

Transformative Knowledge Transfer Through Empowering and Paying Community Researchers

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ABSTRACT

Environmental research is often conducted independently of the community in which the environment is situated, with transfer of results into policy and on-ground action occurring independently of the community's interests or aspirations. Increasingly the need for greater community involvement in the research process has been recognized. For community members, however, such engagement usually involves trade-offs. While it is often assumed that community members should participate voluntarily because they will gain from the research, any benefits from knowledge, understanding and a capacity to influence the research have to be offset against time and potential loss of unremunerated intellectual property. We argue, using case studies from tropical Australia and Africa, that a more effective means of engagement and knowledge transfer is training and remuneration of community members as coresearchers. This engagement is much more than payment for labor—it is investment in local intellectual property and requires researcher humility, power-sharing and recognition that access to research funding provides no moral or intellectual authority. Further, we argue that, for effective adoption of research results, community members need to be part of negotiated agreements on the initial nature of the research to ensure it answers questions of genuine local relevance and that local researchers have the capacity to place locally conducted research into a wider context. We argue that immediate rewards for involvement not only secure engagement but, where appropriate, are likely to lead to effective implementation of research results, enhanced local capacity and greater equity in intellectual power-sharing.

Key words: capacity; community; empowerment; knowledge; research; transfer; transformative.

THERE HAS LONG BEEN AN APPRECIATION THAT NATURAL RESOURCE MANAGEMENT (NRM) is as much about people as it is about the natural environment, and that modes of knowledge transfer need to acknowledge social context (Vanclay 2004). This recognition has extended to research, with a gradual shift over recent decades from researcher as expert to researcher as coinvestigator with the community. Participatory research (Freire 1970; Chambers 1994, 2007) is becoming a standard way of involving communities in the research process so that the relevance of the questions being investigated is mutually agreed (Pretty 1995, Palmer *et al.* 2002, Walsh & Mitchell 2002, Sayer & Campbell 2004, Danielsen *et al.* 2009). This is not least because local people are often responsible for the most critical decisions about the environment (Shackleton *et al.* 2009). Principles developed for participatory research include that it (1) promotes active collaboration and participation at every stage of research; (2) fosters colearning; (3) ensures projects are defined and driven by the community; (4) disseminates results in useful terms; and (5) ensures research and intervention strategies are culturally appropriate (O'Fallon & Dearry 2002). However, while reviews suggest community-based research and management can

be effective (McKinney & Field 2008, Kainer *et al.* 2009), it is generally assumed that citizens have the time and motivation to participate.

Thus, participatory research can exclude community members who have other demands on their time and enthusiasm. Such people may be essential to research because they have unique knowledge or control access to natural resources. In such cases, payments for access, environmental services or even labor can be effective incentives for participation. However, such arrangements retain power differences, usually fail to respect prior knowledge, end when the payments cease and are unlikely to transform thinking. Yet, on private lands, the reluctant and time-poor are often ultimately responsible for ongoing management after the research is over, and thus need to understand and agree with the research conclusions.

One approach, which appears not to have been codified, is employment of community members as coresearchers. We contend that this is not only sound policy but can lead to mutual understanding of alternative realities. Working on the principle that human beings search for and selectively process information confirming their beliefs (Evans 1989), we suggest that the nature of the research process, particularly shared systematic investigation of the unknown, is more likely to augment or challenge conceptual

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models than other more didactic means of knowledge transfer. We also contend that participatory research can be both empowering (Arnstein 1969) and transformative (White 1996), regularly leading to outcomes that extend beyond the life of individual research projects.

To illustrate this argument we have chosen six case studies, two from Africa and four from remote northern and central Australia, where the approach of paying community coresearchers has been applied to issues related to NRM. The case studies were chosen because each involved a partnership between community members, who lacked conventional research skills, and trained researchers, who lacked direct cultural involvement in the environments being studied. In all these case studies community members were employed as researchers, in fact the partnership would not have occurred without the employment. To varying extents these projects also either arose from or incorporated local priorities for knowledge building. The engagement with community thus not only filled all the criteria of participatory action research (O'Fallon & Deary 2002), but took the extra step of recognizing and rewarding prior tacit knowledge of the systems being studied, building on it to enhance two-way knowledge transfer.

