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EPA RESOURCE KIT:
BRIDGING THE GAP BETWEEN SCIENCE AND POLICY

Resource 2 – BRIDGE: Good Practice Guide for science-policy communication

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BRIDGE Good Practice Guide for Science-policy Communication

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Glossary of definitions for this document

Communication
Communication is the exchanging of information, the sharing of ideas or transfer of knowledge.

Evidence
Evidence is the available body of facts, data and information on which policy decisions can be based. This might include technical scientific data as well as medical data, economic data and socio-economic data.

Evidence-based (policy)
An approach whereby the best available evidence from research, which may include economic, sociological and technical evidence and so on, is used to make well informed decisions about policies. The evidence for environmental policy would include, but would not be limited to, environmental science.

Intermediary
This refers to those individuals or organisations who act as translators, conduits of information or facilitators of communication between scientists and policy-makers. Intermediaries may include those operating within science or policy environments and whose jobs involve these tasks, such as policy analysts or researchers, communication consultants, science journalists, research communication officers as well as those operating outside of the science or policy environments, such as NGOs, business representatives, and community organisations and so on.

Knowledge brokering
In much of the literature dealing with science-policy communication, the terms intermediaries and knowledge brokers are used interchangeably. However, at various junctures in the transfer of knowledge within the science-policy interface, both scientists and policy makers also need to translate and broker knowledge and the act of knowledge brokering is often attributed to all stakeholders involved in the science-policy interface. In this document, then, the act of knowledge brokering is used to refer to the combination of tasks necessary to transfer knowledge and information within the science-policy interface. It follows therefore, that knowledge broker can refer to any of the stakeholders who are undertaking those tasks at that time.

Policy
A policy is a strategy to address a particular need or to achieve a particular outcome

Policy-maker
Those directly involved in policy decision making, such as politicians and government department officials.

Research
Systematic investigation to confirm facts and reach new conclusions.

Science
In this document, an organised body of biological, chemical, bio-chemical or physical knowledge.

Science-policy communication
The exchange of knowledge and views between science researchers, policy makers and other interested stakeholders in order to integrate research findings into public policy and to inform researchers about the types of information required to make future policies.

Science-Policy Interface (SPI)
The Science-Policy Interface is the communication space between science, policy and interested stakeholders, particularly in relation to policy formulation and implementation and research agendas.

Scientist
Scientists refers to those conducting environmental science research including university researchers, environmental consultancy or independent researchers, government and industry scientists as well as environmental non-governmental organisations (ENGOs)

Introduction

As the first output of the *BRIDGE Linking science and policy* project which is funded by the EPA Strive programme, this document summarises current international good practice in science-policy communication. The information is drawn from a range of sources including academic literature, national and supra-national policy documents and reports from international science-to-policy communication initiatives. While a broad sweep of science-to-policy literature has been taken into consideration in the preparation of this summary, it focuses particularly on three critical core environmental policy areas identified as key to Ireland's sustainability strategy: biodiversity, climate change and water management (DETE, 2006; DoECLG, 2012; EPA, 2012).

This good practice summary is concerned with communication between environmental scientific researchers and policy makers. Those conducting environmental research may include university researchers, environmental consultancy or independent researchers, government and industry scientists as well as environmental non-governmental organisations (ENGOs) while policy makers include those directly involved in policy decision making, such as politicians and government department officials. In addition to scientists and policy makers, policy discussions involve many other stakeholders who act as information conduits between researchers and policy makers or as advocates for special interests. Such intermediaries, or knowledge brokers, may include communications professionals, environmental special interest groups and ENGOs, think-tanks, business, environmental journalists and even research scientists in other research areas. All are stakeholders in the formulation and implementation of environmental policies.

While this document will refer to researchers, intermediaries and policy makers, clear demarcation between such stakeholders in environmental discussions is not always possible, or indeed appropriate, as the groups overlap and roles can be dynamic (see Garvin, 2002; Young and Waylen, 2011). For example an ENGO may be an intermediary, but may also be involved in research or indeed a policy maker may be heavily involved in an ENGO, and so on.

The summary has four main sections; the first section looks at how science can inform the policy process, the second section details the barriers to science-policy communication, the third section provides an overview of science-policy good practice recommendations and finally, the fourth section offers case studies of science-policy good practice examples from the biodiversity, climate change and water management sectors.

