Environmental *Change* Institute

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Stepping up science-policy engagement to tackle environmental change:
Methods & examples for achieving policy impact

In the context of rapid and unprecedented environmental change, there is growing emphasis amongst the scientific community to engage in policy processes and realise societal outcomes in addition to generating new knowledge. But, how can science-policy engagement efforts be delivered? What are the methods and tools? What are common challenges which need to be addressed? To address these questions, we provide insights and examples of the methods of science-policy engagement by researchers at the Environmental Change Institute, University of Oxford. These practical insights aim to provide guidance for others in the research community to deliver their ambitions to engage in policy processes and generate societal outcomes.

Key messages

- In the context of environmental change, it is important for the scientific community to step up efforts to engage in policy processes and realise societal outcomes.
- A suite of different methods and approaches are available for researchers to engage in policy processes, these range from involving partners in knowledge production processes to engagement in formal policy processes.
- There is no 'one size fits all', and a policy engagement strategy will need to make use of different methods which are relevant to the context, to navigate complex policy landscapes. This brief provides some practical examples of how policy impact can be achieved.
- Effective engagement requires active efforts by researchers to adapt to the policy making culture, that is characterised by different expectations, timelines, and organisational culture.

Engaging at the interface between science and policy

Far reaching decisions are being made about our planet's resources and sustainable future and it is important to ensure that these decisions are grounded in sound science. To achieve this, science-policy engagement has emerged as an important aspect of research efforts related to environmental change (Cash et al., 2003, Clayton and Culshaw, 2009, UNEP, 2017, Clark et al., 2016, McNie, 2007). It involves social processes between scientists and policy actors to enrich decision making (Van den Hove, 2007). The overarching goal of science-policy engagement efforts is to enhance the credibility, salience and legitimacy of knowledge generated (Cash et al., 2003). While credibility relates to the adequacy of knowledge generated, salience refers to its relevance for the target users and legitimacy refers to how the knowledge generation process has remained unbiased and fair in dealing with different views and interests (Cash et al., 2003, Hegger et al., 2012).

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Best practice in science-policy engagement has been identified, including clear targeting of the audience, effective communications, ensuring easy access to research findings, joint knowledge production, participation in policy processes and knowledge brokering (Stringer and Dougill, 2013, Edelenbos et al., 2011, Marshall et al., 2017, Dinesh et al., 2018). In this brief, we have identified the different methods of science-policy engagement that have been used within the University of Oxford's Environmental Change Institute (ECI), within its five research areas: climate, ecosystems, energy, food and water. This brief is envisaged as a resource for researchers undertaking science-policy engagement efforts in the context of environmental change, and aims to provide practical guidance that is illustrated with examples. We have interpreted science-policy engagement in a broad sense, to include not only efforts related to formal governmental/ intergovernmental policy processes, but also informal norms and procedures, including influencing the strategies of community organisations, businesses and non-governmental organisations.

Designing a science-policy engagement strategy

Policy processes can be complex, involving multiple actors, drivers and motivations. Therefore, a sound understanding of the process is essential in order to develop a suitable science-policy engagement strategy. For example, policy processes could be in different stages of agenda setting, policy design, adoption, implementation, review and reform (Resnick et al., 2015, Jann and Wegrich, 2007), and the approach which may be taken would differ across these stages. Therefore, an approach which takes into account the policy processes, stakeholders involved, and challenges which may be faced, is desirable while designing a science-policy engagement strategy (Sitko et al., 2017). This may involve the following steps:

1. Identification of the policy process and stage, which is most appropriate to planned research efforts. Typically research findings are used in the design and review stages.

2. Mapping stakeholders to understand their roles, motivations and the power relations involved.

3. Identifying challenges that may be encountered.

4. Develop actions, which target the policy process identified, at the appropriate stage to exploit the 'window of opportunity', addressing the motivations of different stakeholders and overcoming perceived challenges.

Methods for science-policy engagement

There are a number of methods which can be applied in science-policy engagement, and these need to be selected based on the specific context. Clayton and Culshaw (2009) have identified policy-engagement methods for the Natural Environment Research Council (NERC) community, which we have adapted as below, together with context specific examples from ECI.

1. Formal dialogue

Formal dialogue with partners can take the form of participation in high level meetings, presenting at formal briefings, and through formal commitments to work together (Clayton and Culshaw, 2009). High level meetings can include both planned ones (as part of established processes, such as under the Rio Conventions) or ad hoc meetings which help researchers to understand priorities and the needs of partners, as well as to exchange information about research findings. Formal agreements such as, memoranda of understanding can demonstrate a formal commitment to collaborate. Science briefings and seminars can help communicate research findings, and provide evidence for policy decisions and processes (Clayton and Culshaw, 2009). At ECI, formal dialogue is used by many of the research groups, for example to support the National Infrastructure Commission (NIC) to analyse the UK's long-term economic infrastructure needs strategic vision (Case 1).