INDIGENOUS NRM RESEARCHERS

Although Australian Aboriginal people own about 40 percent of the Northern Territory, including 80 percent of the coastline, there are few opportunities for employment on their own country. One form of employment that has received increasing attention over the last decade is working as rangers to manage land and/or sea, termed locally 'caring for country' (Northern Land Council 1996, Putnis *et al.* 2007). The caring for country program has attracted and retained employees in a way other forms of employment have not, combining western notions of NRM with traditional ecological knowledge. A review of the program's first 10 years used a participatory evaluation process to encourage engagement and ownership of the evaluation process by Aboriginal rangers (Sithole *et al.* 2007). Such participation had been advocated by traditional owners of the lands where management took place, who argued that evaluations of other programs had often failed to involve owners in a meaningful way, were controlled by outside agencies, were rarely explained to the community and often missed its real views and aspirations.

The review was undertaken by a group formed especially for the purpose, the Aboriginal Land and Sea Management Review Team (ALSMRT). The 19 men and women selected by the communities in which caring for country was occurring were first trained in participatory research methods and employed to develop appropriate metrics for assessing ranger programs and to conduct interviews with those involved within the ranger program. The review highlighted the benefits of the program not only for the environment but also for the social and cultural well-being of the participants (Garnett & Sithole 2007). It also demonstrated to the ranger groups the broader value of the work they undertake (Sithole *et al.* 2007).

An outcome of the review was that several researchers from ALSMRT subsequently formed an independent research team, the

Aboriginal Research Practitioners' Network (ARNPNet), which has continued to undertake investigations of the interaction between land management, Aboriginal people and the broader non-Indigenous society.

The participatory process, incorporating training and financial incentives for engagement in research, illustrated that Aboriginal researchers are not only capable of taking the lead in the research process, but can achieve results unattainable through employment of outside researchers unfamiliar with the culture. The experience with ALSMRT gave the ARNPNet researchers confidence to establish their own research network.

USING TRACKING SKILLS TO MONITOR NATIVE ANIMALS

The deserts and rangelands of Australia are among the most sparsely populated regions in the world. Nevertheless, in some arid areas more than 60 percent of native mammal species have become extinct since European settlement. The loss of species can be attributed to habitat degradation caused by introduced herbivores and changed fire regimes, and the spread of introduced predators, some of which are still increasing in abundance and range (Kutt & Woinarski 2007, McKenzie *et al.* 2007). To arrest arid zone biodiversity declines, land managers require accurate information on the extent and abundance of animal and plant populations and the effect of management and natural process variability. The immense size and temporal variability of the Australian landscape, coupled with the low population base, has made monitoring with precision and at an appropriate scale difficult to achieve (Fisher *et al.* 2007).

Many Australian Aboriginal people retain exceptional tracking skills. A simple track-based monitoring approach applied by experienced trackers has delivered useful data on the distribution of threatened and invasive species throughout the deserts and rangelands of Australia (Southgate *et al.* 2007a, b). While the tangible results of the collaboration have so far been expressed in terms of the biological information obtained (Southgate *et al.* 2007a, b), track-based monitoring has also provided meaningful work for otherwise unemployed people. In particular, track-based monitoring has provided employment opportunities for older less literate people who have often retained tracking skills but are least eligible for the few available jobs on communities. The elders mentor younger people who previously had not seen benefits of learning how to track, thus helping retain traditional knowledge and the elders' self-esteem and status within the community. The success of published trials is leading to employment of the most skilled trackers in research and monitoring at other sites across arid Australia.

ISLAND-BASED CONSERVATION

Over the last 100 years, the golden bandicoot *Isodon auratus* (Ramsay 1887) disappeared from much of its formerly wide distribution across Australia. Following the surprising discovery of a remnant population on Marchinbar Island in the Wessel Islands archipelago off the Northern Territory coast in 1993 (Southgate *et al.* 1996), local Gumurr Marthakal Rangers from the

neighboring island joined with researchers from the Department of Natural Resources, Environment and the Arts to undertake further surveys, monitor the population and using mark-recapture methods to estimate the size of the population (which is about 3000 animals). After a long consultation process the traditional owners of the island agreed that feral dogs be eradicated through a baiting program to ensure long-term survival of the only known golden bandicoot population in the Territory, even though the feral dogs have cultural significance. The rangers also searched for additional remnant populations on nearby islands and the mainland and have translocated golden bandicoots to other islands to reduce their risk of extinction (Woinarski 2008).

