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Building global sustainability through local self-reliance

Lessons from landcare

Monograph 219

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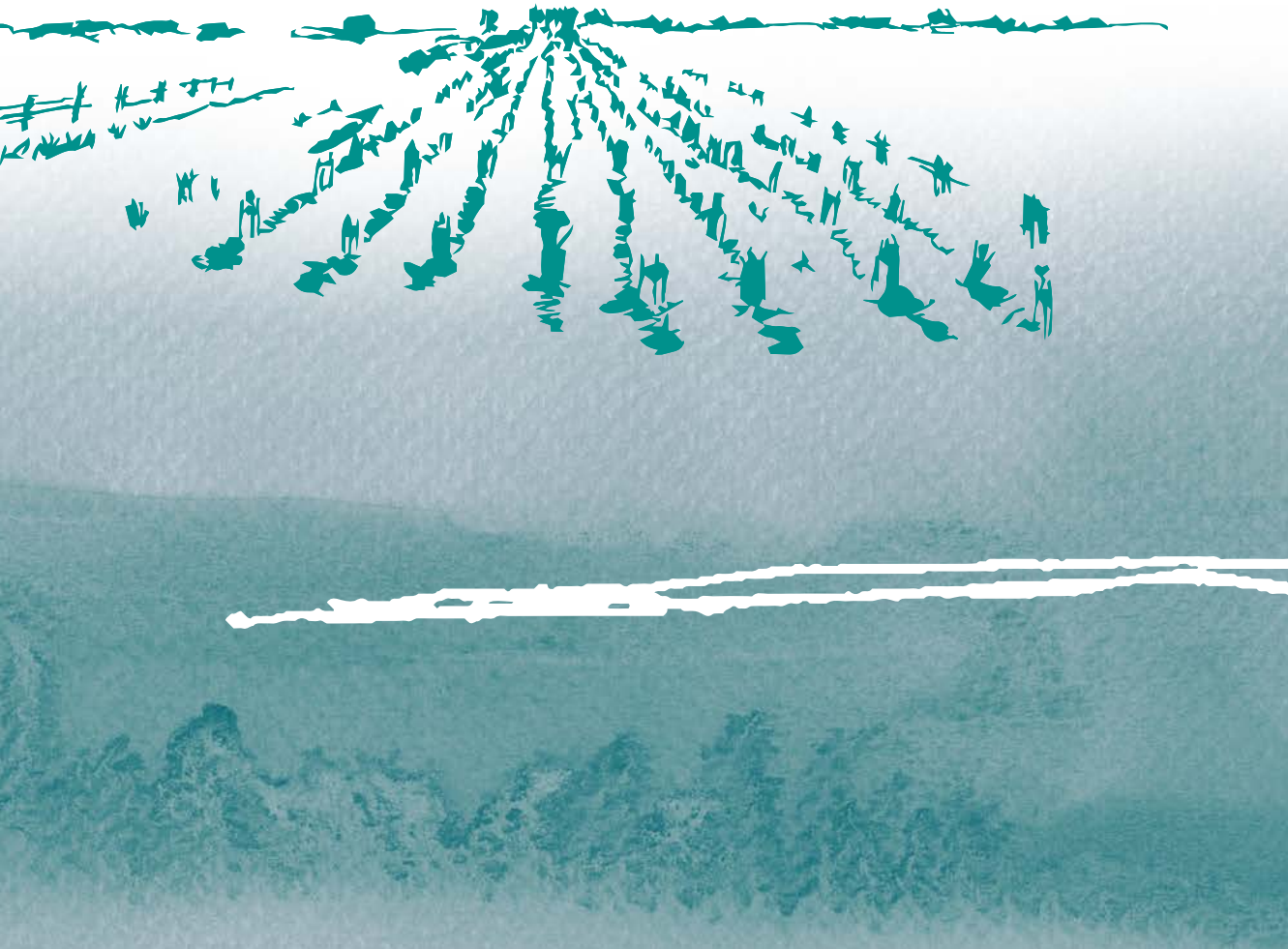
List of shortened forms

ACIAR	Australian Centre for International Agricultural Research
AMAEP	ACIAR Mindanao Agricultural Extension Project
AT Uganda	Appropriate Technology Uganda
CAO	City Agriculture Office
CBDRR	community-based disaster risk reduction
CBRM	community-based resource management
CENRO	City Environment and Natural Resources Office
CGIAR	formerly the Consultative Group on International Agricultural Research
CLEA	Community Learning for Environmental Action
CSIRO	Commonwealth Scientific and Industrial Research Organisation
FAC Net	Fire Adapted Communities Learning Network
GDP	gross domestic product
ICM	integrated catchment management
ICRAF	International Centre for Research in Agroforestry
IUCN	International Union for Conservation of Nature
KADLACC	Kapchorwa District Landcare Chapter
KCLID	Kagawa Canal Land Improvement District
Landcare Australia	Landcare Australia Limited
LID	land improvement district
LIFE	Livelihood Improvement through Facilitated Extension
NAACP	National Association for the Advancement of Colored People
NAADS	National (Uganda) Agricultural Advisory Services
NRM	natural resource management
NUISE	Nanzan University Institute for Social Ethics
OBLA	Olo-clofe B'laan Landcare Association
OECD	Organisation for Economic Co-operation and Development
PCAARRD	Philippines Council for Agriculture, Aquatic and Natural Resources and Development
PULL	PCAARRD-UP Mindanao-Landcare LIFE
ROCP	Regional Onsite Conservation Program
RMIT	Royal Melbourne Institute of Technology
SDGs	Sustainable Development Goals
TOFA	Tuban Organic Farmers Association
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNHCR	United Nations High Commissioner for Refugees
UNU-LRT	United Nations University Land Restoration Training Programme
WWF	World Wide Fund for Nature



PART E

Developing community learning and social cohesion

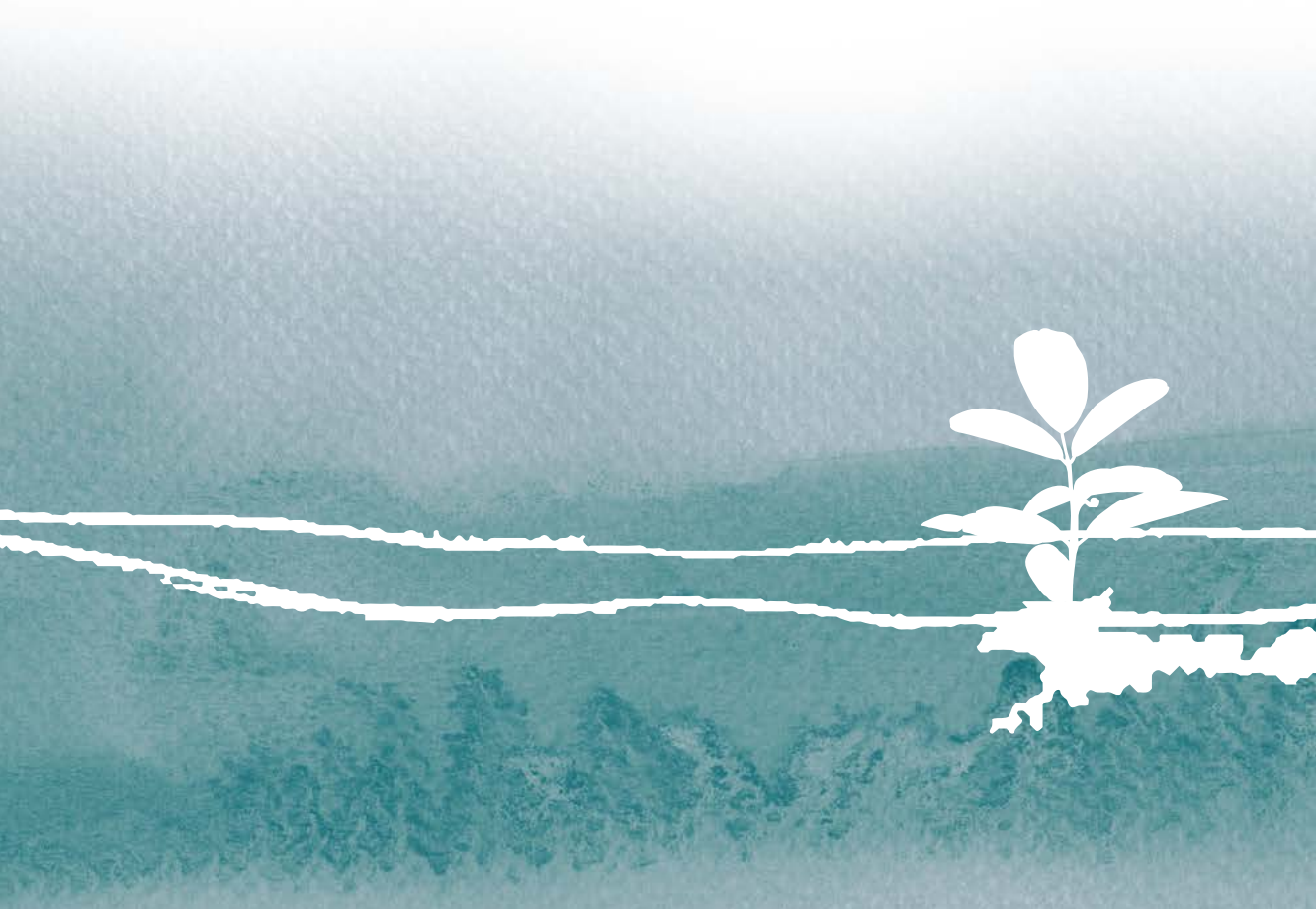


Photo: Intrepid Landcare

CHAPTER 20

Learning like crazy: prototypes and practices of design for shared learning

Ross Colliver

Abstract

This chapter examines how social learning can strengthen the contribution of landcare and improve practices and relationships within natural resource management (NRM). The knowledge that drives landcare effort is often isolated in each of the localities in which it develops, and community-based management is often marginalised by top-down scientific management.

Two projects that respond to these challenges are discussed:

- Community Learning for Environmental Action, an action-research project testing ways to strengthen peer-to-peer learning in the landcare community in Victoria
- the Systemic Inquiry into NRM Governance, which supports people in NRM to develop systems thinking and to organise innovation in governance practice and relationships.

Both projects are attempts to take learning between peers beyond tacit and localised knowledge to explicit knowledge building, and beyond reactions to problems to constructive thinking about the larger social context in which landcare operates. Both projects are presented as prototype designs for social learning, and based on this experience, five practices of design of social learning are proposed.

Introduction

Three passions drive landcare: love for the land, mutual responsibility and learning with others. Love for the land grows out of a relationship with a living place that motivates a person to care for the land. As your neighbours help you and as you see them work on their own properties, a sense of mutual responsibility develops. People join Landcare groups to hear what others are thinking and to see what they are doing, and they stay to keep talking about their ideas and plans and testing these against others' opinions (Curtis and Van Nouhuys 1999).

Three passions drive landcare: love for the land, mutual responsibility and learning with others.

The groups formed between Landcare groups in Australia, known as Landcare networks, have become skilled at facilitating learning between landholders, but there is much less attention given to facilitating learning between Landcare groups around the business of working in a local community and with government. How to organise in communities, how to develop partnerships with government agencies and industry and how to influence agendas locally and of governments are essential knowledge that underpins work with land managers. However, such knowledge does not move readily beyond the localities where it develops.

Landcare networks in Australia have at times struggled to influence the public governance and natural resource management (NRM) systems in which they operate. Landcare members and staff have complained about being marginalised by decision-making organised around government priorities, not local priorities, but they have been slow to speak out and find ways to change that marginalisation (Colliver 2010).

This chapter looks at these struggles and describes projects prototyping processes of social learning that can address them. By 'social learning', I mean learning by those who live and work in a situation, directed towards improving that situation (Pahl-Wostl and Hare 2004; Collins and Ison 2010). Etienne Wenger (1998) observed that while you cannot make learning happen, you can design for learning, so this chapter argues for a practice of design for social learning that supports people understanding and changing their social situation.

One assumption at work throughout this discussion is that the challenges facing Landcare require a capacity to learn with others and to learn from action. In *The reflective practitioner*, Schön (1983) showed how, for the skilled practitioner, for example, a doctor or an architect, every action is a probe, moving things forward around the substantive task (a surgical procedure or designing a house) and at the same time, a move that opens things up, that reveals more about the situation. This may be something the practitioner is familiar with and knows how to handle, but sometimes it is something that hasn't been anticipated and around which a new response must be invented.

Two decades later, in a similar vein, Dave Snowden (2002) observed that in a complicated system where causal relationships can be known, expertise can direct action, but that in complex systems, you can't know what do. What affects what remains uncertain?

Does this leave the practitioner helpless? No, says Snowden. In complex situations, the practitioner can *probe* the system, *sense* what is happening and then use what is discovered about the system to *respond*. Here, 'probe' means action with inquiry behind it, aiming for learning as well as to get a result.

