



A transdisciplinary approach to local waste management in New Zealand: Addressing interrelated challenges through indigenous partnership



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ARTICLE INFO

Article history:

Received 16 November 2014

Received in revised form 20 July 2015

Accepted 21 July 2015

Available online 23 July 2015

Keywords:

Integration

Māori

Participation

Reflexivity

Transdisciplinarity

Waste

ABSTRACT

The goals of transdisciplinary research (TR) generate several interrelated challenges that are largely internal to the TR process: project ownership, participation, integration, and reflexivity. We examine this set of interrelated challenges, as well as some ways of meeting those challenges, through the lens of a particular case of TR: the Kaikōura Biowaste Project (KBP). We find that the KBP was at least partly successful in meeting each of the four interrelated challenges. Key to that success was our partnership with the local Māori (indigenous) community. External challenges of institutional barriers and political implementation complicated the task of meeting some internal challenges; the KBP had some but not complete success in overcoming these. We find that some familiar factors—co-leadership with an appropriate community partner, early involvement of stakeholders, significant time spent by members of the research team in the case-study community, and sensitivity to communication styles—did indeed contribute to the success of TR. In addition: strong leadership and bridging skills in the research team are key resources for overcoming institutional barriers to integration; pragmatic integration can be accomplished without epistemological interpenetration; and the active cultivation of reflexivity among researchers promotes integration. Reflexivity was facilitated by locating the process in a setting shaped and governed by a worldview different from the dominant scientific discourse, suggesting that, rather than on neutral ground, interactions with less dominant communities should take place in settings and through processes that are familiar to the community but relatively unfamiliar and therefore more challenging to the researchers.

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1. Introduction

Transdisciplinary research (TR) is often advocated for addressing problems of environmental sustainability (e.g. Lang et al., 2012; Polk, 2014; Van Kerkhoff & Lebel, 2006; Waterton, Norton, & Morris, 2006; Wijkman, 1999). While there is no

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consensus definition of transdisciplinarity (Jahn, Bergmann, & Keil, 2012), most feature the following elements: it addresses existing, complex societal problems (as opposed to “curiosity-driven” research that often addresses disciplinary puzzles); it involves collaboration both across disciplines and between academic and non-academic¹ participants; and this collaboration entails mutual learning and the integration of different forms of knowledge and normative orientations. Jahn et al. (2012, p. 4) synthesise the current discourse on transdisciplinarity into the following: “transdisciplinarity is a reflexive research approach that addresses societal problems by means of interdisciplinary collaboration as well as the collaboration between researchers and extra-scientific actors; its aim is to enable mutual learning processes between science and society; integration is the main cognitive challenge of the research process”.

Transdisciplinary research is seen as particularly appropriate for addressing problems of environmental sustainability because: (1) the problems are characterised by normative elements that may be in conflict and must be negotiated; (2) the problems are complex and addressing them requires diverse and widely distributed forms of expertise; and (3) addressing sustainability problems depends not only on the scientific rigour of their proposed solutions but also on their societal acceptance and legitimacy, which can be increased through collaborative approaches (Lang et al., 2012; Polk, 2014). Thus, the incorporation of non-academic participants in an effective way and the integration of diverse knowledge and values are key features of TR for sustainability.

Transdisciplinary research faces a number of challenges, both internal and external. The goals of TR generate several interrelated challenges that are largely internal to the TR process and can be termed as project ownership, participation, integration, and reflexivity. In this paper we examine this set of interrelated challenges to successful TR, as well as some ways of meeting those challenges, through the lens of a particular case of TR, the Kaikōura Biowaste Project (KBP). Other challenges to TR have been identified; in particular, the (at least partly) external challenges of institutional barriers to TR and of the implementation or impact of TR beyond the TR process itself have been highlighted (Bracken & Oughton, 2006; Dixon & Sharp, 2007; Evans & Marvin, 2006; Kueffer et al., 2012; Lyall, Bruce, Marsden, & Meagher, 2013; Marzano, Carss, & Bell, 2006; Petts, Owens, & Bulkeley, 2008; Talwar, Wiek, & Robinson, 2011; Wiek et al., 2015). They are not a direct focus of this paper; we will, however, discuss ways in which they interact with the set of internal challenges. We argue that the relative success of the KBP in meeting at least three of the four interrelated challenges is due in large part to a decision to partner with the local Māori² community and to allow the TR process to be partly structured through their protocols.

The KBP is one study within a larger research programme of the Centre for Integrated Biowaste Research (CIBR). The practical goal of the programme is to facilitate sustainable land application of biosolids³ in New Zealand. Biosolids have the potential to promote ecosystem restoration where soils have been degraded (e.g. former mine sites) and to restore fertility to soil in a more sustainable way than the use of inorganic fertilisers, all while reducing the quantity of waste that must be landfilled or otherwise unsustainably and unproductively disposed of (Larney, 2012; Waterhouse, Boyer, Adair, & Wratten, 2014). However, biosolids also may contain harmful components, including heavy metals, pathogens, industrial chemicals, and pharmaceutical residues. In addition, there may be cultural objections to some uses of human wastes (Bradley, Winefield, & Mikaere, 2007; New Zealand Waitangi Tribunal, 1989; Pauling & Ataria, 2010). Thus, decisions on the management of biosolids are not straightforward, involving uncertainty, diverse values, and possibly conflicting evaluations of the sustainability of land application.

The programme uses community-based case studies that link research into the environmental and agronomic effects of biosolids with community knowledge, research needs, and decision-making. This acknowledges that much of the knowledge produced by the project would be particular to localities rather than nationally uniform. The goal is for the results of these TR processes to be utilised by the local authorities and communities concerned. At the same time, the case studies are intended to produce discipline-relevant scientific knowledge and to model methods for community engagement that could potentially be used in other localities to develop relevant knowledge for re-using biosolids.

The authors are members of the social/cultural research team⁴ of CIBR. As well as being directly involved in the KBP, we were members of research teams whose work directly shaped and informed the development of that project; our analysis is shaped by our decade-long observation of relationships among biophysical researchers, social researchers, and non-academic collaborators in this field. We thus follow Dixon and Sharp (2007), Evans and Marvin (2006), Lowe and Phillipson (2006), Waterton et al. (2006), and Wickson et al. (2006) in analysing and evaluating TR as “embedded researchers”. Like them, we have attempted to reflect critically on our own experiences of the current project and to utilise informal knowledge and experience that would not be accessible to an outsider, in order to contribute to the understanding and appreciation of the process and challenges of TR.

We begin by outlining the four interrelated internal TR challenges of project ownership, participation, integration, and reflexivity. We then describe the KBP and how well it met those challenges. This is followed by a discussion of the factors

¹ We use the term “non-academic” here as a convenient shorthand to indicate those who are not professional researchers trained in one or more academic disciplines (see, e.g. Pohl, 2011). It encompasses other commonly used categories such as “user” (e.g., Talwar et al., 2011) and “stakeholder”. We discuss the term “stakeholder”, and our use of it in relation to the Kaikōura Biowaste Project below (see Section 3). We are not equating “academic” with “university”; most of the “academic” participants in our project are not employed by universities.

² Māori are the indigenous people of New Zealand.

³ We recognise that the term “biosolids” is the product of a public relations effort to improve public acceptability of land application of sewage sludge (Goven & Langer, 2009), but it is widely used in New Zealand for treated and/or weathered solid sewage wastes from municipal sewage systems and septic tanks, and it was used in the KBP.

⁴ The social/cultural research team has expertise in social science and/or research by and with Māori.

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