.
- Malhotra, Y 1997, 'Knowledge management in inquiring organizations', <<http://hsb.baylor.edu/ramsower/ais.ac.97/papers/malhotr3.htm>>, accessed 10 October 2000.
- Michael, DN 1995, 'Barriers and bridges to learning in a turbulent human ecology', in Gunderson, LH, CS Holling and SS Light (eds), *Barriers and Bridges to the Renewal of Ecosystems and Institutions*, Columbia University Press, New York, USA.
- Senge, P 1990, *The Fifth Discipline: The Art and Practice of the Learning Organisation*, Doubleday, New York, USA.