To connect local self-reliance and global resilience, Landcare needs ways to take the learning in action that Schön describes, organise it within Snowden's complex systems, and scale this up so it works across networks and governance regimes. The projects described here attempt just this. Think of them as probes into the complex space between landholders, local communities, industry and government – prototypes that are evolving as they are tested.

Situation 1: Little support for learning on the social side of Landcare

Anthony Gallacher and Laurie Maxted are key people in the Loddon Plains Landcare Network in north central Victoria, Australia, a network of 18 local Landcare groups whose members manage 300,000 hectares of private land. Laurie took up a property here 50 years ago:

> I came here in 1967, and I started planting trees then without ever having any funding. I could see that was going to be a goal for us, to be improving the landscape. … We've naturally regenerated and planted on our place, and it's transformed the landscape. My plan was to have 10% of our land covered with corridors of trees, and I've got that … You get shelter and you get better pastures (Colliver 2015b).

Asked about what the network has achieved recently, Laurie describes the difficulty of controlling the noxious week cactus wheel (*Opuntia robusta*) and the success of an interagency group the network has set up. Parks Victoria, local shires and the Catchment Management Authority meet regularly to talk about what each is doing to control cactus wheel. They are coordinating their control activities and having more impact. Participants have developed a sense of shared responsibility for the cactus wheel problem. They support each other's efforts and have found ways to bring in more funding.

Asked about the long-term future of the Network, Laurie's main issue is how Landcare can connect to 'younger' farmers – those over 40 but under 60 years of age. But he has few connections to Landcare people outside his area who face a similar challenge. Nor has he talked about the interagency group outside the boundaries of his network. Laurie would have enjoyed talking with Evan Lewis, chairperson of the Woady Yaloak Catchment Group, where younger farmers are active members and are part of the committee of management. However, there is no arrangement that brings him in contact with Landcare groups that are 200 km away.

Anthony, the network facilitator, meets twice a year with other facilitators in his region, but that meeting is run by the Catchment Management Authority and focuses on government business, not his practice of working in community. Anthony would have learned a lot from facilitators in the nearby Goulburn Broken region, who have set up discussion of their practice as facilitators, but again, there is no arrangement that links Anthony to those facilitators.

Anthony Gallacher (left), facilitator and Laurie Maxted (right), Chair, Loddon Plains Landcare Network

Laurie and Anthony, and the committee of management behind them, are learning how to work with communities and government agencies, but they do not have places to share what they are learning or to learn from others in similar situations. What is going on here? As the Victorian Government has retreated from providing locally based services in the agriculture sector, the connections to land management knowledge have been handed on to private consultants, but the transmission of knowledge has fallen away. Department staff in different localities once discussed and shared what they were learning about the social side of working in communities and in government, but that is now left to Landcare, where local nodes of thinking and action operate in isolation from each other. With demographics, agriculture practice and climate all changing rapidly, this poses a major risk to Landcare's capacity to adapt to current conditions, and to the overall NRM effort.

Knowledge developed while managing and influencing a group's social context (organising, collaborating and influencing agendas) stays stuck in a mode of learning Ikujiro Nonaka called 'socialization' (Nonaka et al. 2000).

Nonaka observed that tacit knowledge is transmitted through shared experience, as in a traditional apprenticeship where a person learns alongside an experienced practitioner (see Figure 20.1). This is fine for local learning, but to move knowledge beyond that locality requires conversations about practice between people who know and trust each other. In such a relationship, people have the safety to articulate what they know, question their practice and go beyond what they know to invent new practice. Explicit knowledge can be combined with other knowledge to create new knowledge, which in turn is absorbed into standard practice, and again becomes tacit.

In Australia, the physical distance between Landcare networks makes it difficult to maintain the kind of conversations that can make tacit knowledge explicit. There are other factors at work too. Projects do not include funds for the networking needed to facilitate these conversations. There is no ongoing support for the professional development of Landcare staff, and except for some governance training for committees, little support for learning between Landcare volunteers. Catchment management authorities, a principal partner for Landcare networks, pay attention to how communities can respond to government's agenda and ways of working, but much less attention to understanding community ways of working (Carr 2002).

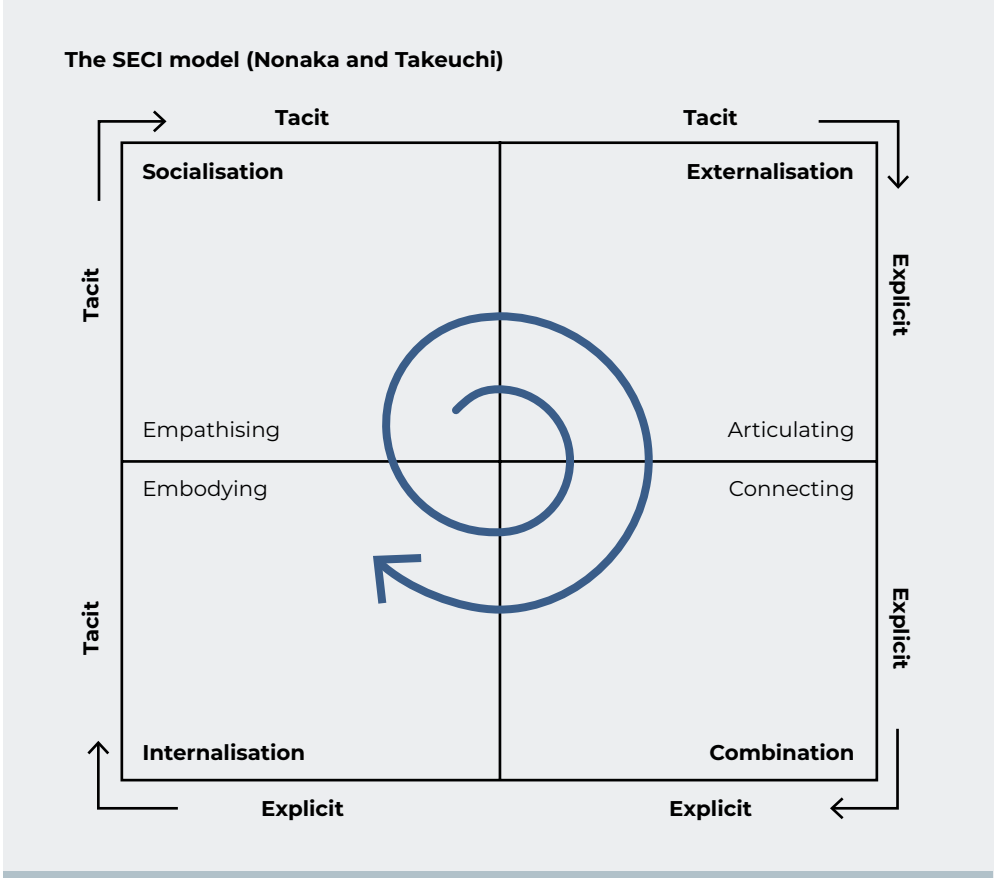


Figure 20.1 Nonaka's model of knowledge creation

Most government NRM is organised around landscapes, not communities, and its language is drawn from the biophysical sciences, not the social sciences. Finally, rural Australia has a culture of stoicism and self-reliance that leads people to accept their isolation and 'just get on with the job'. These are a daunting set of constraints. How can Landcare members and staff articulate and share their social knowledge?

Prototype 1: Peer inquiry on the social side of Landcare

Since 2015, Victorian Landcare's volunteer-managed services and advocacy organisation, Landcare Victoria Inc., has sponsored the Community Learning for Environmental Action (CLEA) project to develop peer-to-peer learning within the landcare movement. Funding has come from the Natural Resources Conservation League, a philanthropic organisation committed to capacity building in the community environment sector. CLEA has developed a multilevel strategy to strengthen peer-to-peer learning.

At the grassroots level, CLEA has targeted Landcare network committees of management, where leaders from member Landcare groups meet regularly to plan for their network. This is a good place for peer inquiry about how to organise, collaborate and influence, but committees of management need rigour in their inquiry. CLEA's support is built around three facilitated sessions that build capacity to pursue inquiry between peers.

In Session 1, Questions Without Easy Answers, a committee of management assesses how the network's capacity has grown in the last two to three years, and where the network needs to break new ground. The latter is framed as a question without an easy answer. A clear question focuses discussion and puts inquiry on the committee's agenda. Session 2, Best Bets, interrogates the network's past approaches to their question and articulates what has been learned from those approaches, then decides what approach will now be taken. Articulating the thinking behind the options puts the committee in a position to evaluate the results of action and to change direction if necessary. In Session 3, the committee maps its collective networks, and decides who to reach out to as it pursues its inquiry.

CLEA is now supporting seven networks in three regions with their questions without easy answers (Colliver 2017a). With an explicit question in front of them, committees of management are able to give long-term issues attention even when there are pressing short-term tasks. The urgent does not overwhelm the important. A regular phone call from CLEA to discuss recent progress encourages the facilitator and the committee to keep going (Colliver 2015a).

At the regional level, CLEA is supporting 'network weavers'. Despite being surrounded by newsletters and websites, when a landholder is looking for a person who can help them with a problem, they often choose to talk to a person they know. This is often a local person known to have good connections. These are network weavers: people active in building connections within and between networks (Holley 2012). CLEA's research in two regions (Colliver 2016) found that this is the primary way that information and support move around the Landcare community. Network weavers enjoy sharing their connections with others and are quick to make new connections to extend their own networks.

CLEA is working with the Catchment Management Authority to support network weavers. The Catchment Management Authority is setting up clear links to experts in the agriculture and environment sectors, and doing more to profile innovators in land management, agriculture and conservation. As network weavers hear about people beyond their current networks, they build them into their social network.

At the state level, CLEA is strengthening peer inquiry in forums run by Landcare Victoria. When it formed in 2008, the then Victorian Landcare Council committed to running two forums each year, in the regions not in the capital city, where volunteers and staff could share what they were doing and learn from each other. Between 40 and 60 people now attend, many travelling long distances to participate. Much learning happens informally over meals and on field trips, but formal sessions have tended to use a one-way presentation style.

CLEA is testing formats for inquiry between peers in these forums. For example, working with an agenda negotiated with Landcare staff, Landcare Victoria's Landcare Professionals Forum in 2017 tested three peer learning formats:

- 'How-to' sessions where individuals shared their knowledge on a specific subject
- 'Knowledge harvest' where small groups gathered recent learning on a current issue
- 'Conversations that can't wait' that made time on the agenda for the conversations that might never be initiated (Colliver 2017b).

The prototype elaborates

The vision is of local nodes of inquiry connected across regions and across the state. CLEA can now build on the three levels of action just described in several ways.

- **CLEA can set up inquiry across Landcare networks.** For example, Melbourne is set to double in size to 8 million by around 2050, and that growth has a major impact in rural areas up to a two-hour drive from Melbourne. Landcare networks in this zone are asking how they can communicate with new settlers who want to learn more about managing their properties but are often time-poor and busy with young families. CLEA is testing ways to broker discussion between these Landcare networks.
- **CLEA can invest more in publishing what Landcare knows.** Landcare staff and volunteers write many reports, but these are mostly about on-ground works, not social processes, and they describe successes at the expense of the interesting failures. Landcare needs another kind of storytelling that takes the social dimensions of working in communities to other Landcare networks, other environmental groups and other community groups facing similar issues in rural communities. This will require building capacity for localised production of audio, video and images for storytelling.
- **CLEA can open pathways for Landcare to talk with city-based environmental groups.** There is currently little dialogue between urban and rural community environmental interests. How can Landcare projects be introduced to interested people in cities so they see what is happening and can participate easily? How can Landcare networks bring what they know about organising, collaborating and influencing into urban settings, and learn from environmental action in cities? There is an opportunity to connect the mobilisation of grassroots advocacy by national and state environmental groups with the experience and agenda of Landcare.

Situation 2: Adapting to the status quo in NRM governance

Landscapes and communities are embedded in local, regional, provincial, national and international levels of governance. The landcare movement has struggled to change the governance regime in which it operates and the institutional arrangements and practices 'by which societies, and social groups, manage their collective affairs' (Healey 2003:104). Operating at the margins of command-and-control hierarchies, communities and environmental groups mobilise network governance to respond to situations where no single actor has the authority or resources to pursue comprehensive action (Wagenaar and Cook 2005). However, community ways of organising are marginalised in NRM governance (Davidson and Lockwood 2009; Colliver 2010).

Consider this exchange from a discussion between Landcare staff and community leaders talking about how to make grassroots Landcare more effective (Colliver 2010:123):

> Instead of writing a policy about what landscape change is, go into a landscape and say 'Who are the people in this landscape?' Not 'We need so much work on salinity, we need this many trees, we need this many rabbits killed' and all this sort of stuff. Go into a landscape and talk to the people in the landscape.
>
> *But you need to do both at once ...*

> You do, but they're not doing both at once, they're looking at the bio-physical dilemmas in the landscape, and then thinking that the community is just this thing that hangs off the side of the landscape.
>
> *Don't you think they understand that?*
>
> They don't! ... They don't understand how we are operating!