Before the research, the owners of the island had not realized the national importance of the bandicoot population. The golden bandicoot or Wankurra from Marchinbar Island was regarded by Yolngu people as a smaller version of the larger northern Brown Bandicoot (which is still relatively common). Involvement of rangers in the research has led to them understanding western scientific perspectives on the species' significance. This has empowered them to advocate within their community for the removal of feral dogs. It also enabled them to participate in translocation to offshore islands of another threatened animal, the northern quoll *Dasyurus hallucatus*, threatened on mainland Australia by invasion of feral toads *Bufo marinus* (Rankmore *et al.* 2008).

Involvement in the research has contributed to ongoing financial and social support for the ranger group, with moves toward institutionalization of their organization by government (Putnis *et al.* 2007). Engagement in the research has led to an understanding among the community of the significance of these remote islands in an Australian context and the potential of the islands for the conservation of species threatened elsewhere.

PASTORAL PROPERTY MANAGERS

The range of the endangered golden-shouldered parrot *Psephotus chrysopterygius* Gould 1858 on Cape York Peninsula, Queensland, Australia, has contracted substantially. In 1992, the parrots were only known to persist on and around Artemis station, a 400 km² pastoral lease on central Cape York Peninsula, and their decline was ongoing (Garnett 1992). The experience of the country among members of the family who have owned the station for a century, and their interest in its wildlife, led them to invite government researchers to live on their property and study the parrot.

Initially, these pastoralists assisted the research by providing access to their property, sharing information and undertaking experimental fire management (Garnett & Crowley 1997). Their paid involvement began with them surveying their property for nests, and recording details of the birds and their habitat. Surveys were then extended throughout the parrot's range, and the pastoralists were later paid to survey another endangered species, the Gouldian finch *Erythrura gouldiae*. Subsequently they were employed to monitor vegetation, and the impact of fire management on conservation and pastoral values. As respected members of the pastoralist community, they were granted access to land from which government researchers were excluded. Of several researchers and

volunteer birdwatchers who participated in the parrot project, no one possessed or matched the field skills of the pastoralists, and few spent enough time with the community or in the environment to develop comparable levels of trust, experience or environmental knowledge.

Involvement in the research resulted in several publications on the parrot, the biology of other species in its environment and other related publications (Garnett & Crowley 1995a, b, c, 1997, 1998, 2004; Garnett & Shephard 1997; Crowley & Garnett 1998, 1999, 2000, 2001; Garnett *et al.* 1998; Crowley *et al.* 2004), in all cases contributing substantial local knowledge as well as new knowledge derived from the research and helping conservation management of the parrot (Crowley 2001, Crowley *et al.* 2004). Personal involvement also gave the pastoralists the opportunity to assess impacts of management on the grasses used by parrots and cattle, and the tree/grass balance. It also led to more comprehensive adoption of appropriate burning practices, fencing of the property to assist periodic relief from grazing and entering into a conservation agreement over part of the property. Further, it facilitated collaborative fire management through Cape York Peninsula, including widespread recognition of the importance of burning for conservation (Drucker *et al.* 2008, Crowley *et al.* 2009). The pastoralists have recently won a prestigious award for their contribution to conservation. Furthermore, the parrots have returned to areas that have benefited from improved management.

CHIVI FARMERS IN ZIMBABWE

The failure of agricultural technology transfer in Zimbabwe (Matose & Mukamuri 1993) led to the development of community-based approaches. One particular research program at Romwe, Chivi district, hired members of the community as researchers, who participated in data collection and analysis. Two of the community members represented and presented the views and aspirations of the community at the inception of the project, a further six were employed on the project itself and another six were employed as support staff in hydrological research. Employment of local researchers from the beginning answered the question, 'what's in it for us?', and gave the community confidence and ownership of the research process. During the project, salary alone had significant benefits (Table 1). For example, one local researcher bought a cow from their salary, which was later sold to pay tuition for their spouse, another collaborator, at a teacher's training college. Some local researchers have continued hiring out their services as researchers to other organizations. Also many collaborators have engaged in other courses with encouragement from the external collaborators, some achieving tertiary education qualifications. One local researcher went on to obtain a Bachelor's degree in accountancy at the University of Zimbabwe.