Case 1: Supporting the National Infrastructure Commission (NIC) to analyse the UK's long-term economic infrastructure needs strategic vision

The National Infrastructure Commission (NIC), a government agency within HM Treasury, is tasked with delivering an analysis of the UK's long-term economic infrastructure needs. It also needs to outline a strategic vision for the next 30 years and set out recommendations for how such needs should be met. In response to this policy demand, the Infrastructure Transitions Research Consortium (ITRC-MISTRAL), led by the University of Oxford, has developed the National Infrastructure System Model for Long-term Planning. The model integrates engineering-based models of demand and capacity for infrastructure services in the energy, transport, water, waste water, and solid waste sectors. There is a formal collaboration between ITRC-MISTRAL and the NIC that enables the uptake and use of the model results for this analysis and strategic vision.

2. Informal interactions, secondments and exchange

Informal interactions with policy partners, including through meetings, telephone conversations, secondments, and staff exchange, are important mechanisms for science-policy engagement. In fact, such informal interactions have been suggested to be the most effective science to policy route (Clayton and Culshaw, 2009), and ECI's experience also shows the popularity and value of such interactions (Figure 1). These interactions are often quicker than formal methods, based on trust and involve ongoing relationships and sharing of information, which can complement other methods of science-policy engagement. Frequent working meetings and telephone conversations with partners can help tailor research efforts to changing priorities and needs. Secondments and staff exchange can support ongoing science-based policy making within partner organisations, while also building the capacity of partners, as well as that of the researcher. Workshops and other external events with partners can create opportunities for networking, secure partner inputs, and help highlight research findings. Informal interactions require proactive participation by researchers, taking account of context specific conditions (e.g. time constraints), but are valuable in different stages of the science-policy engagement process. In some cases these remain unstructured, in other cases, these interactions may take a more structured approach, such as through staff exchange and secondments (Case 2).

Workshop on scenario-guided policy analysis for development, food security and environment in South East Asia | Photo: E. van de Grift for CCAFS

Case 2: Staff secondment to the Cambodian Ministry of Agriculture, Forestry and Fisheries

A staff member was seconded to the Cambodian Ministry of Agriculture, Forestry and Fisheries, to support the Ministry to incorporate a future scenarios approach into the development of Cambodia's Climate Change Priorities Action Plan for Agriculture (CCPAP). This was part of the ECI-hosted CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) future scenarios project. This engagement resulted in the CCPAP plan featuring a scenario-guided priority-setting, with a focus on climate-smart agriculture, and subsequent financial allocations to implement the plan.

3. Capturing information on social and economic impact

Information on the social and economic impact of research can help convince policy makers and practitioners to take on board research findings. This can include providing research evidence to inform public policy, enhancing research capacity and skills of policy organisations, as well as downstream impacts of research, such as changing practices and improving well-being of target populations. Capturing and presenting such information can help build a business case to justify the benefits of future engagement (Case 3).

Case 3: Providing relevant scientific evidence to policy-makers at local, national and EU levels

At Local level – Cherwell District Council and Bioregional approached the Ecosystems team within ECI for their support with developing their Green Infrastructure (GI) Plan. The policy outcomes have included a more robust GI plan for Bicester, input into the National Planning Policy Framework and Guidance and a tool box of proven GI assessment tools suitable for use by Local Authorities (Smith et al., 2019).
At National level – ECI staff have contributed significant knowledge and expertise to various chapters of the second UK Climate Change Risk Assessment (CCRA) that is part of the Governments' commitment under the Climate Change Act 2008 to publish a CCRA every 5 years. The evidence from the CCRA feeds into the UK National Adaptation Programme that sets out the actions being taken to address the risks and opportunities posed by a changing climate. It was published by Defra in July 2018. ECI contributed evidence to Chapter 3 Natural environment and assets, and Chapter 8 Cross-cutting issues (Interactions between risks, distributional and indirect impacts).
At EU level - the adaptation team within ECI contributed to a report on the methods being used for assessing vulnerability to climate change in Europe for DG Clima, European Commission (Downing, 2017). The knowledge from this study also contributed to a European Environment Agency report that completed a survey of the status of Member States' vulnerability and risk assessments to climate change (Füssel et al., 2018). Both of these reports, along with other evidence sources, fed into the Evaluation of the EU's Strategy on Adaptation to Climate Change 2018.

4. Partner involvement in research programmes and projects

Involving policy makers and non-research impact partners within research programmes and projects can help ensure that the project/programme has a policy focus at the very outset and allows researchers to obtain timely advice from partners. Such involvement can also help ensure that research outputs cater to the needs of partners, and improve dissemination and communication efforts (Clayton and Culshaw, 2009). Partners can be involved either on advisory boards for the project/program, as well as peer-reviewers and advisors for specific outputs. Engaging the Food and Agriculture Organisation (FAO) within the Scientific Advisory Committee of the Global Environment Change and Food Systems (GECAFS) project was crucial in ensuring that research outputs informed policy processes within the FAO and the international community (Case 4).