Community and government have different ways of governing. Brunner and Steelman (2005) characterise government NRM as scientific management, an approach that differs from community-based governing on many counts (Table 20.1).

Table 20.1 Government and community ways of governing

Government NRM	Community NRM
Start with policy and biophysical science	Start with the whole person and their social world
Allocate resources to priorities based on scientific evidence	Allocate resources to priorities based on individual and community readiness
Decide the end goal, plan all the actions required, then implement	Decide the end goal, plan a step, check the results, then plan the next step
Work through a hierarchy of public servants, using contractual relationships to deliver outputs	Work through relationships of mutual responsibility between passionate people, using social networks to mobilise resources

Source: Colliver R (2010) *Community-based governance in social-ecological systems: an inquiry into the marginalisation of Landcare in Victoria, Australia*, Murdoch University, Perth.

Sometimes these differences are brought together, but there is a tendency for people working in government to assume that the way government organises action is the best way, or at least, more effective than what are often seen as the messy, half-baked ways community organisations work.

Landcare members have talked about this for many years, but only slowly turned their attention to how they might change NRM governance itself. There is a long backstory at work here. In the first Decade of Landcare in Australia, to 1985 from 1995, government funding was guided by community priorities. In 1995 there was a shift to decision-making at regional level but funding criteria were loose enough to negotiate a fit with community priorities. In 2002 there was a swing to centralised control: the 2002 National Action Plan for Water Quality and Dryland Salinity tied funding to regional strategies, the plan's assets and threats framework moved technical data to the core of decision-making, and advances in spatial representation of resource condition allowed funders in distant cities to think they knew what was happening at the local level (Davidson and Lockwood 2009). Boundary objects and bridging structures (Berkes 2009) were not developed between local and regional levels, hindering discussion between community members and technical staff of regional authorities.

Landcare projects that didn't fit state and national priorities went unfunded. Landcare members complained bitterly to each other, but stayed quiet with funders, so as not to bite the hand that fed them. Research in 2006–08 (Colliver 2010) with two cohorts of Landcare staff and leaders found that a common response to the difference between government and community ways of governing was to educate the few in the government hierarchies who showed interest, but to not waste time trying to change 'the system'. They regarded policy as unintelligible and irrelevant to the real work happening on the ground.

Loss of funding forced a reappraisal of this stance, and in 2008 Landcare members who were disenchanted with Landcare's marginalisation formed the Victorian Landcare Council to advocate for Landcare, and, shortly after, the National Landcare Network to do the same at national level. Advocacy, however, is constrained by government ways of doing business – the standing committee, the expert report, the detailed plan, the funding criteria. These change very slowly. We need to move faster than this – we need to learn like crazy. How can Landcare members and staff influence the status quo and remake governance?

Advocacy is constrained by government ways of doing business – the standing committee, the expert report, the detailed plan, the funding criteria. These change very slowly. We need to move faster than this – we need to learn like crazy.

Prototype 2: The Systemic Inquiry into NRM Governance

Fitting together different ways of governing across levels of governance in NRM is difficult (Cash et al. 2006). Everyone is pushed for time. Hierarchies of control that articulate social goals and direct resources are intertwined with networks that influence opinion and organise action. Within this hybrid, people find a way to do business, even when they see serious constraints in current arrangements. The principle of subsidiarity (Marshall 2008) suggests that higher levels of authority would improve efficiency and effectiveness in governance by devolving decision-making to lower levels. However, without asserting their interests and capacity, people at community and even regional management levels might wait for a long time for this devolution. Discussion in a forum of peers is one means to critique the allocation of authority in a governance system, to build the case for decisions that could be better managed by being devolved, and to build social learning around the processes that devolved decision-making requires.

Spurred on by Landcare community leaders in the Corangamite region of Victoria, Australia, the Systemic Inquiry into NRM Governance is opening a space for inquiry and innovation within NRM governance. The Lonsdale Systems Group, an alliance of systems-change researchers and practitioners, used its networks to bring together a cohort of around 40 people known to be innovators in NRM governance in five day-long workshops through 2015–16.

Premised on equality between practitioners, paid and unpaid, from local, regional and state levels, and on the value of differing perspectives, the inquiry critiqued and redesigned NRM governance around points of opportunity identified by participants, then won funding for three trial projects in 2017–18, targeting the urban connection to biodiversity, environmental accounting and co-design of NRM planning.

The project draws on the approach to social learning developed by Professor Ray Ison and colleagues (Collins and Ison 2010). Their action research in catchment management has come to understand innovation in governance systems as an emergent property of collective inquiry into those systems (Colvin et al. 2014). Bring people together, with their different values and points of view, around a shared situation of concern and commitment to improving governance, then facilitate so the conversations go deep enough and wide

enough. Assumptions, practices and institutional arrangements will be critiqued and redesigned. Shared inquiry changes systems.

Current practices are habits of hand and mind; current arrangements reflect where power sits. Even when all parties are dissatisfied, unlocking stuck situations requires thinking about the whole system to find what will change things. In the inquiry workshops, participants took failures of governance and diagnosed *why* things stay the same, then designed a set of actions to transform the governance system. Figure 20.2 provides an example – alternate pathways for transforming the partnership between community and government.

For 30 years, Landcare groups and networks have taken action locally, and assumed (along the right-hand loop in Figure 20.2) that Landcare would be taken on as partners in planning. This hasn't happened. An alternate track (in the left-hand loop in Figure 20.2) would gather evidence of Landcare's impacts, get better at telling that story and advocate for people-centred policies. This might then compel government agencies to do more than consult on their terms when it suits them. A third pathway (and the one taken by the Systemic Inquiry into NRM Governance pilot, called Co-designing NRM Planning) is to take on the processes by which priorities are set and projects designed (the nuts and bolts of NRM planning) and co-design these. Through this approach, decision-making draws on the capacities, knowledge and influence of both regional and community levels.

Impacts of the three pilot projects were reported in 2018 and 2019 findings on how to support systemic inquiry in governance. At this point, it is clear that the inquiry gives people in Landcare a way to be part of changing governance with other innovators in NRM.

Figure 20.2 Transforming the community–government partnership

Conclusion

This chapter has argued that design for social learning is a way to link local self-reliance to global resilience. It has examined two prototype designs: supporting peer learning in Landcare and improving NRM governance. Both create spaces where people who work in a system can inquire into and improve the way business is conducted. Six precepts for design for social learning emerged from the projects:

1. **Create a space for inquiry.** Busyness drives out inquiry and locks in the status quo. Inquiry needs a dedicated space. Be realistic about what people can manage alongside their day job, but don't back off from the fact that this is *inquiry*. State what needs attention, and propose a place for rigorous inquiry and inventive action.
2. **Cultivate companionship.** Social influence depends on heartfelt relationships between those who want to do things differently. Constructive, critical inquiry needs other people's views to shake up preconceptions, and others' enthusiasms to fire our imaginations.
3. **Facilitate with activist intent.** Probe for the experience behind opinion, and for difference in points of view. Listen for the dominant and minor discourses, and listen for what is emerging in the system.
4. **Learn to do it while you do it.** The content is not the only thing that matters – *the way* you learn together matters. Ask what is working as we analyse and co-design, and make this explicit as practices of social learning.
5. **Recruit allies.** Inquiry in the midst of action isn't a line item in many budgets, whether departmental, program or project. Search out allies who want to create and resource safe places for social learning alongside normal business.
6. **Get used to being out of your depth.** Events tumble over us, overtake us and have their own impetus. We come to know by getting out of our depth, by not knowing and then finding a way forward.

Underpinning social learning is an assumption that there is no body of knowledge out there to be found, but that knowing arises in action and in good company. We may be friends, or not, but we are at least companions on a path together, and this is the ground from which new knowledge grows. It's a hard journey, on our tiny planet. We have reached a very steep slope; the weather is closing in. What makes it possible to keep going, each in our own area of influence, each with our talents, is that we have at our side companions who share the journey.

Rumi, the 13th century Sufi master, put it this way (Rumi 1991):

> With company you quicken your ascent.
> You may be happy enough going along,
> but with others you'll get farther and faster.
> Someone who goes cheerfully by himself
> to the customs house to pay his traveller's tax
> will go even more light heartedly
> when friends are with him.

Landcare's challenge is to create a community of practice, not only around land management or conservation, but around design for social learning. With company, we will quicken our ascent, and make our way cheerfully.

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Photo: Brett Ellis

CHAPTER 21

Traditional knowledge as a landcare strategy

Liddy Nevile

Abstract

Learning and practising methods of land care is a major challenge for researchers, practitioners and all of us who benefit from good land management. Currently, much contention is focused on the role of both hot and cool fires in a context, in Australia, where fire is often feared. It can be devastating to the lives and livelihoods of modern communities and the countryside.

The fire practices of Aboriginal Australians before European settlement are of interest in this respect. Some argue that the modern practices of agriculture, forestry and the regeneration of Indigenous flora and fauna would benefit from careful consideration of these older practices. In most of Australia, there is a gap of up to 200 years between the work of current ecological science today and the Indigenous science that was applied more widely before European settlement.

This chapter explores what is now known about fires, both human-controlled and wild, in a 'caring for country' environment. It suggests that greater cross-cultural communication is needed between Indigenous and non-Indigenous approaches to managing this fragile Australian landscape. It also suggests that greater sharing of different cultural approaches to environmental management could have real relevance to achieving sustainability across the globe in the face of climate change.

Introduction

In geological and human history terms, Australia is an old country. Its environment is fragile. Indigenous practices have supported its inhabitants for millennia, alongside significant co-evolution of the environment. In the wake of European colonisation in the last 200 years, however, the Australian environment has significantly changed, sometimes irrevocably. Catastrophic fire events are now not infrequent.

This chapter aims to draw attention to the learning styles applied to environmental management exhibited over previous millennia in Australia and the ways that we learn today. Key aspects of past environmental management, for example, the Indigenous concept of 'cultural' or 'cool' burns or fire management, are not necessarily understood or accepted by contemporary managers of the landscape. In addition, the practices from the past are not easily articulated or evaluated due to the changed circumstances of those who were keepers of this knowledge. This chapter explores current knowledge of fire in the Australian landscape and suggests that greater cross-cultural communication is needed to manage this landscape sustainably and fairly. This is a learning of global relevance in the business of applying the subsidiarity principle with the landscape management context.

The country

Recent alternative views of Australian history (for example, Gammage 2012, 2018), tell us that the Australian landscape was, as seen in early paintings, a land with open 'grazing' spaces. Hunting was easy, the land was rich with biodiversity, and there was less risk or more safety from what is now greatly feared in Australia – uncontrollable fire. This state of the country was the result of Indigenous 'caring for country' practices. Fire was used positively where machinery and chemicals are less evenly used today, as both Indigenous and non-Indigenous land managers sought open grassy landscapes for grazing animals.

It is slowly being recognised that the land had in fact been 'treated' by its Indigenous traditional owners to provide those useful open spaces depicted in early European paintings.

As was my personal experience in mainstream education in Australia, past Australian generations were told histories through paintings that saw the landscape through a romantic, European lens. It was often explained that early painters were simply seeing the new land as they saw the Mother Country (mainly Britain). Indeed, the early painters were probably influenced by techniques that had been developed in Europe for European conditions, with results that appeared to look somewhat 'European' (Clark and Whitelaw 1986).

Today, it is slowly being recognised that the land had in fact been 'treated' by its Indigenous traditional owners to provide those useful open spaces depicted in early European paintings. The Indigenous practice of using fire as a tool for agriculture, rather than regarding it as an unpredictable, arbitrary risk and enemy, has been credited with this achievement. The role of open grazing has now also been recognised (Gammage 2018).

A friend of mine relates that in the mid-1900s his immigrant grandfather had a practice of 'slow burning' their farmland. He claimed that his grandfather's neighbours on surrounding properties did not 'approve' of this practice, so in later years, early in the growing season, the old man simply dropped some ash from his pipe in a strategic location and then took a while to get around to dealing with it. He knew that by the time he did deal with it, his mission would have been accomplished, and a slow burn or patchwork burn would be underway. His grandson recalls it as a controlled, deliberate approach to slow or cool burning.

Australia is now subjected annually to many very savage wildfires and their devastating consequences, including loss of flora and fauna and of life and houses, equipment and livestock. Huge areas are burned beyond recovery by increasingly hotter and less controlled fires, particularly in the catastrophic 2019–20 fire season. These hot fires race up hillsides, supported by increasingly strong winds and unusually high temperatures.

In this new environment, wildfire behaviour is extensively studied and is the subject of many scientific papers. Many theories are based on an analysis of environmental damage after significant wildfires, and often the conclusions lead to the modification of practices, including in some cases greater adoption of Indigenous approaches to cultural or cool burning.

