

Kia pono te mahi pūtaiao – Doing science in the right spirit

WILL ALLEN^{1*}, JAMIE M. ATARIA^{1†}, J. MARINA APGAR², GARTH HARMSWORTH^{3‡},
LOUIS A. TREMBLAY¹

¹Landcare Research, PO Box 40, Lincoln 7640, New Zealand; ²Lincoln University, PO Box 84, Lincoln 7647, New Zealand; ³Landcare Research, Private Bag 11052, Palmerston North 4442, New Zealand

*Author for correspondence: willallennz@gmail.com

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Over the past two decades the challenges facing environmental and natural resource managers have become more complex. Natural resources are more contested and degraded, and stakeholders as a result want a greater say in their management. Single-issue management is often not proving effective. Policymakers, industry sectors, indigenous groups, communities and scientists alike have to recognise the interlinked nature of many apparent resource use problems. Successful outcomes are increasingly dependent on the coordinated actions of decision makers operating at many different levels and scales. Consequently, many viewpoints and sources of information have to be shared among the different stakeholders involved, and integrated to find solutions that will guide the way forward (Allen & Kilvington 2005, Berkes this issue; Robson et al. this issue).

Multi-stakeholder research approaches that facilitate the wide involvement of people in problem solving and decision making with respect to issues and plans which impact on them are becoming widespread. Transdisciplinary research approaches such as sustainability science (Kates et al. 2001), post-normal science (Funtowitz & Ravetz 1993) and complexity science (Waldrop 1992) all call for more inclusive inquiry where local and other knowledge systems collaborate with science in research. The ownership of resulting knowledge production and ensuing management efforts are wider and can more adequately address issues of sustainability.

The papers in this issue all highlight the importance of working with indigenous peoples on issues of environmental management. The use of indigenous knowledge in environmental research raises some particular issues for transdisciplinary approaches. We agree with Berkes (this issue) that the science vs indigenous knowledge *debate* would be more usefully

† Rongomaiwahine, Ngāti Kahungunu, Ngāti Tūwharetoa

‡ Te Arawa, Ngāti Tūwharetoa, Tuhourangi, Ngāti Raukawa

reframed as a *dialogue* and *partnership*. Moreover, if indigenous knowledge about the environment is viewed more broadly as a system through which indigenous peoples understand and engage in the world (Raffles 2002), then it encompasses much more than ecological knowledge. Work with traditional ecological knowledge therefore is necessarily framed within a wider cultural base (Berkes this issue). Because indigenous knowledge systems tend to view people, animals, plants and other elements of the universe as interconnected by a network of social relations and obligations (International Council for Science 2002), they create a particular context within which research on traditional ecological knowledge should be embedded.

This special nature of indigenous knowledge raises important considerations for those seeking to undertake science within an indigenous setting. Any research with indigenous peoples and their knowledge systems should be regarded as scientific inquiry that is applied to an issue of significance to that community's chosen development path. Therefore, the research needs to be aligned with the broader community goals and processes that the community is engaged in. These goals are often long-term and intergenerational. For example, a goal sought by many Māori – *mō ngā uri whakatipu* (for the coming generations) – refers to a responsibility to leave the world in the same or better state for our descendants. In the same indigenous setting these goals are supported by the frameworks of *whakapapa* (interconnectedness referring to genealogical descent and relationships between all things in the cosmos) and creation narratives (Marsden & Henare 1992; Patterson 1994), and *kaitiakitanga* (guardianship and the many roles, responsibilities and obligations associated with it). In these frameworks people and communities are one component of this holistic view, and their roles and behaviour are modulated by a system of mutual dependency, reciprocity, obligations and consequence (Roberts et al. 1995). To take another example, the Kuna peoples of Panama use the *Bab Igar* (“the way of the Father”) as their guiding framework. This is a compilation of oral history that makes up the collective memory of the Kuna peoples and is a holistic framework highlighting the relationship between all beings and responsibilities of the Kuna to the cosmos (Chapin 1991; Howe 2002). Furthermore, transdisciplinary inquiry approaches that deal with complexity and sustainability are fostered and encouraged by indigenous community processes of governance (Apgar et al. 2009). Analyses focusing only on the similarity, difference or compatibility between traditional ecological knowledge and Western science can potentially obscure an opportunity for science to learn from working with the transdisciplinary frameworks of indigenous peoples.

