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Fostering collaboration for knowledge and action in disaster management in South Africa

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Engaging diverse stakeholders in collaborative processes to integrate environmental information into decision making is important, but challenging. It requires working at and across the boundaries between knowledge types — a complex milieu of different value systems, norms, and mental models — and multiple stakeholder-engagement processes which facilitate knowledge exchange and co-production. Using a qualitative, inductive approach, we analysed perceptions and outputs of a transdisciplinary project which aimed to generate new knowledge, awareness and action for ecosystem-based disaster management in South Africa. Several obstacles that could potentially undermine the project's objectives were identified, including: preconceived assumptions; entrenched disciplinary thinking; and confusing terminology. Enabling factors included efforts to ensure project co-creation and the use of knowledge brokers in promoting systems thinking that is grounded in practice.

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Introduction

Over the last decade the role of healthy ecosystems in providing protection against natural hazards and mitigating the impacts of climate change has been highlighted [1•,2,3]. Ecosystem-based disaster risk reduction is increasingly receiving attention as a means to boost the ecological buffering capabilities of ecosystems [4]. This approach focuses on conserving or restoring regulating ecosystem services provided by healthy ecosystems [5], such as the role of wetlands in slowing flood waters [6]. Despite its potential, ecosystem-based disaster management remains limited in practice. This is partly due to the complexities involved in exchanging and integrating knowledge from the multiple disciplines, stakeholders, sectors and scales involved in ecosystem management and disaster risk reduction [7•,8••,9••,10••]. Careful design of collaborative processes that generate and facilitate knowledge sharing and use is therefore a potential avenue for addressing the slow uptake of ecosystem-based approaches [8••].

Current examples of knowledge exchange for improved ecosystem management [11,12••], as well as efforts to integrate ecosystem-based disaster management into multi-sectoral policies in South Africa [9••,13••], offer potential to integrate ecosystem knowledge into decisions and actions. The latter example, in the Eden District of the Southern Cape region of South Africa, was initiated in response to a recent increase in disasters, related to floods, droughts, storm waves and wildfires. The transdisciplinary project was initiated in 2008 between a national science council, a university, a national insurer, a non-governmental organisation, and local and provincial governments [13••]. This project (hereafter referred to as 'The Eden project') was established as a short-term project to better understand the impacts and causes of disasters in Eden, identify possible management strategies, and build a longer term collaboration for disaster-risk reduction in the area.

A recent review of the project highlighted numerous successes in moving from research to impact, including new investments in ecosystem restoration, institutional changes in the private and public sectors, and the development of new partnerships between scientists, practitioners and decision makers [9••]. Based on these successes, we aim to analyse the project and identify the factors that facilitated or hindered the project's achievement of it aims, with a particular focus on knowledge co-production among diverse stakeholders.

Methods

A qualitative, inductive approach informed by grounded theory methodology [14] was used, which involved an iterative process between data collection and analysis.

Data collection

Using purposive and snowball sampling [15], 19 participants were selected as informants as they were key role-players in the knowledge co-production process. These participants, in almost all instances, represented the key participants from the respective institutions involved in the study. However, due to time restraints, we did not interview all implementing agents involved in the project (see Table 2) but instead selected leaders, or those participants from the main institutions most involved in the project. Semi-structured interviews (of approximately 45 minutes each) were conducted with these participants between May 2013 and April 2014 by the lead author. Interviews were primarily face-to-face but some were telephonic, and participants consented to the interviews which were digitally voice-recorded and then transcribed by the lead author (Table 1). To complement the interviews, key project outputs (e.g. project reports of the different institutions involved in the project; project presentations of research findings from workshops/meetings) and related information (e.g. institutional websites; meeting minutes; plans) were collected for analysis.

Data analysis

The analytic process comprised a series of iterative steps exploring the topics and items of interest embedded within the textual data, and data analysis therefore progressed in tandem with data collection. Applied thematic analysis using annotations, memos, and open and axial coding were used to analyse both the interview transcriptions and additional documentation [16]. We explored how knowledge was exchanged between participants and the factors that either hindered or enabled the production and exchange of knowledge.

Results

To interpret the findings, and to ensure participant anonymity, core project participants were grouped according to their emerging roles in the project (Table 2).

Perceived success factors

Just over five years since its inception, the collaborative project has resulted in a range of outcomes linked to changes in knowledge, awareness, policy, practice and response actions. Perceptions on what elements of the project were 'successful' varied. For some, success was perceived to be in relation to the formation of new communities of practice and research networks. For others, success was linked to developing and linking new qualitative and quantitative models for understanding complex problems. Specifically, the role of ecosystem services in disaster management was made clear not only in scientific publications (e.g. [13••]), but also in stakeholder publications [17]. This knowledge was helpful in eliciting new perspectives and actions in the management of ecosystems and disasters (e.g. [9••]) across a wide group of stakeholders. These actions resulted in a suite of ecosystem-based response strategies initiated in Eden, including private and public investments, restoring ecosystem services, institutional changes to promote more pro-active disaster risk reduction and the establishment of multiple social-learning networks [9••].

However, most participants agreed that the processes of collaboratively designing the project, producing the knowledge, and developing and implementing the response strategies were its main successes, as highlighted by a knowledge broker: '*A large part of the success in Eden is that it spoke to what can be done over what can't be done and the power of the individual and organisations shared response to a problem*'.

Participants did, however, mention some shortcomings of the project, inter alia the absence of a baseline assessment

Table 1

Broad topics for discussion in the interview guide

Broad topic	Main question categories
Role in the project	The way in which they became involved The ways in which their different roles emerged Other individuals with whom they closely collaborated
Whether the project has been a 'success'	Their definition of indicators of success Their views on what important outcomes of the research should be Satisfaction with the outcomes
How knowledge was exchanged	Role players with whom information was shared Means of sharing information Perceived barriers, if any, to knowledge exchange
Learning, if any, that had occurred	Whether they learnt anything new in terms of knowledge, skills or networks Their opinion on whether others had learnt anything new in terms of knowledge, skills or networks