Biodiversity degradation

Broadscale change in the Australian landscape occurs surprisingly quickly. The country is not as it was 200 years ago. Vic Jurskis, a former New South Wales senior forester (personal communication, 5 July 2018), points to the many dead and dying tree trunks and branches, and to the increased thickening of vegetation, that is now commonly seen in uncleared areas right across many parts of the Australian landscape. This is indicative of sick trees in a declining forest due to a lack of regular burning and a lack of sustainable grazing, which Jurskis says has similar benefits to traditional burning:

> The process begins with the lack of fire, seedlings grow into bushes; mulch accumulates; soil conditions and microclimates change; nitrogen accumulates in the soil; tree roots deteriorate; and as the trees get sick they lose their foliage and that lets more light in and the understory thrives; that's a vicious cycle; pests flourish that eat any part of the tree, the leaves and the roots – because sick trees are better food (Brown 2015).

In some parts of the landscape where trees are accessible to grazing stock compared to other areas that are fenced off, the latter can be seen as having thickened vegetation with many saplings. Jurskis suggests that the comparison of the crowns shows that trees in the grazed paddocks are healthier and supports the theory that trees decline unless undergrowth is controlled and nutrient cycling is maintained by burning or grazing. Traditional approaches to Indigenous burning kept forests clear of such undergrowth.

Without regular and appropriate burning, soon enough, instead of an open grassy forest with well-spaced trees and wide crowns and an open, grassy understory, the vegetation begins to close in on itself. The crown of the tree recedes down onto the branches. A forest that is in the last stages of tree decline has a thick understorey that has developed because of a lack of burning or grazing, leaving the trees vulnerable to pests, parasites and diseases.

> The survivors are still there. The dead trees aren't obvious because they've broken down. It's quieter because the bellbirds have 'moved on to where there are more sick trees in the earlier stage of decline' (Brown 2015).

The ‘space’ vacated by dying trees is then filled. For Jurskis, the final stage of tree decline in many Australian ecosystems is the invasion of wattle scrub and, in his opinion, that’s how it will stay. He considers that the wattles produce hard seeds that persist in the soil, so when the current stand dies of old age or gets burned by a high intensity fire, a new wattle scrub will return. Jurskis says this is an example of how the decline of forests that were previously managed by Indigenous burning ends up destroying biodiversity (Brown 2015).

Protecting diversity through traditional knowledge

The television program *Insight SBS* (SBS 2016) featured my friend Victor Steffensen, an Indigenous fire expert. Each year in Australia, rural fire services across the country carry out vast swathes of back-burning and hazard reduction. Steffensen considers that this is entirely the wrong approach: that the fires tend to burn inward, creating an inferno from which animals cannot escape and a heat so strong that it burns both undergrowth and canopy.

Indigenous or cultural burning, on the other hand, is cool: fire temperatures remain low so that the flames never reach the canopy.

> ‘The canopy is [a] whole other world,’ says Steffensen. ‘The canopy is so important to us because that’s the life of the flowers, the fruits, the birds, the animals … that top canopy is very, very sacred and the simple rule is that it never burns. If you burn the canopy, then you have the wrong fire. Fire [should] behave like water, trickling through the country [so] it doesn’t burn everything’ (SBS 2016).

Traditional burns are also started from ‘fire circles’ and patterns that allow the fire to spread outwards in an ever-increasing circle. This allows animals to escape when they smell the smoke and also keeps temperatures down, with only one fire front to manage. Steffensen asserts that this kind of fire knowledge has been lost over the centuries, both because of colonisation and the subsequent breakdown in the oral transmission of knowledge. This problem is exacerbated by the introduction of non-native plants (weeds) that spring up when the canopy burns, and the increasing shift of rural farming populations towards the cities. Even European pastoral knowledge of how to manage the land with fire may increasingly become lost (King 2016).

I spent a day with Steffensen, Indigenous Elders and forestry experts in Victoria learning about cool fires. We were shown how trees limit the height to which fires can burn without damaging the canopy, with the cool fire cleaning their trunk and offering propagation opportunities to seeds in the surrounding area. During the day, an Indigenous Elder described how he believed the bark of the gum tree controls the movement of air up the trunk and that it inhibits a cool fire at an appropriate height. Similarly, a cool fire may burn the leaves and blacken the trunk of Australian grass trees, but the tree usually survives. The living growth-point is buried underground, protected by tightly packed leaf bases. In fact, new growth in grass trees can be stimulated by fire, and large numbers of other plants can be triggered to flower (Bush Heritage Australia 2018). Cool fires burn up the trunk of grass trees and melt resin that Indigenous people have used for centuries as glue, to join tips to spears, for example. This was demonstrated on this cultural day by an Elder.

What is cultural or cool burning and can we use it today?

In his book *Firestick ecology*, Jurskis (2016) tells a simple story of how Indigenous people managed the land through fire to create and maintain the biodiversity and the fire-safe environment that greeted the first European settlers. The subtitle is 'Fairdinkum science in plain English'. He finishes his book by saying that, to conserve biodiversity and to live safely, Australians need to manage our forests with fire 'willingly, frequently and, with practice, skilfully' (Jurskis 2016). Indeed, the evidence of contemporary land management failure is all around us, he says.

Bill Gammage is another expert in forestry. He was awarded the 2012 Prime Minister's Prize for Australian History for *The biggest estate on earth: how Aborigines made Australia* (Gammage 2012). In this book, which is based on extensive research, Gammage argues that the use of fire was a universal management strategy across the Australian landscape, making it appear to newcomers as 'park-like' or 'like a gentleman's estate'. Brown (2015) considers that this would have taken centuries of stable fire management. Justin Leonard, lead researcher in urban bushfire design at the Commonwealth Scientific and Industrial Research Organisation (CSIRO), adds that 'there's a way to live in every part of the landscape' based on 'understanding what fire is in that location' (King 2016).

Steffensen works to empower local communities with traditional fire knowledge so that those most affected by major bushfires can mitigate them best. He considers that a cool fire does little damage to plants and animals. The burning takes place early in the fire season before the country is fully dried out. At this time of the year, fire may need coaxing and gentle persuasion to do its work.

One of Australia's favourite fire prevention measures is prescribed or controlled burning – using carefully controlled fires to clear out flammable materials. We're almost obsessed with it.

At my new property in the south-eastern coastal district of Australia, a region new to me, the ground dried out quickly in my first summer there. I was alarmed by the cracks in the soil. Lots of smaller animals, I learned, use the cracks to escape the heat of the sun and also, of course, potential fires. Bigger animals like wombats have holes into which they can go and other animals, like koalas, can wait high in the treetops. Cool fires travel slowly, and animals like kangaroos know how to run through the cool front of the fire, from the bit yet to be burned to the area already burned. Horses also take this approach.

Australian researchers, however, do not necessarily agree that increased cool burning will stop the damaging wildfires across Australia. One of Australia's favourite fire prevention measures is prescribed or controlled burning – using carefully controlled fires to clear out flammable materials. We're almost obsessed with it. Indeed, it seems that the outcome of every major inquiry into major fires is that we need to do more of it. The 2009 Victorian Bushfires Royal Commission (2009) that followed Victoria's 2009 Black Saturday fires recommended that 5% of all public land in Victoria be treated by controlled burning per year – a doctrine that was subsequently dropped due to its impracticality.

Research published by Furlaud et al. (2017) modelled thousands of fires in Tasmania and found that nearly one-third of the state would have to be burned to effectively lower the risk of bushfires. As such, the question of how much to burn, and where to burn, is a puzzle we must still solve, especially given the inherent risk, and the issues caused by smoke, and shrinking weather windows for safe burning due to climate change (Furlaud and Bowman 2017). Other researchers have worked with data collected from real fires:

> Fifty years of real data, not modelling, from Western Australia shows that the extent of high intensity wildfires is inversely proportional to the area of prescribed burning during a few years beforehand, irrespective of variability in climate and weather, provided that at least about 12% of the landscape is burnt each year (Jurskis, personal communication, 5 July 2018).

Mistakes in analysis that lead to concerns about intentional burns (and thus allow the fuel loads to accumulate unchecked) can be very costly in terms of flora and fauna biodiversity, human and animal lives, and the constructed environment. Many researchers have tried to explain the role of cool fires. It is not a simple exercise: natural fires, perhaps started by lightning strikes, burn fast and hot when they have a good supply of fuel, including dry understorey plants and debris from the canopy. The fuel available itself depends not just on how long it has been accumulating but also the nature of the soil. Establishing the many relevant factors scientifically means being able to compare before and after circumstances over a long period and in many different and variable locations. A single unique set of factors is very unlikely to be able to be generalised effectively. Multiple sets of factors are not easily determined in ways that make for accurate generalisations. In fact, researchers are confirming that fires are somewhat idiosyncratic and unpredictable.

Cool burning and culture

Steffensen says that recently, because his people could not access the plants they need for cultural practices and because they get very frustrated about not being able to burn their land, the movement to think harder about these issues has started. Now, with years of practice, Steffensen's demonstrations and explanations are very persuasive (see, for example, Steffensen 2017). Caring for country is a cultural practice for traditional Indigenous people. Cool burning was just another cultural practice, and this suggests that younger Indigenous people would accompany Elders undertaking a burn many times before being left in charge of it themselves. Cultural practices are often documented orally in stories. The characters, such as the fire itself, the undesirable plants that are destroyed and the plants that are promoted, all have roles. The attraction of the poetic language and imagery surrounding this highly subsidiary approach to land management, is strangely disarming. Steffensen tells us that cool fires help heal the land.

In the past, Indigenous people have explained to me that cultural stories contain deep knowledge that is shared at the right time, with the right people, in the right place. Young people are shown key cultural practices when they are ready, but the repetition of stories enables them to take in the knowledge being shared. The repetitive nature of the story is a reminder of a practice that is already known intuitively, like an aide-mémoire.

Cultural practices can be hard to define in general terms. People often are prompted to act in a particular way in a particular location. Their actions are often based on intuition rather than following a fixed recipe. Intuition can be hard to learn and evaluate. Very often, outsiders without the local intuition can find it hard to learn through observation alone.

Governments are now accepting the research and listening to Indigenous voices, acknowledging that for millennia Indigenous people have managed the land using fire and that they have maintained a high level of biodiversity. Researchers such as Gammage, Jurskis and others point to a rapid decline in the health of Australian landscapes in recent centuries. They agree that the 'recipe' for cool burns is not simple or generally applicable, and that different conditions warrant different action. At this point in the debate, however, there is not wide agreement about what exactly constitutes effective cool burning, or what factors need to be considered, or how to do it on every occasion. The complex nature of the many combinations of factors makes modelling, a significant scientific method, very difficult.

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Conclusion

What is there to learn from all this about fires and caring for country? Well, for a start, in content terms, let's be sure that we are talking regionally and, preferably, very locally. This means supporting real subsidiarity in decision-making about land management. Whatever is learned for use in one context is not necessarily going to be useful in another. Different regions in Australia have been classified according to best guesses about what Australia might have been like pre-European settlement. Today, landscape-scale differences exist, but they are new differences that have resulted from a different set of causes, including misunderstanding about the nature of the countryside.

To combat fire risk in the Australian landscape, we must take a multipronged approach that includes innovative local strategies, such as designing new spatial patterns for prescribed burning, manually removing fuels from areas in which prescribed burning is not possible, improving the standards for buildings and defensible spaces, and most importantly, engaging the local community in all of this.

> Only by attacking this problem from multiple angles, and through close collaboration with the community and all levels of government, can we effectively face our fiery future (Furlaud and Bowman 2017).

Today, a major constraint that severely and appropriately inhibits the initiation of any kind of fire is related to risk management. The cost of insurance is exorbitant and it is sometimes hard to convince people that fires are good! There is, however, more to learn about cool fires from Indigenous people. This means spending time with Indigenous Elders. These learnings can also differ significantly across different Indigenous cultures. Australian Indigenous people have shown themselves to me to be custodians of caring for country knowledge. In the wake of Australia's disastrous bushfires in 2019–20, these voices are increasingly being heard. Indigenous culture provides for the dissemination of such knowledge by word of mouth or demonstration, but usually, it is only shared to someone suitable to take on the responsibility of maintaining it or passing it on.

Such knowledge is often protected, and can be preserved in stories that could be mistaken as being designed to convey all the knowledge. Learning to learn from others employing different epistemologies and pedagogies takes as much time as learning the content to be conveyed, but is frequently well worth the effort and time.

Landcare, like all newcomers to the management of the Australian landscape, has yet to discover how those who have inhabited Australia for thousands of years can help with caring for our shared country. There is no clear method for this task, but it must be undertaken.

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Photo: NZ Landcare Trust

CHAPTER 22

The contribution of landcare towards gender equity: the accidental equaliser?

Jayne Curnow and Mary Johnson

Abstract

The principles of landcare do not explicitly address gender inequality, nor are the practices of landcare primarily designed to attract women in equal numbers to men. Yet landcare presents a more level playing field that consistently disrupts patriarchal norms in various country contexts. Landcare provides an enabling context for women to participate more fully and to take up leadership roles. Was this deliberately orchestrated by Joan Kirner and Heather Mitchell-Carmichael, who created the highly successful Australian Government Landcare program?

