Environmental Science & Policy 54 (2015) 497–504

Contents lists available at ScienceDirect

Environmental Science & Policy

journal homepage: www.elsevier.com/locate/envsci

Creating a biodiversity science community: Experiences from a European Network of Knowledge

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ARTICLE INFO

Article history:
Available online 23 April 2015

Keywords:
Science–policy interfaces
European research
Biodiversity
IPBES
Network of Knowledge

ABSTRACT

As biodiversity continues to decline despite our increased knowledge of the drivers and consequences of biodiversity loss, much of the current focus is on strengthening interfaces between biodiversity knowledge and policy-making. While many of the challenges associated with science–policy interfaces are well known, what is less well studied is the more specific issue of how to integrate the broad range of knowledge relating to complex issues such as biodiversity and ecosystem services, to inform decision-making at regional and global scales. Based on a formative evaluation of the development of a European Network of Knowledge on biodiversity and ecosystem services, we identify key themes to build a broad biodiversity science community capable of developing integrated knowledge to inform decision-making. Based on these findings we outline future steps for the successful integration of knowledge in decision-making at the European, and also the global scale, in particular the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES).

1. Introduction

Our understanding of the causes and consequences of biodiversity loss has greatly increased but despite this biodiversity has continued to decline (GBO3, 2010; Liu et al., 2011) resulting in the recognition that new approaches are needed (Butchart et al., 2010).

Many of these approaches have focussed on the apparent disconnect between science, decision-making, and sustainable management, but often continue to follow the 'linear model' of transferring facts to solve problems as perceived by policy-makers (Young et al., 2014). Such a model has a number of drawbacks, including potential mismatches with user needs or concerns, ill-adapted or untimely communication means and lack of engagement of key knowledge holders (Vogel et al., 2007; Young et al., 2014; van den Hove, 2007). The model fails to realistically capture the complexity of both science and policy, ignoring the socially constructed nature of knowledge (Cash et al., 2003). Complex and broad issues around biodiversity encompass a wide range of values and knowledge (Young et al., 2014), which can make understanding and two-way communication problematic (Rothman et al., 2009) and are unlikely to lead to simple 'solutions' (Laurance et al., 2012; Pielke et al., 2007; Stirling, 2010).

The recognition of the complexities of both science and policy processes, and the challenges associated with the linear model have led to an increasing focus on strengthening interfaces between science, policy and society involving a process of knowledge sharing and co-production for mutual benefit (Spierenburg, 2012; van den Hove, 2007; Young et al., 2014; Fazey et al., 2012). One key part of this process involves bringing together different knowledge types and forming a broad knowledge community. Integrating this social dimension of biodiversity has the aim not only of better informing decision-making (Adams and Sandbrook, 2013) but importantly of initiating changes in behaviours (Sarrki et al., 2013). This has been the backdrop for the development of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) (Koetz et al., 2012), which was created in 2013.

The broad challenges of science–policy interfaces are well understood, as are issues over the institutional design of

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http://dx.doi.org/10.1016/j.envsci.2015.03.014
1462-9011/

intergovernmental science–policy initiatives such as IPBES (Vohland et al., 2011; Koetz et al., 2012). However, what is less well studied is the more specific issue of how to best bring together relevant knowledge types to develop more joined-up large-scale approaches involving a process of coproduction with the aim of informing decision making on biodiversity and ecosystem services.

The concept for a Network of Knowledge (NoK) was outlined in an interactive workshop in May 2009 involving 80 experts from across Europe (EPBRS, 2009), which led to the development of a proposal to the European Commission to explore turning this concept into practice. Building on existing knowledge transfer structures the NoK aimed at developing a joint community of interest and facilitating the interaction between knowledge holders and knowledge users by establishing transparent and rigorous procedures to bring together and organise knowledge whilst balancing the need for credibility, relevance and legitimacy (CRELE) (Cash et al., 2003; Sarkki et al., 2013). Led by a consortium of researchers involved in major networks of biodiversity expertise in Europe and with wide experience in interdisciplinary biodiversity research and science–policy interface work on the national, European and international scale, in 2011 a pilot European Network of Knowledge (NoK) on biodiversity and ecosystem services was developed and tested. The aim of this was to bring together all relevant forms of knowledge to answer specific questions jointly formulated with decision makers and other knowledge users. This involved a two-way, open consultation with a range of knowledge holders and knowledge users from across Europe encompassing research institutions, existing networks, practitioners and decision makers from different governance levels. Although peer reviewed science was recognised by participants of the NoK as a key knowledge source, biodiversity knowledge was defined more broadly, involving knowledge from a wide range of sources including field, local and indigenous knowledge, grey literature and knowledge in languages other than English (KNEU consortium, 2014). Thus, a key part of developing the NoK was the ability to bring together the diversity of actors holding and using knowledge on biodiversity and ecosystem services.

