

National scale mechanisms for integration at the science-policy interface for sustainable catchment management

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Abstract

In this paper we focus on the critical interface between science and policy, at the national scale. This paper identifies ways to facilitate better integration between science and policy through demonstrating potential mechanisms that will aid integration between scientists and policy makers. Mechanisms to aid integration at the science-policy

interface can be classed as ‘opening up’ and ‘closing down’. To enable robust policy making there is need for a participatory process that enables ‘opening up’ the science-policy discourse to a range of expertise, value positions and modes of thinking. There is also a need for ‘closing down’ type activities that assist the decision making process by cutting through large amounts of often uncertain, complementary and conflicting evidence. In this paper we provide an example of an ‘opening up’ mechanism and a ‘closing down’ mechanism. The former is centred around a ‘coordination role’ that the authors of this paper provide to the Government of England and Wales (Department for Environment, Food and Rural Affairs (Defra)) and the later example is based on a recently produced diffuse pollution ‘user manual’ that links our scientific knowledge of the cost effectiveness of a wide range of diffuse pollution mitigation methods to reduce the impact of agriculture on surface water status with national scale policy instruments. Effective two-way communication between researchers and governmental science and policy staff is vital if we are to move towards transparent and robust evidence based policy making.

Introduction

In this paper we focus on the critical interface between science and policy, at the national scale. The need for increased integration between scientific communities and policy makers has been highlighted (Funtowicz and Ravetz, 1993). There is also an urgent need for greater integration between policies, the natural and social science evidence base and their implementation to achieve sustainable catchment management (Macleod et al., 2007). The need to integrate intellectual and practical efforts of scientific communities and policy makers at the EU scale in support of Water Framework Directive (WFD) (2000/60/EC) implementation has been discussed by Quevauviller *et al.* (2005). Since the WFD is implemented at the member state scale it has generated a need for a critical interface between member state governmental departments and the scientific communities that they rely upon to direct and support their policies through the generation of an ‘evidence base’. The authors conclude

that the lack of clear coordination mechanisms at EU and member state levels has led, in part, to policy research needs not being communicated to the scientists and research outputs not reaching or being used by policy makers. Other factors impeding the science-policy interaction include differential cultures, expressed in different discourses; different timetables; different standards for measuring excellence and different forms of accountability (de Jong, 1999). This paper is focussed on identifying ways to facilitate better integration between science and policy through demonstrating potential mechanisms that will aid integration between scientists and policy makers at the national scale. As such, these mechanisms are examples of the move towards deliberative policy making (Hajer and Wagenaar, 2007).

In Europe, there has been a drive in environmental research programmes to bridge the science-policy interface through integrative research e.g. (Fry, 2001; Pohl, 2005; Tress et al., 2005; Tress et al., 2007). Integrative research covers both interdisciplinary and transdisciplinary research projects and has been defined by Winder (2003). Interdisciplinary projects involve crossing the subject boundaries of multiple academic disciplines to create new knowledge and achieve a common research goal. Transdisciplinary projects involve non-academic participants such as policy makers, as well as academic researchers from multiple disciplines to create new knowledge and answer a common question. Barriers to integrative research include: additional time required for integration, challenges of coping with different academic traditions and the geographic distances between researchers (Tress et al., 2007). Pohl (in press) recently asked if transdisciplinary research was a valuable means to address the science-policy interface? The authors found that transdisciplinary research projects can be categorised as either reorganising knowledge according to the perceived interest of the audience or co-production of knowledge through greater interaction. The later is more useful for policy development especially when multiple policy cultures need to be involved e.g. climate change and sustainable catchment management. In the UK, there has been a growing awareness of the need to bridge the science-policy interface. A workshop in 2005 addressed two key questions: how do we improve

the linkages between policy needs and research programmes; and, how do we enhance the accessibility of scientific knowledge to policy makers? (Science meets Policy, 2006). In summary, it was recognised that significant efforts from both the science and policy sides was required to enable a more effective and robust interface.

Mechanisms to aid integration at the science-policy interface can be classed as ‘opening up’ and ‘closing down’. To enable robust policy making there is need for a participatory process that enables ‘opening up’ the science-policy discourse to a range of expertise, value positions and modes of thinking. This helps ensure scientists and decision makers are fully informed of all the scientific and societal options. The drive towards ‘evidence based’ policy will benefit from this ‘opening up’ process as it should provide greater transparency and accountability in decision making.