In analysing the trajectory of landcare, one contributing factor is the conceptualisation and practice of landcare being conducted primarily in the realm of community. Community is a space where the gendered roles of women and men intertwine with greater ease than private spaces, where the roles of women are more pronounced, and the public space, where men tend to dominate. The community locus of landcare is spatially grounded in a defined landscape and sphere of influence, and hence is irrefutably place-based. This immutable link to place is conducive for increasing the visibility and recognition of women's talents and unremunerated labour and offers women a segue to public roles.

Introduction

The dominant vision of a farmer, or indeed anyone pursuing a life on the land or conducting business in a natural environment, has been constructed as inherently masculine. This image is consistently reinforced by the broader patriarchal social relations that pervade most societies. In Australia, challenging the norm of defaulting to the masculine is an ongoing project. When landcare emerged in the 1980s, it was in the context of a burgeoning phase of analysis and critique of the public–private realms of gendered activity. It was an era of new opportunities and new horizons for women. More women were gaining academic degrees as there was free access to universities. Women as the 'second sex' (de Beauvoir 1949) were well served by razor-sharp analyses that theorised and exposed the bind of women after the 1960s sexual revolution in treatises such as *Damned whores and God's police* (Summers 1975). Feminism was influential in the establishment of the rural women's movement and networks that proliferated across the country. At the same time, the publication of the seminal book *Silent spring* (Carson 1960), an expose on agricultural pesticides, changed global public opinion and prompted reconsideration of agricultural practices. In the early 1980s, one of the most dramatic manifestations of Australian land degradation were the dust storms, a consequence of groundcover loss and the devastating drought that impacted Australia. This stirred the environmental movement into action, along with a broader awakening interest in the impacts of farm practices on land, water and food production.

When landcare emerged in the 1980s, it was in the context of a burgeoning phase of analysis and critique of the public–private realms of gendered activity. It was an era of new opportunities and new horizons for women.

It is within this context that landcare took a quantum leap to be an Australian Government program that relied heavily on voluntary effort. Driven by two stateswomen from opposite ends of the political ideological spectrum – Joan Kirner from the left and Heather Mitchell-Carmichael from the right – landcare was elevated onto the environmental platform in Victoria in 1986, then nationally in 1989 under Prime Minister Hawke's Decade of Landcare. Landcare thrived in communities with more than one-third of rural households, and urban dwellers in cities becoming involved (Brown 1996:31). Feminist thought formed part of a critical thread of scholarship examining women's involvement in landcare (for example Beilin 1997 and Lockie 1997). More than 20 years on, we take the work of these scholars as inspiration for the reflections and analysis in this chapter.

As we skip forward to the 21st century, Australia has had its first female prime minister in Julia Gillard. Fiona Simpson is currently the first female head of the National Farmers' Federation. Patriarchal relations are still the default cultural norm in Australian public life; however, the tectonic plates of masculine hegemony are shifting. Increasingly, public and academic discourse is questioning these norms as being detrimental to women and men, many of whom seek more heterogenous, divergent forms of masculinity (Flood and Howson 2015).

Heather Mitchell-Carmichael (left) and Joan Kirner at Winjallok celebrating the tenth anniversary of Landcare in Victoria. Photo: Landcare Victoria Inc. archives.

The global #MeToo movement has shifted the private shame and damage of sexual assault onto the international agenda, paving the way for a renewed questioning of the tenets of the institutions that structure society to overwhelmingly serve and favour the dominant position of men. More broadly, the spectre of sexual and gender-based violence towards women is now firmly on the agenda. While not a formal theme, the impact of sexual and gender-based violence on agricultural livelihoods and productivity came up repeatedly in presentations and plenary discussions at the 2018 international conference, *Seeds of change: gender equality through agricultural research for development*.

Landcare in the community: equity beyond public and private domains

In this chapter, we argue that landcare, in no small but yet quiet and unassuming way, has made a significant contribution to making women visible and placing them on an equal footing with men in the landscape, associated public institutions and forums. This has not required feminist advocacy or protest action within or directly targeted at landcare. We make this argument at the macro level to investigate how landcare creates an enabling environment for equality. This necessitates the omission of a discussion of the inequalities that surely occur in landcare; that is a given in the broader context of structural and societal gendered inequity. The point is not to dismiss these occurrences, but to take this opportunity to fully explore how the structures and practices of landcare have apparently managed to foster equality, without an intentional or systematic strategy to do so.

While so many other organisations and groups grapple with entrenched sexism that maintains persistent barriers to women's leadership, access to resources and equal benefits from policies and legislation, Landcare has quietly been achieving gender equity that it never explicitly set out to achieve. Research conducted in south-west New South Wales, Australia, in the 1990s found that Landcare was the only local agricultural organisation that did not have a significantly gendered membership skewed towards males, 'offering women an acceptance and legitimacy denied to them by other farm organisations' (Lockie 1995). 'Women farmers find that they have a voice in local agricultural meetings for the first time' (Brown 1996:31). Landcare organisations were also more likely to have women in professional roles than 'traditional' government extension services. Campbell contrasted the 100 or so nationally funded Landcare facilitators, many of whom were women:

> pioneering a new role in which they are expected to use communication and facilitation skills, with an emphasis on process rather than content', with 'their regional bosses and other colleagues, groups consisting overwhelmingly of male agricultural science graduates … in a system dominated by the linear technology transfer paradigm … in which scientific rationality is pre-eminent, and the traditional notion of community consultation is a public meeting to announce departmental policy to anyone who turns up' (Campbell 1994:206).

Landcare is conceptualised as a group endeavour, enacted through community relations by and for the benefit of the community, at the intersection of gendered public and private realms. Here we will borrow and extend an analytical framing of women's labour in international development to put forward the proposition that one of the reasons Landcare has been so successful in attracting both women and men is its location in the realm of community. It is here that women and men are more easily able to interact beyond the norms demarcating the private as feminine and the public as masculine. The expertise, labour and multiple other contributions of women are more visible and hence can be valued in community spaces.

While heterogeneity abounds, there is a clear, dominant pattern of undervaluing, discounting or simply ignoring the labour of women in most societies. Since the 1980s there has been a strong movement to recognise and value women's labour, notably through the work of Waring (1988) and others who questioned why women's work was not counted in national gross domestic product data. Beyond gross domestic product, how do we account for the informal and unremunerated work of women? How can women's roles be fully recognised and valued? As the COVID-19 virus rages across the globe, data on how women are disproportionally and negatively impacted by the pandemic is pouring in from Australia and across the globe (for example, Burki 2020; McLaren et al. 2020; Yildirim and Eslen-Ziya 2021). It is clear that social systems are ill-equipped for gender equity in good times and, unsurprisingly, this is exacerbated in bad times.

One way of illuminating women's unpaid economic contribution is Moser's framing of women's labour into three distinct arenas: reproductive, productive and community (Moser 1993). Reproductive labour includes childbearing and rearing, and the full gamut of domestic duties that maintains and cares for men, other women and children. Productive labour includes work for payment in cash or in kind. This may be performed in the formal or informal sector and includes subsistence activities, such as food grown for direct consumption. In the community arena, Moser differentiates between women's unpaid, informal roles in the provisioning and maintenance of local social relations and community resources, and men's remunerated formal organising and political roles in the community.

Landcare provided a new dimension to the realm of community that valued the normative roles of women and men, while providing new opportunities for women to take on more organising, leadership and political roles in the community alongside men. It is at sites of community that the principles and power of landcare manifested as an accidental equaliser in gender relations.

Place-based: location, location, location

The practice of landcare is a grounding exercise – recognising and legitimising the relationship of the individual to a specific physical environment and other people in that area. A sense of place permeates all aspects of landcare and the identity of landcarers. 'Place-based' as a construct assumes a geographical context that can be understood in terms of its social, cultural, political, economic and institutional characteristics, and the interactions of people therein. Place influences how individuals and groups perceive the world through human experience, social relationships, emotions and ideas.

A place-based approach provides people with a framework for identifying and responding to local needs, including the social, environmental, spiritual and economic wellbeing set within a particular location. Landcare asks people to take a place-based approach: to start where they are, with what they have, without recourse to any higher authority or source. It encourages participants to value the contributions of all, both women and men, and often children. Indeed, adherence to landcare principles creates space for social inclusion beyond a gendered binary. Those who find themselves on the margins of public power and access to resources can also find a place that does not just enable but values and celebrates their contributions. For example: young people (Intrepid Landcare), Aboriginal people (Ginninderra Catchment Group) and people living with disabilities (Nature Freedom). Place-based approaches also legitimise participation in landcare of 'other' types of farmers who may have been (or felt) excluded from conventional extension activities, such as 'hobby farmers' or 'lifestylers' (Campbell 1994:257).

Landcare is strongly local and based on the strength of human relationships mediated in the community sphere by a shared interest in the land or seascape. That said, the global spread and replication of landcare since the 1990s has been facilitated by more affordable air travel, mobile phones and internet linking people and organisations. The physical settings are unique but, in each instance, the common thread is people's commitment to each other and care for the environment. The landcare style of commitment brings women and men together to focus on commonalities and navigate mutually beneficial outcomes. This is in stark contrast to the cyclical building and maintaining of gendered norms and hierarchies of power that require a sustained focus on biological and socially constructed difference.

Gender equity and subsidiarity in landcare

The apparatus of the Australian Government, and many democratic nation-states, is structured around top-down hierarchies of power modelled on patriarchal military structures. A place-based orientation of governance, such as that set up by Kirner and Mitchell-Carmichael for Landcare, provides a framework for multiple sites of power in the service of the individual and the local. This is the heart of the principle of subsidiarity as defined by Michael Seigel in Chapter 3. The policies and programs of the Australian Landcare program dispersed and shared power with a focus on community control of

community affairs. Kirner and Mitchell's polycentric structure provided entry points for numerous women to incrementally broach the private–public divide on the middle ground of community. It brought a mechanism of subsidiarity into rural homes and towns that served the agency of not just male but also female individuals. The largely undervalued productive and reproductive labour of women came into view, albeit as the backdrop of their community landcare activities. With visible positions in the community, acknowledged in the public domain as being on an equal footing with men, women had a platform that attracted social capital beyond the private sphere.

Landcare presented an opportunity for women to not only have a voice, but to be heard; to make choices and decisions that influenced the allocation of public resources. Landcare became the accidental equaliser, providing women a segue into the domain of public discourse and power. A pathway emerged that enabled women to draw on intra-community bonding capital to build bridging capital and inter-community networks. This did not occur in isolation. Change was afoot in other dimensions of gender relations. The rhetoric and representation of the quintessential Australian farmer as male was being challenged. In 1994, women were afforded recognition as farmers in law. Prior to this, the permissible legal status of women who worked on the land was to be described as unproductive silent partners, domestics, helpmates or farmers' wives.

Landcare presented an opportunity for women to not only have a voice, but to be heard; to make choices and decisions that influenced the allocation of public resources. Landcare became the accidental equaliser.

Over the past decade, there has been a groundswell of youth-led campaigns to address global challenges such as climate change (Greta Thunberg), gender equality and social justice (Malala Yousafzai) and human rights (Manu Gaspar). A new generation of landcare leaders are emerging as Landcare groups, networks and supporters invest in the future through youth initiatives. One Australian organisation, Intrepid Landcare (see Chapter 27), has focused on building teams of skilled youth and volunteer facilitators through leadership development programs. Intrepid has also conducted conversations between youth and elders where ideas and experiences are shared. Emerging from these conversations has been 'a depth of connection with others and a sense of belonging across the community' (Lee et al. 2020).

The Intrepid Landcare example of intergenerational interaction shows that landcare can create a space where conversations, reflection and learning occur within a community of practice. These social transactions are used to accompany meaningful interaction, where the past can inform the future, yet past practice can also be challenged. This space is where participants develop a strong relationship to the social construction of knowledge and a collective sense of purpose is created. Engagement between generations and cultures becomes the precursor for effecting change, the transfer of explicit and implicit knowledge and where serendipitous opportunities present. Importantly it is a space where societal matters such as gender equity can be explored.

Conclusion

In many of its incarnations, Landcare provides equitable opportunities for participation and leadership by both females and males. Without any dedicated effort, women made up 50% of delegates at the 2018 Australian Landcare conference (Landcare Australia 2018). That said, the broader operating environment is still predominately patriarchal. In Australia at least, a farmer is still most frequently imagined to be male. The Australian Research Council recognised this disjuncture and funded The Invisible Farmer project, which is working to address this bias in perception and representation (Forge and Dale-Hallett 2015). This and other initiatives to foster equity and to eliminate gendered discrimination are all parts of an ongoing process of change.