A key outcome of engaging locals as research partners was that they were able to participate in discussions and read project documents and evaluate the options being promoted. In many instances, the local researchers became early adopters of new technologies. Participation by local researchers also gave outside researchers insights about the issues under study and reactions to the technologies

TABLE 1. *Postresearch project activities for collaborators at Chivi, Zimbabwe, occurring as a consequence of being paid to be researchers.*

Researcher	Activity
Local researcher 1	Became a teacher firstly at the local school, and then transferred to another school within the same district
Local researcher 2	Became a nurse at a nearby district hospital
Local researcher 3	Emigrated to the United Kingdom and later bought his father a truck. Locals hire the truck especially in emergency cases, <i>e.g.</i> , to transport the sick to hospitals or the dead from hospitals to the area
Local researcher 4	Trained as motor mechanic at Masvingo technical college
Local researcher 5	Went to train in agriculture
Local researcher 6	Went on to take his A-level exams with the intention of increasing his chances of securing a vacancy at a tertiary institution

being transferred. Two years after the project ended, some local resident researchers were still being consulted by the community for advice. The death (and nonreplacement) of the ward agricultural extension officer in 2003 resulted in farmers from neighboring villages also consulting former local researchers for advice, especially about water-harvesting techniques. Thus, the community benefited from having embedded expertise familiar with local cultural practice.

Local researchers also gained in status through the project. One became the chairman for a local revolving fund scheme. Another became a key member of the village traditional jury. A woman with basic educational qualifications became a community mobilizer for community gardens, a position usually the preserve of men. Again the community benefited through having enhanced capacity among its leaders. At the project's end, local leaders thanked the researchers for paying community researchers. As a result young people developed an interest in community projects, which had not happened previously.

BORANA PASTORALISTS

As with Zimbabwe, transfer of knowledge and technologies from research to farmers via extension has been ineffective for small-scale farmers in East Africa (Spencer 1986, Critchley 2000). Traditional 'transfer-of-technology' approaches to agricultural research can no longer keep pace with the complex, diverse, vulnerable and dynamic production environment of resource poor farmers (Watts *et al.* 2003) and rarely benefit them because of the inefficiency of extension services (Pardey & Roseboom 1990, Jain 1992).

This second African case study describes a survey undertaken in the Borana lowlands in southern Ethiopia and northern Kenya in 2003/2004 on the economic value of animal genetic resources, particularly Borana cattle. At least 4 million Borana pastoralists live in Kenya and Ethiopia (Coppock 1994), where they maintain a strong culture, based on the husbandry of cattle, which is also the main source of income. Eight local researchers (five in Ethiopia and three

in Kenya) were employed to conduct almost 400 individual interviews, including semistructured questionnaires and a choice experiment (Zander & Drucker 2008). The questionnaires were translated by local researchers based in the villages closest to the pastoral settlements. As they belonged to the same tribe and language class, they were well accepted and trusted. Trust played a key role when eliciting reliable information about the number of cattle and income, as farmers feared government authorities because of tax issues. The researchers, once trained, were able to explain complex choice experiments to farmers unused to answering hypothetical questions.

The researchers benefited from being engaged in discussions and from learning about the background of the study. Almost all showed immense interest when they learned about the global threat to animal genetic resources. Although some were aware of local loss of genetic variety, no one knew of the global erosion of diversity. This knowledge passed from researchers to interviewed farmers and hence to relatives, colleagues and neighbors. This led to better management of their Borana cattle genetic resources.

Certificates presented to local researchers enabled their future employment as researchers with other international organizations in the research area. To the researchers this was almost as important as their salary, and increased their local status. This impact also had flow-on effects within the community. For example, one man sold most of his cattle to send his children to school so that they could emulate his researcher nephew.

LESSONS LEARNED

In all case studies, community researchers with no prior formal training were able to contribute substantially to the research findings through transmission of tacit knowledge. The benefits went beyond salary payment. Interaction with local communities would have been minimal or impossible had not the community researcher been engaged. Although the topics researched were always important to the participants, research itself was not viewed as a priority compared with other demands on their time. The transfer of scientific knowledge to the local researchers or into the community was demonstrated through changes in attitudes or behavior (Table 2), although it is sometimes hard to distinguish the effects of involvement in research and the effects of other knowledge sources or drivers of change.