There is also a need for ‘closing down’ type activities that assist the decision making process by cutting through large amounts of often uncertain, complementary and conflicting evidence. A scientific knowledge based approach is required that acknowledges the complexity of the science and the science-policy interface and the uncertainties associated with the chosen approach (van den Hove, 2000). Both ‘opening up’ and ‘closing down’ processes are shaped by power relationships (Fischer, 2000). The balance required between ‘opening up’ and ‘closing down’ type appraisals in participatory multi-criteria analysis has been recently explored by Stirling (2006).

To aid national scale integration at the science-policy interface, we provide an example of an ‘opening up’ mechanism and a ‘closing down’ mechanism. The former is centred around a ‘coordination role’ that the authors of this paper provide to the Government of England and Wales (Department for Environment, Food and Rural Affairs (Defra)) and the later example is based on a recently produced diffuse pollution ‘user manual’ that links our scientific knowledge of the cost effectiveness of a wide range of diffuse pollution mitigation methods to reduce the impact of agriculture on surface water status with national scale policy instruments.

‘Opening up’ mechanism: Sustainable water management coordination role

Our primary aim is to enable effective coordination and communication between the relevant scientific disciplines (e.g. hydrology, biogeochemistry, landscape management, economics and sociology) and between Defra science and policy staff involved in assessing and managing agriculture’s impact on water resources at farm, catchment and national scales. We have established forums (physical and virtual) where research scientists and policy makers can inform each other of their work on assessing and managing the risks of agriculture on sustainable water management and their research and policy requirements. An online blog, including podcasts from our workshops, allows the wider scientific and policy communities to keep abreast of recent developments. The advantage of a blog approach is that it is interactive and invites live and evolving feedback. National and international workshops will examine our knowledge of the sources, pathways, impacts and management of agriculture on water resources in light of climate change. These workshops will bring together advances in several scientific disciplines to allow participants to assess the status and further research requirements for integrated water management. Thus, these online and face to face deliberative spaces provide an opportunity to identify, debate and examine alternative perspectives, leading to a deeper engagement with the ‘evidence’ required for policy making.

‘Closing down’ mechanism: Diffuse pollution ‘user manual’

To aid policies on the management of diffuse pollution to inland and estuarine water bodies we have recently contributed to an assessment of the cost effectiveness of a wide range of diffuse pollutant (N, P, FIO and sediments) mitigation methods (Haygarth, 2003) and

linked these to a series of policy measures to enable policy makers to explore the cost effectiveness of policy scenarios (Cuttle et al., 2007). Each method has a description, rationale for adoption and means of reduction, mechanism of action, potential for applying the mechanism, practicalities of adoption, costs, effectiveness and other benefits or risks of pollution swapping. The method also highlights the areas of scientific uncertainty. To enable effectiveness and costs to be assessed, model farm systems were set for average UK climatic conditions on clay loam and sandy loam soils. These model farm systems included: arable, arable with manure, dairy, suckler beef, broiler and breeding pig (indoor and outdoor). Thus, this mechanism distils scientific knowledge into a product that can support decisions by policy makers by advising on suitable combinations of policy instruments to meet their goals.

Linkages between ‘Opening up’ and ‘Closing down’ mechanisms

There is an urgent need to create stronger and more transparent linkages between ‘opening up’ and ‘closing down’ mechanisms at the science-policy interface. Policy makers need to involve the research community throughout the policy cycle and to enable integration between a growing number of science-policy review cycles and the setting of future research priorities. Additional ‘closing down’ mechanisms that aim to distil the current state of knowledge of particular socio-ecological processes into decision support tools that are linked to policy decisions that are timely and transparent are required. Effective two-way communication between researchers and governmental science and policy staff is vital if we are to move towards transparent and robust evidence based policy making.

This paper has highlighted the need for improved integration at the science-policy interface and provided two examples of national scale activities in the UK. The examples highlight the need to have a balance between ‘opening up’ and ‘closing down’ activities. ‘Opening up’ and ‘closing down’ processes are interlinked but often in tension with one another. ‘Closing down’ mechanisms are more

likely to be perceived as legitimate if they recognise the multiple perspectives that deliberation encourages. However, it is difficult to distil these perspectives into elegant and/or practical solutions that are easily communicated by policy makers to operational staff. Furthermore, implementation of policy generates a range of further challenges to be tackled in partnership between scientists, policy makers and society. Evaluation of such mechanisms can help contribute to regenerative, not degenerative, institutions (Schneider and Ingram, 1997).

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