This chapter has been informed primarily by the Australian experience of landcare. However, the concepts – place-based, community-driven and subsidiarity – are understood and enacted by numerous societies across diverse geographic and political settings. These concepts and the principles of landcare have created an enabling environment for women's participation, the recognition of their roles in reproduction, production and the community, and increased gender equity. Beyond the position of women that has been our focus here, dialogues that promote mutual interests and that identify common priorities, partnerships and principles for cooperation have always been present in landcare. The facilitation of intergenerational conversations encourages futuristic thinking, while simultaneously tapping into elder wisdom, knowledge and experience. Landcare's platform also arranges the operating space that enables social inclusion and civic participation, and allows for independent advocacy and the identification of dominant interests, which can then be more accountable and engaged.

The spectacular achievements of the Landcare program and its enduring presence, despite the winding back of Australian government support, also begs the converse question posed in this chapter about the contribution of landcare to gender equity. How much of the success of landcare is because of the opportunity and greater equality it affords women? What would landcare look like if it had been skewed towards male interests, as so many programs are? What can this teach us about how much more successful other programs can be when founded on gender equity?

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CHAPTER 23

Landcare: leveraging the opaque to build resilience

Pip Job

Abstract

This chapter is an opinion piece, full of observations from 12 years of my experience in various roles in the landcare sector in Australia and more widely. Through this chapter, I aim to explore landcare as a great example of subsidiarity in action and discuss what can be achieved at a local level. The landcare movement brings a solutions-oriented view to the world. It shows that when community members come together around a shared vision, their resilience will be significantly enhanced. Overlay this with leadership, social fabric and a holistic approach to managing environmental, economic and social dynamics, and I consider that landcare provides a very formidable partner, influencer and change-maker. Adopting landcare's somewhat opaque elements and qualities has the potential to provide governments and communities across the globe with a tremendous return on investment when applied to complex problems. We can leverage these opaque elements to achieve better community outcomes.

Landcare as an integrator

When we think of environmentalism and conservation, we tend to think of 'green' issues. If we think of agriculture, it's generally described as 'brown'. But when I think of landcare, it's a lovely shade of khaki. It's green and brown together, blended, intricately connected.

There are parts of the landcare concept, however, that are less tangible and harder to quantify. I see these as the opaque elements of landcare. Let's take a closer look at these opaque elements and the value they bring in making our people, families and communities resilient and robust as part of the landcare ethic. I have loosely grouped these opaque elements into three areas of thinking: social fabric, leadership and holistic thinking. Many of these opaque elements are covered elsewhere by authors such as Curtis and van Nouhuys (1999), Sobels et al. (2001), Cullen et al. (2003) and Henry et al. (2017).

Social fabric

Landcare institutions, especially the larger networks of Landcare groups, generally have a high level of governance and are well respected within their communities. These groups are an integral part of the social fabric of a community and individuals, and communities often feel a strong sense of pride and ownership in their Landcare group.

Landcare can bring people together across a wide variety of themes, expanding the circle of interest across a community. I recall an event hosted by the Little River Landcare group called Breakfast with the Birds. This organised field trip saw farmers rubbing shoulders with hardcore conservationists, urban community members and people they may not have crossed paths with on a normal day. They all came together to appreciate birds and enjoy a wholesome breakfast. Landcare brings people together.

Landcare in larger regional communities creates the opportunity for the urban community to reconnect with nature and feel ownership for their local environment. In Dubbo, in the central west of New South Wales, Australia, city landcarers often frequent the banks of the Macquarie River while undertaking bank restoration projects, planting trees and transforming the vein that runs through the heart of the city. Families of all ages mix with people from all walks of life, joined by a common cause. Landcare connects people.

The level of trust and respect that the community has for its local Landcare group should never be underestimated.

Connectedness is an essential ingredient of the social fabric of communities. In regional communities, Landcare groups are the conduit for social cohesion and belonging, and they provide a safe place for social interaction during workshops and events. Landcare has an inclusive culture that brings people together regardless of their age, race, culture and gender. As an example, the Little River Landcare group ran a workshop to coincide with World Environment Day to encourage the more senior citizens in their community to share their local stories, all as part of collecting the oral history and anecdotes of the region. Residents of the local aged-care facility thrived under the opportunity to be part of Landcare for the day, weaving their history into the tapestry of the future.

People trust Landcare, especially its local staff and volunteers, and they want to be engaged in what Landcare is doing. The level of trust and respect that the community has for its local Landcare group should never be underestimated.

Just prior to my time as CEO of the Little River Landcare group, I sat in a community meeting where the group committee informed the community that they had decided to shut the group down, following major changes to funding structures in 2010. There was a critical turning point during this meeting. A former chair of the group and dedicated member patiently listened to the committee present their views and reasoning for the proposed closure. He waited for his time to stand and share his view. In his wise words, he stressed the value of Little River Landcare as the social fabric of the community. He said that in a time when many other leading community groups had closed, Little River Landcare provided much more than field days. It provided a diversity of interaction points for the community, and this is what the community valued. A representative from another Landcare group then said that other Landcare groups looked to Little River as leaders – if we couldn't do it, nobody could.

This meeting was a turning point that resulted in a number of changes, including leadership, the organisation's goals and a deeper understanding of the value of the group, which came from listening to the members. I am proud that today, the Little River Landcare group is still operating and running strong many years later and that these wise words about social fabric created a different outcome.

Leadership

Landcare can provide leadership during adverse conditions and times of stress and pressure. This can be during natural disasters or even during farm biosecurity threats. This is often the case where other forms of community leadership are not strong or are non-existent. During an anthrax occurence in the central west of New South Wales – a time when landholders were scared and untrusting – people looked to the Landcare group for help in breaking through the community resistance concerning the issue that was being experienced. Landcare was able to achieve desired outcomes in increasing on-farm livestock vaccinations and incidence reporting.

More recently, in New South Wales in 2017, an extreme bushfire burned out more than 37,000 hectares, destroyed nearly 30 farming homes, sheds and equipment, and caused livestock losses in the order of 7,000 head. The local Landcare community surrounding the Sir Ivan fire zone helped connect with impacted farmers to determine their support needs and how they could receive aid in a strategic way. This was, of course, because Landcare had localised knowledge, existing governance and tremendous respect and trust within their community.

Leadership is also key to problem-solving. Landcare can be a spontaneous organisation, addressing the needs of the community in an innovative way by looking at the problem from a solution-oriented angle. Sometimes this means Landcare embarks on solving issues it has never dealt with before. Landcare can look at problems from different perspectives and overcome barriers through an organic and spontaneous approach to local issues.

A good example is when the Little River Landcare group addressed mental health and set a goal to not lose a single member to suicide during the Millennium Drought. We embarked on an ambitious endeavour to break the stigma around mental health and give the topic a voice so that everyone could normalise their understanding of this serious health issue. As a group, we had no preconceived ideas about how mental health should be approached

and we had very few connections with mental health experts to tap into. Within months, we were planning a community day with guest speakers from Beyond Blue (a mental health advocacy group), local farmers who shared their personal mental health stories and a variety of support groups who attended as stallholders. More than 300 people attended what was an emotional day, with both tears and laughter.

This event initiated a wide range of initiatives, including mental health training. We developed a mental health peer support structure and did regular mailbox drops reminding people to be watchful of their own wellbeing and those around them. We advocated for a mental health expert to visit the community every month, and established a network with trusted individuals across the community who could drop in on people who needed someone to chat with.

As leaders, we weren't deterred by venturing into areas in which we had no knowledge or experience. We saw an issue in our community and found solutions. The loss of a single member to suicide was not negotiable.

The Little River Landcare group … set a goal to not lose a single member to suicide during the Millennium Drought. … We weren't deterred by venturing into areas in which we had no knowledge or experience. We saw an issue in our community and found solutions. The loss of a single member to suicide was not negotiable.

Holistic thinking

Landcare in Australia is increasingly moving towards the triple-bottom-line approach and endorsing practices and programs that encompass environmental, economic and social outcomes. This is resulting in Landcare being engaged by industry groups that are developing industry sustainability frameworks. In 2016, I sat on the steering group that formed the first Australian Beef Industry Sustainability Framework and I was very proud when Landcare was identified as a key stakeholder during the consultation phase. Landcare is demonstrating its professional integrity and leadership in this space. Young landcarers now regard their involvement in Landcare as giving them skills, capabilities and experience and helping them along a career path. Many employment opportunities in the sector have been created through initiatives such as the NSW Government's $22.4 million investment in 2019 to fund 84 Landcare coordinator roles (Landcare NSW n.d.). The skills developed through Landcare, such as community consultation, stakeholder engagement, project management and problem-solving, means that landcarers are eagerly sought for their skills. Landcarers make excellent employees across the private, corporate and public sector because they are customer-focused, passionate individuals with tremendous purpose.

Landcare cutting through the red tape

There is an additional opaque element worth mentioning: red-tape reduction. An important element of the Landcare model is its ability to reduce red tape between funding bodies and the land managers who undertake projects. This helps to increase engagement and participant satisfaction. This is often undervalued, but it reflects the key role Landcare can play as a crucial conduit, especially for government bodies that are rolling out funding programs with complex reporting requirements. As Landcare builds as a professional non-government organisation model and moves into the social enterprise world, its governance structures and delivery capacity will also be enhanced.

An example of managing red tape occurred during my time as CEO of Little River Landcare. We secured funding for a $1 million program targeting biodiversity hotspots and looked closely at how we could enhance our engagement to maximise the environmental outcomes of the program. Many natural resource management programs are rolled out with the primary producer outlaying the costs initially, and seeking reimbursement or receiving funding in part payments. Instead, Little River Landcare set up a corporate partnership to supply its members with bulk loads of fencing and water reticulation supplies. This meant that the work could be completed when they had time to do it, rather than only when they had sufficient financial resources. At this time, the region was recovering from the Millennium Drought and landholders had eroded their farm equity to survive. The corporate partnership enabled us to negotiate the cost of the supplies and achieve cost efficiencies, and the cumbersome elements of the funding agreement didn't need to be passed on to the farmers. As a result, we delivered even more kilometres of fencing than anticipated – on time and within budget! Everyone was happy!

Conclusion

Landcare is a great example of what can be achieved at a local level with a solution-oriented approach. When community members come together with a shared vision, their resilience will be significantly enhanced. Overlay this with leadership, social fabric and a holistic approach to managing environmental, economic and social dynamics, and this makes Landcare a very formidable partner, influencer and change-maker.

Never underestimate Landcare. Its opaque elements offer a tremendous return on investment. They may be the hardest parts to quantify, but just because it may be a little difficult, it doesn't mean they don't exist.

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Photo: Andres Arnalds

CHAPTER 24

Knowledge and progress: building bridges to empower community action

Andres Arnalds, Jonina Thorlaksdottir, Brian Slater and Fred Yikii

Abstract

This chapter examines the concept of participatory knowledge management in research, monitoring, evaluation and planning. The goal is to enhance progress in caring for the land. We draw on experiences from community-based approaches in Iceland, stakeholder viewpoints from Africa and Central Asia, and considerations from literature on efficiency of both knowledge generation and utilisation. The chapter further discusses conditions that need to be in place to strengthen knowledge gain and adoption, founded on the emerging principle that knowledge is most effectively applied when it is jointly produced by experts and the potential participants in decision and action. Building stronger bridges between the worlds of science and community boosts capacities, with benefits extending much further than implied by the knowledge gain itself, especially in terms of awareness, environmental literacy and advancement of skill in various areas of caring for the land. Such a paradigm shift has the potential to generate knowledge and facilitate effective action across elevated scales and at lower cost than through conventional approaches.

Introduction

Over many decades, massive investments have been directed towards conserving and restoring ecosystems worldwide. However, challenges are still mounting, with land degradation caused by human activities undermining the wellbeing of two-fifths of humanity, driving species extinction and intensifying climate change. Land degradation is also a major contributor to mass human migration and increased conflict (IPBES 2018). The tasks ahead are both large and complex and require transdisciplinary approaches to develop solutions that must meet a wide range of (often conflicting) goals.

The global agenda for sustainable development towards 2030 rests to a large extent on socioeconomic, political and cultural foundations. Among issues that need to be elevated are active community participation and fostering of environmentally responsible behaviour among a broader range of stakeholders. One should 'never doubt that a small group of thoughtful committed citizens can change the world; indeed, it is the only thing that ever has' (a quotation widely attributed to Margaret Mead).

The importance of community action as a key element in caring for the land was highlighted during the First International Conference on Landcare Studies held in Nagoya, Japan, in November 2017. Speakers clearly demonstrated that decisions made by individuals and communities at the local level are a major determinant of land health and thus the quality of the diverse ecosystem services they depend on. The conference illustrated that community action and collaborative learning, meeting multiple goals and expectations, is a key factor in creating enabling conditions for improving environmental sustainability.