When scientific research engages with indigenous knowledge it can fulfil an important role in supporting communities in addressing their sustainability and well-being. This is particularly important in the post-colonial setting where science must recognise its position within a wider context of indigenous development. As some scholars note, the formation and use of knowledge are not void of power, and if underlying inequalities are not addressed, research on indigenous knowledge can become an instrument reinforcing scientific and Western progress (Ellen et al. 2000; Agrawal 2002). Smith (1999) has argued for the decolonisation of methodologies, and for research, historically seen as helping colonialism, to build new approaches that are more respectful, ethical, sympathetic and useful for indigenous peoples. The United Nations Declaration on the Rights of Indigenous Peoples (UN 2007) emphasises the rights of indigenous peoples to maintain and strengthen their own institutions, cultures and traditions and to pursue their development in keeping with their own needs and

aspirations. In the post-colonial setting, the need to place research with indigenous peoples within wider cultural, social and political contexts is sometimes recognised in science policy (e.g., MoRST 2005). However it also needs to be recognised by those engaging in research that appropriate research design can also assist indigenous peoples to meet their goals.

Increasingly scientists, science programmes and institutions are adopting this wider approach to research with indigenous communities. However, because the cultural component often remains hidden in conventional research proposals and published conclusions, its application in design and practice can often be less rigorously reviewed than the design and practice of other research steps. Accordingly, if the science community wishes to ensure the relevance and rigour of research initiatives in indigenous settings, then it needs also to incorporate review or evaluation approaches that ensure that such research programmes are examined within this broader context. For example, the International Society of Ethnobiology (ISE), under the visionary leadership of Darrel Posey, has developed a code of ethics for working with indigenous peoples that is based on the principle of mindful conduct and reciprocity (ISE 2006) and in New Zealand a guide for working with Māori has been developed for the Foundation for Research, Science and Technology (Harmsworth 2001).

Seen from these perspectives, it becomes apparent that embedding research within indigenous communities requires strong relationships to be built first. It is important that the wider cultural setting is understood if science is to be a good fit. A change will be required in the attitude of researchers, who will have to learn a new set of skills for engagement in genuine partnerships that require an open heart and open mind (e.g., Moller et al. 2009). Wehi et al. (this issue) point to the need to understand cultural knowledge in the language it is developed in. The Māori expression *harore rangitahi* (one-day mushroom) refers to indigenous community experiences of scientists not being committed to long-term community goals. For the approach we are advocating here, ongoing involvement and cultural commitment is pivotal for nurturing *kanohi ki te kanohi* (face-to-face) relationships.

This raises some interesting challenges for our current institutional structures of science that find it easier to measure results by (science) outputs rather than the quality of long-term relationships (e.g., Roa et al. this issue). Moreover, true partnerships require up-front investments that are not recognised by current funding structures. Good research projects should emerge from interactions, rather than being thought up in institutional settings, far from real-life community applications. Embedding research in this wider context need not impinge on the quality of disciplinary inquiry, because at the end of the day indigenous communities want top-quality science that meets their needs. The benefits will come from a diversity of ideas that create new spaces for innovation and good opportunities for interdisciplinary approaches and for solving complex environmental issues, all of which can build science knowledge and useful applications of it.

It is not our intention here to provide a recipe for doing science in the right spirit. This can only emerge from genuine relationships between indigenous communities and science. The effectiveness of science is also enhanced if embedded in culture, and this applies to all community settings, not just to indigenous. We do, however, point to the need to build capacity within science in some key areas: the ability to place research projects in a wider cultural context, to build and maintain trust, and always to respect “the custom of the house

or the land you are in". Being mindful to manage our skills in these areas will help to better meet the needs of both indigenous communities and science.

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