Through a series of participatory workshops the NoK developed a procedure to respond to requests for knowledge that included three key phases: preparing, conducting and finalising (see Fig. 1). The preparing phase involved a dialogue and scoping process between the decision maker requesting knowledge from the NoK (the requester) and knowledge holders to define the requester's needs and identify appropriate methods to respond to these needs – this phase aimed to increase the relevance of the question, methodology and subsequent response. The conducting phase involved the establishment of an ad hoc working group made up of experts based on the methods chosen and the expertise needs identified. The role of this group was to gather, evaluate and use the knowledge available from a range of sources to meet the needs of the requester – this phase aimed to increase the credibility and legitimacy of the knowledge produced. The finalising phase involved a review process by a broad range of both knowledge holders and knowledge users to ensure the outputs were of sufficient quality, relevance and understandable by all concerned – this final phase aimed to strengthen the relevance and credibility of the NoK outputs.

The NoK tested the above procedure using three case studies initiated and designed by the coordinators to assess different components of the NoK. The 'conservation' case study had a policy requester and focused on a policy driven issue, whilst the 'marine' case study was science driven, and the 'agriculture' case study had a mixture of both. In practice each one tested different parts of the NoK, with different people from different fields of expertise involved and different methods applied. The phases developed for the Nok and the different components of the NoK tested in the three case studies are outlined in Fig. 1.

The process of developing and testing the NoK was accompanied by a formative evaluation of the case study processes and outcomes, as well as the general NoK process. A formative evaluation differs from other types of evaluation in so far as it involves an ongoing process of evaluation during the development of a programme or intervention. Whereas summative evaluations examine effectiveness against stated objectives and are therefore conclusion orientated, formative evaluations focus on improvement and are action orientated. The formative evaluation approach is helpful to clarify goals, understand the nature of implementation processes and how they come together in practice and identify outputs and outcomes from the process (Clarke and Dawson, 1999). This enabled an iterative, dynamic approach with information feeding back in to directly contribute to the development of the NoK and build a more robust, practical process. The aim of the evaluation was to carry out (i) an assessment of the process of setting up a NoK; (ii) an evaluation of the process of carrying out case studies; (iii) an evaluation of the outputs and outcomes of the case studies and (iv) a detailed analysis of the difficulties encountered and how they were overcome. With this study, we aimed to support the development of the NoK, but also to further specify the challenges of SPIs on biodiversity and ecosystem services and other complex topics. The results of this formative evaluation, following a brief explanation of the methods used, are presented here. This empirical evidence highlights key themes for bringing together and transmitting existing knowledge into decision-making processes.

2. Materials and methods

As highlighted in the introduction, while the NoK had the overall aim of improving the science–policy interface on biodiversity and ecosystem services, the key objective within this aim was to better bring together a range of relevant knowledge, or in other words a range of different actors holding and using knowledge across Europe. Specifically, the development of the NoK was responding to a current lack of an inclusive enabling environment of better structured interactions that acknowledges the roles of existing knowledge holders in biodiversity science–policy interface across Europe (KNEU consortium, 2014). The focus of this evaluation therefore was the ability to bring together different actors and their knowledge, as a key factor towards strengthening science policy interfaces. The literature best suited to provide the most relevant theoretical framework for the evaluation was therefore based on criteria from the literature on public participation and stakeholder engagement in the field of environmental management (Rowe and Frewer, 2000; Beierle and Konisky, 2001) (see Table 2) which recognises the inseparable link between people and knowledge (Fazey et al., 2012). This formed a baseline to evaluate who was engaged in the NoK, how they were engaged (in terms of integrating knowledge), and the social and environmental outcomes of their engagement.

The main method of data gathering was 75 semi-structured interviews (Table 1) guided by, but not restricted to, the evaluation criteria. Interviewees were selected to include participants in the project who were involved in developing and/or testing the process and participants who advised or actively contributed to the process, from different areas of expertise, professions and from different geographic locations in order to capture a wide range of perspectives and opinions on the process. The testing of the NoK in the three case studies predominantly focused on different aspects of the preparing and conducting phases of the NoK, with only the conservation case study examining a policy driven issue with a specific requester from the policy community. A number of