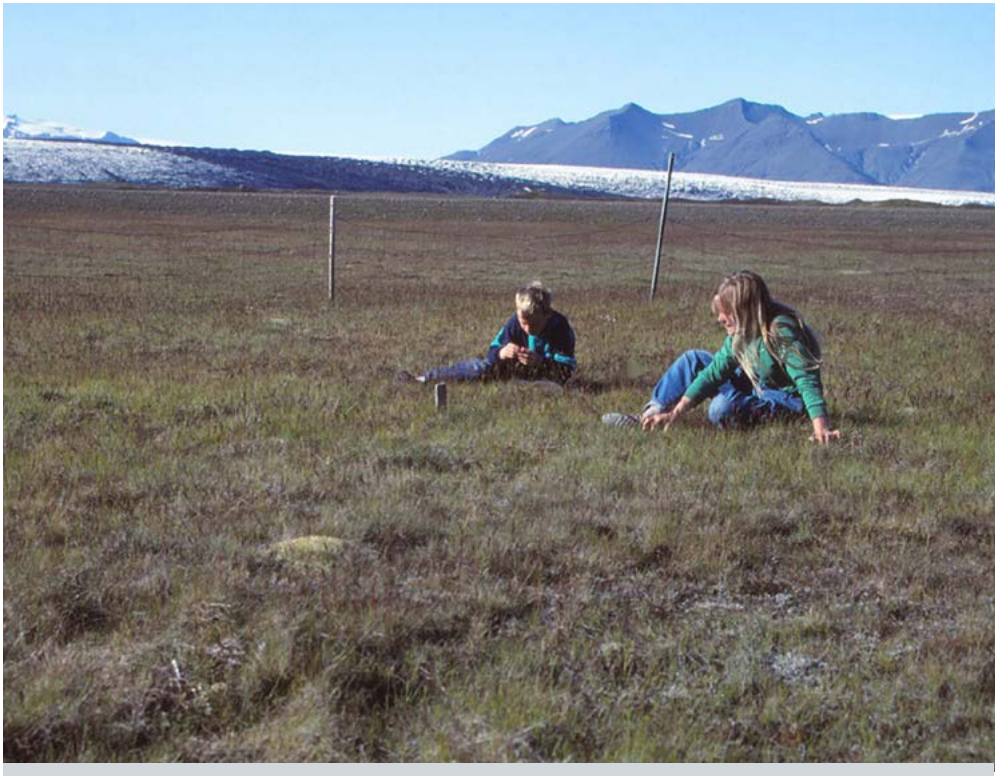

Photo: Andres Arnalds

A constant flow of knowledge and empowerment needs to exist, leading to the environmental awareness, ethics, land literacy and management skills that are among the pillars for responsible action. These principles have long been recognised, but where do we stand in terms of action? Why is land degradation still an alarming problem globally despite massive investments in research, knowledge, management and mitigation efforts over the years?

Part of the explanation may rest in lack of recognition of the role of proper activation mechanisms for community-based action, cross-fertilisation of ideas, experience sharing and co-production of knowledge in advancing the mindsets that environmental stewardship rests on. Inefficient knowledge management systems may be slowing down progress, as relevant knowledge is too often lacking, inaccessible, or not utilised for various reasons (Yikii 2009). Even the knowledge that exists may not be integrated into systems that can support decision-making and action (Thorlaksdottir 2015). This persistent gap between the generation and the utilisation of knowledge may in many countries be among the key barriers to better environmental management. Democratisation of knowledge is fundamental for increasing efficiency in management for environmental sustainability. To reach such goals, various roles in the generation and management of knowledge need to be revised, forging stronger links with community involvement and empowering change.

Why is land degradation still an alarming problem globally despite massive investments in research, knowledge, management and mitigation efforts over the years?

The main purpose of this chapter is to examine the concept of participatory knowledge management in research, planning, monitoring and evaluation, with a view to enhance progress in caring for the land. This includes asking the following questions:

- What kind of conditions need to be in place to foster the co-production of knowledge, advance social learning and form bonds between groups such as researchers, professionals, farmers and communities?
- How can participation further help in advancing our understanding of the needs of the land, fostering land literacy, awareness, environmental ethics and the skills connected with adaptive co-management and effective policy formation?
- How do we gain greater recognition of the fundamental importance of participatory approaches in the process of generating knowledge for progress?
- Is a paradigm shift in applied research required to build stronger bridges between knowledge and action?

The value of participatory knowledge management is purposely highlighted here, influenced by the authors' own experiences. It is important, however, to keep in mind that the appropriateness of such approaches spans a broad range of scales depending on the circumstances.

The need for a new paradigm in knowledge management

The roots of inefficiency in caring for the environment are many and complex. However, there is growing evidence from both literature and undocumented experience that current knowledge management systems lack efficiency in many aspects, especially in terms of linking knowledge and action for progress.

Conventional approaches to knowledge generation rely to a large extent on research conducted within the domains of formal research institutions such as universities and other public agencies (Green and Mercer 2001) or by scientists practising within the private sector. Interaction with potential users of the generated knowledge tends to be low and incentives for them to participate weak. Even in studies where communities are involved to some extent, such as when information is obtained through surveys, it has been claimed that while science and personal strength of the respective researchers may be advanced, the collaborators may commonly receive little benefit (Blumenthal 2011).

Scientists tend to generate knowledge in isolation (Asenso-Okyere et al. 2008) and research funding is often insufficient in key areas needed for better understanding principles behind conservation, management and restoration by a wider range of stakeholders. Without proper contact with the potential users, some of the knowledge becomes irrelevant or low impact, regardless of its scientific quality. A further drawback of such approaches is that, with weak linkage to the massive experiential and Indigenous knowledge available and the knowledge generation power at the grassroots level, important user needs are not satisfied.

This adds to concerns related to the conventional model that the publication of scientific papers as the main means for dissemination of research findings and common extension systems tend to be passive. There is an inherent inefficiency in bridging knowledge, attitude and action. This model assumes linear relationships between knowledge and action (that is, one step leading to the next). However, when it comes to the foundations of environmental sustainability, as elaborated by Monroe et al. (2000), there may be a weak cause-and-effect progression from knowledge to attitude to behaviour. The reason is that, although people may have good knowledge about the issues of concern to them, this might not be enough to affect their behaviour. The pathway of translating knowledge to action is complex and has an array of limitations, such as land policy, lack of technological access or insufficient economic options to engender environmentally sustainable behaviours.

In their guide to funding and managing applied research, *The getting of knowledge,* Campbell and Schofield (2007) discuss the importance of research for enabling change, solving problems, developing opportunities, supporting innovation and building new knowledge. To succeed, one should no longer 'simply fund the research and hope that someone will adopt or extend the results' (Campbell and Schofield (2007:46). In their view, a more targeted approach would be to involve the users of knowledge at all stages from defining the problems, selecting topics, designing research questions, participating in the research, disseminating the findings and deciding on continued programs. It should be recognised that inefficiencies portrayed by lack of adoption may be more representative of a failure within research and extension than a fault on the practitioner's end.

Research efficiency: stakeholder viewpoints

The need for a new paradigm with a focus on improving research efficiency is strongly reflected in viewpoints presented by United Nations University Land Restoration Training Programme (UNU-LRT) fellows from 13 countries in Africa and Central Asia who attended the GRÓ Land Restoration Training Programme in Iceland. Exploring the state of research and uptake of knowledge in their countries, they represented a broad range of disciplines, such as research, teaching and lecturing, policymaking, extension, knowledge brokering and facilitation, and on-ground project management at district and local levels (Arnalds 2019).

Commonalities in their views include the issue that top-down approaches often overlook the voices, existing knowledge and needs of the communities in question. Regarding efficiency of knowledge use, they expressed a tendency for low appreciation of the role of research, and that duplication of research was common. In addition, a clear gap seemed to exist between research and farmers. Faulty links between research and extension were mentioned as major factors limiting the flow of information, knowledge, useful new technologies and resources.

The UNU-LRT fellows stressed that research findings should be shared in a timely manner and be accessible and tailored to specific needs. They remarked on the diversity of target groups and the importance of appropriate language and presentation of results for the respective readers or audiences. This links with their experiences that scientific presentation may not be very appealing to people not well versed in such writing styles. They pointed out various means to make such writing more accessible, such as through advice outlined in the sarcastic paper *How to write consistently boring scientific literature* (Sand-Jensen 2007).

Among the challenges, in their opinion, were that the research agenda was often donor driven or determined by researchers with undue attention to needs and a lack of proper coordination between organisations. They felt that stronger emphasis should be on uptake and utilisation of research results in public policy, and that decision-making and application need to be ensured within the project planning stages. The fellows also emphasised the need to bring farmers and other stakeholders into research as partners to strengthen the connection between identification of research needs and development of solutions.

Knowledge for progress: different views of purpose

To increase the efficiency of both knowledge generation and use, an elaboration of four key questions may aid in the process. These are:

1. **What?** – Clearly defining new knowledge and prioritising research topics and targets as reflected in the views of prospective users.
2. **Why?** – The purpose of applied research and other knowledge generating projects in addressing such needs.
3. **For whom?** – Consider the often numerous and diverse key beneficiaries of the added knowledge.
4. **How?** – This depends on the answers to the preceding questions governing the project design.

Such an approach, while also recognising the importance of basic research and academic freedom, can have multiple benefits that need to be accounted for. This includes actual use of the generated knowledge, policy effects and returns from investments in research projects and programs, and success in terms of progress at the ground level.

It is also important to recognise at the early stages in the research cycle the potential factors that may interfere with effective mobilisation of knowledge to support decision-making for sustainable development. According to the extensive work of William Clark and colleagues (for example, Clark 2010), three such efficiency barriers may stand out:

- mutual incomprehension between scientists and decision-makers
- fragmentation of the knowledge system
- inflexibility.

These are further elaborated to include key factors affecting the ability of new knowledge to influence decisions, such as perceptions on whether the knowledge was credible (Is it true?), salient (Is it relevant?), and legitimate (Is it unbiased, respectful and accountable?). Scientists and practitioners commonly have different perceptions of problems, solutions and what constitutes reliable knowledge. New knowledge must be trusted by decision-makers and practitioners alike before it is allowed to influence their behaviour.

Part of the problem may also rest in different views of purpose. If potential users of knowledge consider themselves to be part of some undefined mass in separate silos from researchers, this obscures the purpose and targets of the research. It also makes it difficult to determine where on the scale from data to progress successful knowledge management should operate (Figure 24.1).

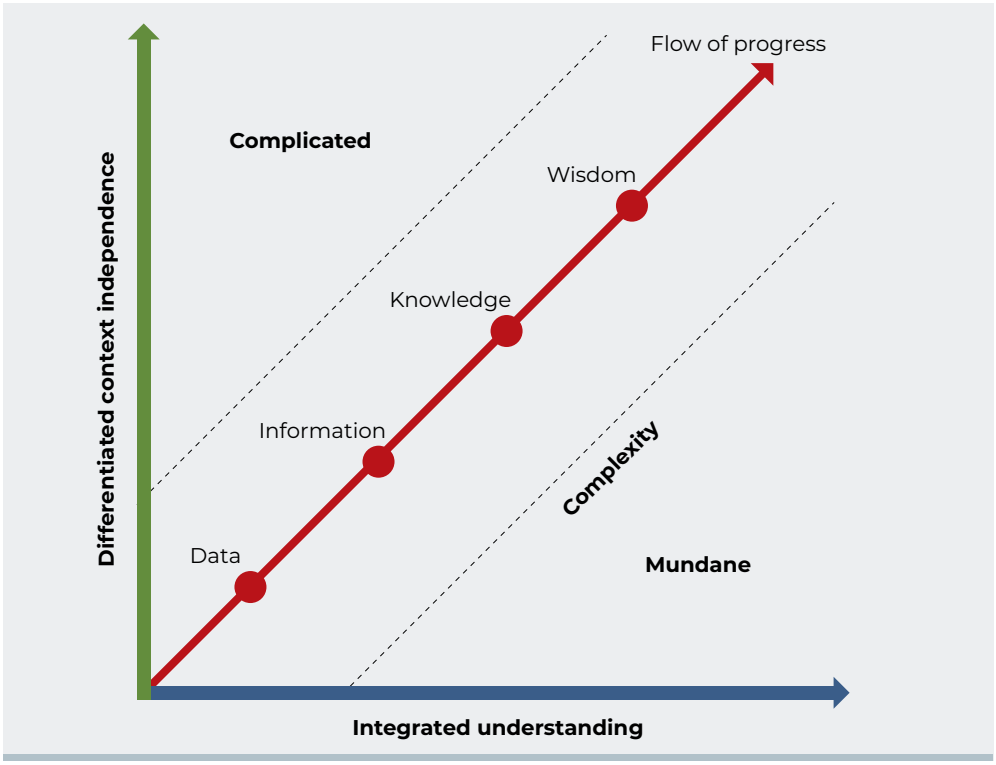

Figure 24.1 The role of context in understanding

Source: Bellinger G (2004) *Knowledge management: emerging perspectives*, Systems Thinking website.