Case 4: Food systems 'thinking' within the Food and Agriculture Organisation

The GECAFS project was developed with the specific aim of helping to set the policy agenda for major agencies working in the development agriculture and food security sector. FAO was the principal 'client' from the outset and in addition, several other major organisations have also adopted food systems 'thinking'. An FAO representative was invited as an inaugural member of the Scientific Advisory Committee from the design stage and FAO colleagues were also engaged in the research. The co-development and co-ownership of the project outputs enhanced the stakeholder adoption and helped FAO embrace a stronger food systems perspective. The GECAFS food systems 'thinking' was incorporated into FAO's major strategic policy document – Climate Change and Food Security: A Framework Document (2008).

5. Involvement with partner advisory committees

Researchers can become members of relevant partner advisory committees to provide advice and ensure that scientific findings are incorporated within the policies and plans developed. This usually happens at the level of individual researchers' and not at the project/programme level. While some advisory committees are reconstituted periodically, others maybe created at short notice to deal with specific problems and opportunities (Clayton and Culshaw, 2009), therefore some level of flexibility is beneficial while adopting this approach. ECI staff members are involved in ten partner advisory committees , expert panels or steering groups (see Figure 1).

6. Provision of technical assistance

This is a highly demand driven route and involves responding to requests from partners for technical assistance (e.g. evidence generation, analysis for specific tasks and parliamentary questions). There is usually a gap in technical capacity within policy partners' organisations which can be filled by researchers, while at the same time ensuring that their findings are used in the analysis. Requests for technical assistance may often be received at short notice, and it is useful to have the flexibility to respond to these requests, in order to increase the non-academic impact of research. ECI is involved in providing technical assistance to policy partners at various levels, for example providing technical assistance to the Scottish Government (Case 5).

Case 5: Developing a transport, energy and air pollution model for use by Scottish Government

A researcher within the UK Energy Research Centre has been developing and disseminating the Scottish Transport Energy and Air pollution Model (STEAM) for transport/energy policy analysis and strategy development. This has involved a series of meetings with various parts of the Scottish Government (transport, energy and climate, air quality). The planned policy and scenario modelling work aims to respond to the needs of the Scottish Government to develop their transport, energy and climate policy following the climate change plan. This includes a quantitative scenario exercise using STEAM to explore four contrasting futures for Scotland that compare 'lifestyle' change and socio-cultural factors against a low carbon, technology-focused transition pathway using a socio-technical approach.

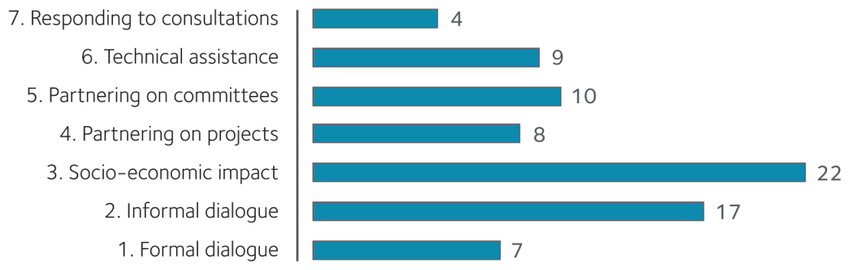
7. Responding to consultations

There are often opportunities to respond to consultations launched by partners. This method helps ensure that the consulting organisation is aware of relevant research findings while developing a policy or making an investment. Case 6 shows an example of responding to consultations under the UNFCCC's Warsaw International Mechanism.

Case 6: Input from the ECI for the work plan of the Warsaw International Mechanism

In 2014, ECI submitted its views in response to a call from the Executive Committee of the Warsaw International Mechanism under the UNFCCC. The submission provided the Executive Committee of the Warsaw International Mechanism with details relating to the science of attributing extreme weather events, probabilistic event attribution in practice, and suggestions for the work plan.

Figure 1: Methods for science-policy engagement in the ECI



An analysis of the different methods used within ECI during summer 2017 (see Figure 1) shows that the full range of methods for science-policy engagment are applied and that the most common method is capturing information on social and economic impacts, such as contributing to policy reports and briefings. The analysis also showed that individual personal relationships (respectful and respected) were frequently used and critical to successful science-policy engagement. These relationships tended to be developed over a long time while working together on different projects and a range of different activities.

Towards more effective science-policy engagement under environmental change

While the above section outlines different methods for science-policy engagement and how these have been put into practice in ECI, they are not without their challenges. Designing, implementing and assessing science-policy engagement efforts are challenging (Van den Hove, 2007). These challenges include: dealing with the expectations of policy partners, the often tight timeframes involved, high staff turnover in partner organisations, the difficulty of attributing policy change to engagement activity and communicating uncertainty. However, there is a growing emphasis on evidence-based policy and practice, which provides an opportunity for researchers to strategically link their research to policy outcomes through effective science-policy engagement mechanisms. While this brief provides a range of methods which have been applied in the ECI context, these need to be complemented with a sound understanding of the policy-making processes and decision needs for the individual situation. Science-policy engagement activities should take into account the specific context of the engagement and choose the methods and relevant content to meet the needs of the stakeholders involved.

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