In the case of the nonindigenous pastoralists, the movement of knowledge through pastoral networks was greatly facilitated by employment of the pastoralists as researchers (Garnett & Crowley 1997), a process that has proceeded for 15 years. Similarly, in Zimbabwe and East Africa, knowledge of the technologies and ideas introduced by the research radiated within the community from the community researchers. For the indigenous NRM researchers, knowledge transfer was demonstrated through the participants' involvement in subsequent research projects using the unique combination of cultural connection and research skills developed in the first project. Furthermore, in most of these case studies, the recognition given to both traditional knowledge and knowledge acquired through the projects increased the opportunities for and interest in

TABLE 2. Evidence of and benefits from knowledge transfer through employment of community researchers.

Knowledge transfer evidence/benefits	Indigenous NRM researchers	Track-based monitoring	Island-based conservation	Australian pastoral managers	Chivi farmers	Borana pastoralists
<i>Individual</i>						
Understanding of research process	Yes	Yes	Yes	Yes	Yes	Yes
Coauthor on knowledge outcomes	Yes			Yes		
Acceptance of new knowledge	Yes		Yes	Yes	Yes	Yes
Early adopters	Yes			Yes	Yes	Yes
Increase in personal status within community	Yes	Yes	Yes		Yes	Yes
Behavior/land management practices changed/reinforced	Yes	Yes	Yes	Yes	Yes	Yes
Research skills applied beyond project	Yes	Yes	Yes	Yes	Yes	Yes
<i>Community</i>						
Oral transfer through community researcher social networks	Yes	Yes	Yes	Yes	Yes	Yes
Changes in community/organizational practice	Yes			Yes	Yes	Yes

intergenerational knowledge transfer, with older people passing skills to younger community members. There was also colearning, with researchers learning more about not only their research topic, but also about its cultural and environmental context, and management implications.

Several of the projects resulted in subsequent employment in research, with new research partners and for different purposes. In each case, the specific knowledge collaboratively gained was augmented by the transfer of investigative skills that allowed diversification of income sources.

DISCUSSION

Most education in NRM attempts to persuade people that conservation will benefit the broader society (Jacobson *et al.* 2006). Employing community members in research delivers both direct and indirect benefits, and reaches beyond those who will be converted by the public benefit argument. Direct benefits arise from income in areas where there are few employment opportunities. While it could be argued that payment could set up unequal power relationships, the provision of payment is also a tangible recognition that community researcher contributions are considered valuable. Payments also acknowledge that tacit understanding of the system being studied is as important to achieving management outcomes as is formal understanding. These case studies thus go beyond much participatory action research in that the research process is conducted collaboratively and the generation and ownership of knowledge is shared by both trained and community researchers, who together interpret it. While employing community researchers can sometimes be difficult, especially balancing the need for cultural connection with obtaining data of sufficient quality to investigate an issue with genuine rigor (Danielsen *et al.* 2009), the overall conclusion in these case studies is that they would have been unachievable without paying community researchers. The transfer of

knowledge was thus an emergent property from the contract between researcher and community.

There were also other benefits. Our experience suggests that engagement in the research process often leads to the community researchers and their communities changing their attitudes or behavior beyond the life of the project, sometimes in unexpected directions. Thus, employment of community researchers falls within the definition of transformative participation (Deshler & Selener 1991), effectively empowering community members to go beyond the particular research project in which they are employed and applying the skills and modes of thinking to new avenues of endeavor (White 1996). Apart from benefits for improved land and conservation management through informed adoption of research results, the very act of employing people can be transformative in that it diversifies means of income. Given that diversification of income sources is the primary route out of poverty (Krishna 2007), engagement of community members in research can be seen as one potentially useful means of alleviating poverty. The practice of community-based research is also consistent with evidence that community-based forest management is effective only if it simultaneously enhances social capital of households and local institutions and increases incomes (Mazur & Stakhanov 2008).

Of course, training and employment of community people is not possible in all circumstances. While tacit knowledge built up over generations and transmitted orally can complement, and extend western research techniques, much modern research also requires extended intellectual and technical skill development well beyond what can hope to be achieved at a community level. Furthermore, funding bodies may not always make provision for employment of community members as researchers. Also implicit in this approach is the capacity of both western and community researchers to communicate effectively between each other, including both training and knowledge transfer. Not all researchers are effective teachers and any allocation of resources to employment of community researchers must also make an allowance for teaching

and training. Also, not all community members are capable or culturally appropriate to be researchers and the initial selection of researchers can be critical to the success of the subsequent project; negotiation of the appropriate people to collaborate on research is almost as important as negotiating on the research project itself. Despite these cautions, however, employment of community researchers could become the default position in research aimed at engendering community benefit rather than the occasional exception.

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