Research: building the bridges

There is a growing awareness that collaborative learning approaches involving a broad range of stakeholders may hold a key to more effective adaptive management of environmental challenges. New learning approaches such as experiential, multi-loop, social, and transformational learning all involve aspects of broad participation of stakeholders across multiple scales (for example, Percy 2005; Armitage et al. 2009; Reed et al. 2010; Kolb and Kolb 2012; Medema et al. 2014). These partnerships have many names reflecting purpose, level of engagement and geographic area.

Such modes of research and knowledge management are gaining increasing attention as means to enhance more informed decision-making and practice. They represent a move beyond researching 'on' towards partnering 'with' participants and working together towards shared goals (building the bridges). Essentially this is a process of building new knowledge, which is generated and 'conceptually owned' by the participants themselves (for example, Oettle et al. 2014). There are almost endless possibilities when it comes to applicability and involving individuals and groups in generating information, developing understanding and new technologies, monitoring, evaluating, planning and aiding policy. Such involvement may also be regarded as a powerful tool to address emerging challenges resulting from conventional transfer-of-technology being inadequate for managing the complexity of issues affecting sustainable agriculture and natural resource management (Gonsalves et al. 2005).

Collaborative learning approaches involving a broad range of stakeholders may hold a key to more effective adaptive management of environmental challenges.

A collaborative process, one which aims to successfully involve all partners in research and include their broad area of knowledge management processes, needs to build on the unique strength that each partner brings to the table. In addition, it should enhance their autonomy and right for self-determination. However, there are many challenges to this task. Defining the scale of collaboration and moving the focus from simply gathering data towards a vision of practical purpose can be difficult. For those participating, new roles are assumed and the democratisation of knowledge changes existing environmental, economic and social relationships. A common base often becomes the nature of information, resources and technologies people need to better take care of the land (Moles 2008).

For the scientist, this means moving from solely being a provider of expert information or opinion based on research findings, to becoming an active contributor to achieving community goals by collective action. This also means that the act of identifying projects and posing of research questions is challenged by new players working together, guided by principles of sustainability and recognising the need for a long-range horizon. The need for stakeholder empowerment and responsibility also implies a moral or ethical right to shape the research agenda. Thus, to optimise research features and impact the public, researchers need to make sure they are asking relevant questions.

The power of local knowledge and experiential learning

Efficiency in knowledge management can in many cases be elevated by recognition of local knowledge, which is usually more extensive than documented sources may indicate. There is also a need to develop strategies to advance knowledge by tapping into the interest and power of many stakeholders in experimenting, learning and developing innovative, efficient and effective solutions. Such approaches span a broad range. At one end of the scale are observations of what stakeholders such as farmers are doing to improve land management and ecosystem conditions locally. This can strengthen the base for clarifying knowledge needs and subsequent research. At the other end are guided trials and experimentation in adaptive modes that can gradually build the foundations for more formal research explanations and verify the nature of such findings.

The potential of such informal collaborative modes in generating knowledge and stimulating further research and development can be illustrated by participatory-based knowledge development in Iceland. It further demonstrates the power of bridging divides between stakeholder groups by forming an adaptive learning process for all involved.

Around 1990, an Icelandic version of landcare started developing, inspired and influenced by Australian experiences. This change in conservation strategies gradually brought soil conservation in Iceland from a tradition of top-down approaches with little local involvement towards building bridges between farmers and conservation. The farmer–government collaborative program Farmers Heal the Land, operated by the Soil Conservation Service of Iceland, was established in 1990 and remains a flagship of soil conservation and ecosystem restoration within the country.

At the time the Farmers Heal the Land program was established, land restoration methods in rangeland environments were largely based on concepts from agronomy, with high input levels of seeding and fertilisation, and were too cost ineffective. New techniques were needed to aid large-scale vegetation establishment in severely degraded land. By visiting, observing and actively listening to farmers who had been independently trying low-input solutions, a more cost-efficient and ecologically relevant methodology was quickly developed, linked with scientific understanding available at that time. These techniques were strengthened and expanded by experiential approaches, like using a 'this is one big experiment' reply attitude instead of giving the revegetation farmers direct advice. Scientific experimentation has since refined and developed these methodologies further. Through such partnerships, a growing group of participating farmers was able to develop solutions much faster than conventional research approaches could have, at a lower cost and with methodologies tailored to a broad scope of local site conditions (Arnalds 2011).

Realising the potential of evaluation and monitoring

Participatory-based approaches in monitoring and evaluation have a massive range of benefits but vastly underutilised potential for application. The use of such methodologies has become highly relevant (for example, in the broad areas of assessment of land condition and trend, reporting on actions like revegetation, restoration of biodiversity and forestry, and in programs aimed at offsetting release of greenhouse gases by carbon sequestration). Participatory collaboration can lower costs, elevate knowledge generation and expand the impact of both monitoring and evaluation, all depending on how well the project design serves the purpose of such efforts.

The need for detail, choice of methods and level of community engagement is strongly linked to the fundamental questions of *why* and *for whom* the activity is carried out, just as in all other areas of knowledge management. Is the purpose primarily to add contributions to science or, as sometimes felt by farmers, to compile a database to fulfil documentary needs? Is the data collection intended to support policymaking? Alternatively, is the evaluation and monitoring meant to have an important role as a practical tool to adjust management or methodologies so techniques and skills can be improved at the 'action' level. Factors such as the effect on both virtual and conceptual 'ownership', platforms for learning, environmental literacy, awareness, behaviour, action and cost efficiency from broad perspectives are important elements in choosing the most appropriate approaches for the monitoring or evaluation of projects at hand.

Although stakeholder engagement is on the increase (for example, in the quest for sustainable use of natural resources), top-down methodologies in assessments of condition and trend are predominant in many countries. Experience shows that limited local involvement can be a barrier to efficiency. The long-running battle for better management of the severely degraded rangelands of Iceland (Arnalds 2011; Crofts 2011) is an interesting example. There are indications that, no matter how detailed, the various efforts conducted over the years to monitor land use, map vegetation and assess habitat types and soil erosion may not have resulted in the management improvements needed, despite the massive data accumulated. Indeed, management changes appear to have been fraught with difficulties, in part resulting from low levels of trust and conceptual 'ownership' in the results from these programs and subsequent development of solutions (Thorlaksdottir 2015).

In her evaluation of the land use part of the current Icelandic quality verification scheme, which highly impacts the level of governmental payments to sheep farmers, Thorlaksdottir (2015) found the system to be characterised by top-down approaches. The farmers in turn felt that their knowledge about the resources and efforts in land improvements, such as revegetation of degraded land, was not accounted for and the land evaluation process was often seen as being unclear. Thus, acceptance and understanding of cause-and-effect relationships and needs for land condition improvements was limited, leading to a partial failure of the system. As the flow of information and knowledge management was impeded, a weakness was created that limited the ability of the scheme to affect the management and sustainability of the production. This study demonstrates a need for stronger ties between knowledge, policies and action, and locally based win-win approaches that link understanding and management of natural resources.

Experience demonstrates that verification and monitoring systems dealing with land use need to be based on actual local involvement as much as possible, be flexible and encourage adaptive management. Local and scientific knowledge should be considered as equally relevant, and used jointly – they should both be tools for documenting and advancing local management, as well as encouraging independent thinking, innovation and implementation of new ideas and measures. Appropriate communication platforms and information pathways that encourage sharing and aid in identifying potential problems and solutions can immensely increase the value of such schemes while aiding consensus building between stakeholders, including scientists. A constant re-evaluation and adjustment of the implementation process can be aided by having feedback mechanisms in place that incorporate local achievements, ideas and knowledge (Thorlaksdottir 2015).

Continuing the legacy of participatory planning

The potential for the application of participatory approaches is broad. In the land-use arena, the Australian Potters Farmland Plan set up in the 1980s (Campbell 1991) may be considered as a true pioneer in whole-farm planning. It clearly illustrated the value of empowering landholders in planning and decision-making, showing that they can be leaders of change and that conservation and production are two sides of the same coin.

In 2001, based on the Australian experience and as a follow-up to an Icelandic landcare study tour the year before, the Soil Conservation Service of Iceland spearheaded a collaborative project on good farming practices and planning as a tool to foster sustainability. The aim was to empower landowners to make their own plans on a whole-farm basis, and coordinate services by various institutions like agricultural extension, soil and nature conservation and forestry accordingly (Schmidt and Arnalds 2020).

This program consisted of two one-day workshops run a few weeks apart. The participants were provided with high-quality aerial images of their land and taught how to interpret them, read the land and to classify the condition and utilisation of the land. They were then guided into a six-step cycle, repeating the cycle as needed:

1. situation and land resources analysis
2. vision, ideal and long-term goals
3. assessment of present land use and conservation efforts
4. setting goals and priorities
5. drafting a plan, using double clear overlays
6. lessons learned, evaluation and changes.

The program emphasised participation on a family basis, and regular visits and advice from consultants as needed. It illustrated the multiple benefits of participatory property planning, most notably the conceptual ownership, learning, pride and utilisation of the plans made by the farmer families themselves with aid from specialists. Participants often remarked that they felt they saw their environment differently. By getting to know the land better, they could more easily detect positive or negative changes in its condition and respond accordingly. The aim was to gradually expand the focus from planning at the farm level to linking such planning on adjacent farms and to district levels.

It was hoped that this approach would become a framework for increased institutional cooperation and better integration of their goals, advice and service on a farm basis. However, the project did not evolve beyond the promising trial stage, possibly in part due to weak policy guidance and inherent institutional tendency to stay within conventional operative frameworks.

This example is in harmony with experiences in many other countries, demonstrating the potential of well-organised participatory planning to bring about empowerment on wide scales. Thus, more voices are heard and integrated, which can create understanding and commitment with substantial socioeconomic and environmental benefits (Kpierekoh 2011).

Citizen science

As discussed in the preceding chapters, civic engagement plays an increasingly important role in knowledge management. Currently, community participation in scientific processes is discussed widely under the heading of 'citizen science'. This bridge between

the worlds of science and community boosts capacities, with benefits extending much further than implied by the knowledge gain itself, especially in terms of awareness and environmental literacy.

The phenomena's main strengths are in the areas of research, evaluation and monitoring, with mobile technology and new media boosting the capacities. As an indication, there are more than 1,500 active and searchable global citizen science projects listed on the SciStarter website. Earth Challenge 2020 involved more than 1 million volunteers globally in gathering data. At a country level, the Australian monitoring programs Saltwatch, Frogwatch and Streamwatch involved more than 300,000 people – individuals, schools and groups – leading to manifold knowledge gain (Sullivan 2009). Using modern technology, enriched environmental data can be collected on a scale inconceivable only a few years ago and trends, for instance in response to management and changing climate, become evident through the use of standardised methods.

Community engagement in citizen science has two tiers of benefits:

- the contributions that the huge observational effort makes to environmental science
- the education of the people involved (Sullivan 2009).

Volunteer contributions can significantly push research fields ahead and are increasingly significant in our rapidly changing environment. Efforts should be made to encourage more volunteer participation in research, with confidence that it will improve the scope of science, acknowledging the contributions and giving credit where credit is due (Yikii 2009). There is much advancement in this field, as reflected by Hecker et al. (2018).

Using modern technology, enriched environmental data can be collected on a scale inconceivable only a few years ago and trends … become evident.

Conclusion

Fostering both community and stakeholder involvement in co-production and management of knowledge spans a broad range of applicability and can have multiple benefits way beyond the importance of the actual data or information itself. Among them is the increased flow of information, communication, cooperation and trust that successful knowledge projects bring. Feedback loops stemming from involvement can both speed generation of knowledge and advance knowledge uptake and skill-building through the principles of learning-by-doing adoption, and thus reduce costs, enhance efficiency and foster real change. Depending on the nature and level of involvement, being a participant in gaining more information and developing solutions that relate to your local context can be very motivating and cultivate a conceptual 'ownership' that applies to both success and failure of the knowledge or techniques being developed. Curiosity and pride are stimulated, adding to commitment and important flow-on educational benefits from participants to user groups, families and the wider community.

Hearing the voices of communities in setting a research agenda, with a design that enables all actors to have a say in the research process, aids in adoption of results being part of the study, but not an isolated component. These attributes increase the likelihood

of decisions being effectively informed by science. A bridge is built between relevant stakeholders through the stages of problem identification, formation of research questions and experimental design, to the dissemination and utilisation of the newly generated knowledge. This becomes a tool for learning where the process aids in the development and uptake of output.

Participatory approaches to knowledge management can deliver much if carefully integrated throughout all the different processes and levels of action. This includes within research, monitoring, evaluation, planning and policy and involving relevant stakeholders as much as possible. However, it is necessary to keep in mind at every step that all environments, every challenge and every group of actors is unique. Knowledge management processes must be tailored to the needs and mindsets of each situation.

Participatory knowledge management is a fast-evolving field where nothing should be taken as a set principle. The development of enabling conditions for such approaches should be encouraged, underlining their power to enhance means for caring for the land.

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