



Putting transdisciplinary research into practice: A participatory approach to understanding change in coastal social-ecological systems



Claudia F. Benham^{a,*}, Katherine A. Daniell^b

^a Fenner School of Environmental and Society, The Australian National University, Canberra, ACT 2600, Australia

^b ANU Centre for European Studies, The Australian National University, Australia

ARTICLE INFO

Article history:

Received 9 September 2015

Received in revised form

30 March 2016

Accepted 14 April 2016

Available online 5 May 2016

Keywords:

Research methodology

Transdisciplinary research

Great Barrier Reef

Participation

Governance

Science-based policy

ABSTRACT

As the health of many coastal ecosystems declines, there is an increasingly urgent need for research that transcends academic disciplines and can respond to complex environmental problems. While the benefits of transdisciplinary research are widely recognised, there are institutional and practical constraints on researchers wishing to put these approaches into practice. In this paper we seek to understand how incorporating participatory elements into research design and data collection can enhance the benefits of a transdisciplinary approach and improve outcomes for scientists and users of research. To do so, we describe and reflect on a transdisciplinary research project conducted in a large industrial port in the Great Barrier Reef World Heritage Area, Australia. Drawing on experiential observation and theoretical contributions from across the literatures on transdisciplinary and participatory research, we also develop an integrated research framework that can be applied across contexts. The research demonstrates that incorporating participatory techniques during the research scoping phase can help researchers to develop a transdisciplinary research programme that can both strengthen research outcomes and ensure their relevance to coastal communities and decision makers.

© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

Coastal zones are home to some of the earth's most productive ecosystems, and more than half of the global population (Leigh et al., 1987; Beatley et al., 2002; Glaser and Glaeser, 2014). Coastal ecosystems comprising mangroves, seagrasses and coral reefs supply vital nutrient cycling services, support human livelihoods and provide critical breeding and foraging habitat for fish, invertebrates, marine mammals and turtles (Duarte, 2000; Waycott et al., 2009; Glaser and Glaeser, 2014). However, these environments are changing rapidly in response to a range of natural and anthropogenic drivers, including agriculture and land use change, industrial development and climate change, which can threaten the health and integrity of coastal ecosystems, and disrupt human communities (Turner et al., 1996; Burke et al., 2001). Despite many years of interventions by scientists, governments, local communities and other actors, the health of coastal ecosystems continues to decline (Waycott et al., 2009; Christie, 2011; GBRMPA, 2014).

The development and expansion of port and shipping facilities is

a key driver of change in coastal systems. In the Indo-Pacific region, where the majority of the world's seagrasses and corals occur (Bruno and Selig, 2007; Coles et al., 2012), port development is among the major drivers of ecosystem decline (Grech et al., 2011; Coles et al., 2012). In the Great Barrier Reef World Heritage Area (part of the Indo-Pacific), the recent expansion of ports for the export of commodities such as gas and coal has placed pressure on coastal ecosystems and has altered interactions between local communities and the environment (Grech et al., 2013; Benham, 2016). Recent port development in the Great Barrier Reef reflects a global trend towards coastal development associated with the export of Liquefied Natural Gas (LNG) and other commodities (Ruester and Neumann, 2008; Kumar et al., 2011; B.P., 2015). Rapid growth in the global LNG industry, in combination with longer-term regional change processes, present new challenges for science-based governance practice in coastal zones, which has hitherto failed to slow environmental degradation (Christie, 2011; Thorpe et al., 2011; Benham, 2016).

One contributing factor in this failure is fragmentation across the large and diverse body of coastal research, including a lack of integration of social and natural science approaches (Visser, 2004; Christie, 2011). Since the early 20th century, modern science has

* Corresponding author.

E-mail address: claudia.benham@anu.edu.au (C.F. Benham).

been conducted largely within single disciplines, constituted and reinforced by the institutional structures of universities and funding bodies, and by researchers themselves. In itself, the disciplinary model of scientific enquiry represents a paradigm shift from earlier approaches which emphasised a broad based understanding and transference of skills across a range of scientific domains (Kuhn, 1968; Shapin, 1996; Henry, 2008). In recent years, however, the emergence of cross-disciplinary, multi-disciplinary, interdisciplinary and transdisciplinary research approaches have challenged and attempted to overcome disciplinary boundaries. Across the sciences, there is now a well-recognised need for research that transcends academic disciplines and can respond to complex problems (Bammer, 2005; Liu et al., 2007; Madni, 2007). Furthermore, it is apparent that successful applied research and policy must engage a range of stakeholder perspectives and acknowledge the role of human values in conservation and management, in addition to being based on sound scientific understandings (Visser, 1999; Visser, 2004; Christie and White, 1997; Ciannelli et al., 2014). Arguably, integrated research approaches are particularly critical at the coastal interface, where marine and terrestrial processes interact with each other and with human users through an intricate network of inter-dependencies (Beatley et al., 2002; Adger et al., 2005; Folke et al., 2010; Richmond et al., 2007; Halpern et al., 2008; Christie, 2011). A review of past approaches to policy-making for coastal environments has found that policy driven solely by science “has been a generally failed experiment ... resulting in incomplete understandings of scale and interrelationship, inadequate policies and frustrated scientists of various disciplines” (Christie, 2011:172). Visser (2004:23) reflects that “natural sciences alone cannot meet the challenges posed by coasts ... [instead] the analytical strength of the natural sciences in the study of ecosystem change has to be coupled with the social science study of social transformation.”

Among the various types of integrative research, transdisciplinary approaches are thought to have the greatest potential to respond to the demands and imperatives of the 21st century (Russell et al., 2008). Yet, despite a growing theoretical understanding of transdisciplinary research and its benefits, this form of research has been difficult to put into practice (Wickson et al., 2006; Guimarães et al., 2014). Although recent advances in Integrated Coastal Zone Management (ICZM) have sought to promote participatory and transdisciplinary approaches (Christie and White, 1997; Visser, 2004), marine conservation has been criticised for applying fragmented disciplinary approaches to complex problems (Thorpe et al., 2011). Social science remains largely focused on terrestrial environments and in the coastal zone, social data has often been treated as “context” for, or supplementary to, biophysical studies (Visser, 2004), apart from some notable exceptions in the participatory modelling field (e.g. Perez et al., 2004; Forrester et al., 2014; Ticehurst et al., 2007; Daniell, 2012). Moreover, impact assessment—still the key tool for predicting and managing the impacts of large development in coastal zones—typically deals with socio-economic impacts largely independently of environmental change. Transdisciplinary research in the coastal zone is also hindered by an ongoing lack of a common language for communication across disciplines (Fry, 2001; Lang et al., 2012) and by the reinforcement of disciplinary boundaries by universities and other academic institutions (Angelstam et al., 2013). Furthermore, some transdisciplinary approaches, which are typically problem-focused (Lang et al., 2012), have remained largely separate from participatory methods, which have emerged, in part, to construct a knowledge base on which disempowered social groups can achieve specific social transformations (Kendon, 2005). There is evidence, however, that funding bodies are increasingly looking to support inter- and transdisciplinary research with a strong focus on

stakeholder engagement and participatory methods (Russell et al., 2008; e.g. BiodivERsA, 2015). New methods are also being developed to evaluate cross-disciplinary study (see for example Strang and McLeish, 2015), suggesting that transdisciplinary approaches are a hallmark of research futures.

1.1. Purpose of this paper

This paper reflects on a process of research undertaken in Gladstone, an industrial port city located adjacent to the World Heritage-listed Great Barrier Reef in Queensland, Australia. In the research, we employed an iterative, mixed-methods research design, drawing on transdisciplinary and participatory research principles, to shape and implement a research agenda that investigated the socio-economic and ecological impacts of rapid growth and redevelopment in the local port and Liquefied Natural Gas (LNG) industry. The research focused on the following three, interrelated issues:

1. Understanding the localised social, economic and ecological impacts of rapid port and LNG development, including the links between environmental change and socio-economic wellbeing;
2. Determining the key factors underpinning local attitudes towards port and LNG development in the Great Barrier Reef; and
3. Critically assessing the effectiveness of existing governance arrangements for port development, with a focus on impact assessment.

In this paper we seek to understand how incorporating participatory elements into research design and data collection can enhance the benefits of a transdisciplinary approach and improve research outcomes for scientists and users of research, using the Gladstone case study as an example. In doing so, we first define what we mean by transdisciplinary research and compare this to other forms of coastal research. We then characterise the key forms of participatory research as they are applied in the stakeholder engagement and resource management literatures. The majority of the paper is devoted to describing the research approach used in our case study, and discussing its strengths and limitations. Drawing on experiential observation and theoretical contributions from across the literatures on transdisciplinary and participatory research, we also develop and apply a research framework that could extend the benefit of our research insights beyond a single case.

2. A role for transdisciplinary research in the coastal zone

Transdisciplinary research approaches aim to promote integration across disciplinary boundaries, in order to provide new perspectives on complex problems. They are characterised by an emphasis on ‘real-world’ problems, integration and transcendence of disciplinary boundaries, evolving methodologies arising from iteration and reflection on the part of researchers, and collaboration or partnership between researchers and external stakeholders (Hirsch Hadorn et al., 2008; Russell et al., 2008; Brown et al., 2010; Guimarães et al., 2014). This focus on transcending disciplines and engagement with external stakeholders distinguishes transdisciplinary research from other approaches which involve collaboration between researchers working within different disciplines (multidisciplinarity), or on areas of overlap between disciplines (interdisciplinarity) (Giri, 2002; Cooper, 2002; Russell et al., 2008).

Integrative research approaches, such as transdisciplinary research, have been proposed as key pathways for addressing complex ongoing and emergent problems in the coastal zone

Download English Version:

<https://daneshyari.com/en/article/1723346>

Download Persian Version:

<https://daneshyari.com/article/1723346>

[Daneshyari.com](https://daneshyari.com)