Using scientific research in environmental policy decisions

Our expertise in environmental matters is perpetually increasing as significant amounts of time and money are spent on research related to environmental issues. If, however, this expertise is not translated into policy, is not used to protect people or planet and fails to impact positively on society how valuable can it truly be? Science-policy communication is the exchange of information between science researchers, policy makers and other interested stakeholders in order to integrate research findings into public policy and to inform researchers about the types of information required to make future policies. When environmental policy is based on environmental expertise as evidence, it is generally more robust, relevant and has more positive impacts. In short, integrating environmental science into environmental policy makes better environmental policy.

There is some discussion as to what constitutes evidence-based policy. One widely used definition of evidence-based policy is an approach that "helps people make well informed decisions about policies, programmes and projects by putting the best available evidence from research at the heart of policy development and implementation" (Davies, 2004: 3). Realistically though, there are differing extents to which policy may be shaped by evidence and some policies may be more accurately described as being *evidence-influenced* or *evidence-aware* rather than evidence-based. (Davies et al, 2000).

It is necessary to make an important distinction here between evidence-based policy and science-based policy as scientific research is just one type of evidence and often policy makers will set out to balance scientific data with economic data, social science data and so on. However, the formalised evidence-base of policy making is, of course, just part of the story and it would be naive assume that policy making is an entirely rational process based on evidence alone (Davies et al, 2000). Other considerations including resource availability, values, political compromises, public opinion, culture, the relative clout of the various interested stakeholders and the proximity of the next election may all bear influence on policy making. As illustrated by Fig. 1 below, policy is often the result of many often interwoven and sometimes conflicting, considerations vying to be heard (Jones and Walsh, 2008; Barry, 2009).

One example of this is highlighted in a report from the NGO World Wide Fund for Nature (WWF, formerly the World Wildlife Fund) on overfishing in the EU. The report claims that over the past decade, fishing quotas have been set on average 45% higher than advised by experts and that

fisheries ministries in EU member states have followed scientific advice in just 13% of their decisions (WWF, 2012)[1]. Clearly other factors were shaping these decisions such as political measures to support fishing industries and communities reliant on higher level fishing quotas. It does illustrate however, that an important challenge for both policy makers and scientists is the communication of policy-relevant science in a clear and transparent fashion within a "crowded marketplace" of issues and concerns (Barry 2009: 1).

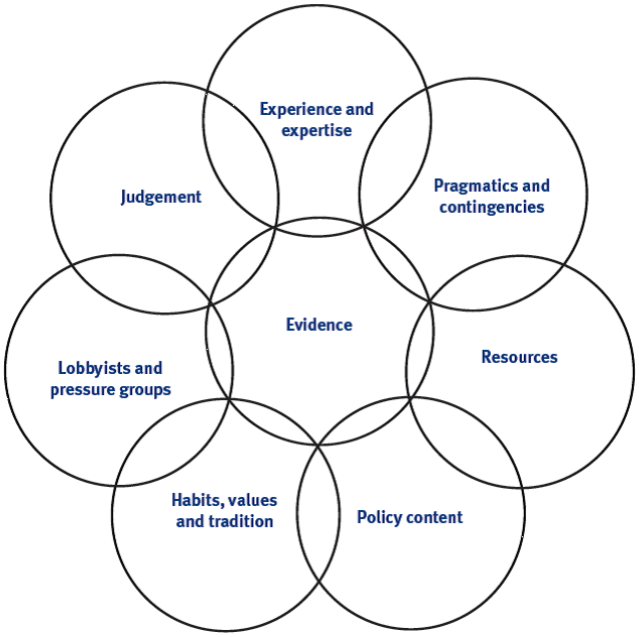

Fig. 1: Policy is influenced by many factors (adapted from Jones and Walsh, 2008: 2)

That scientific research should be at the heart of policy formulation is a refrain often repeated by both researchers and decision makers (Davies *et al.*, 2000; Forfas, 2012). In Ireland, the need for evidence-based policy has been articulated by a number of policy sectors from socio-economic policy (NESF, 2007) to biodiversity (NPBR, 2006). Ireland's national research strategy recognises the need to foster research which can contribute to solving public policy challenges (Forfas, 2012). Equally, the current national sustainable development strategy emphasises the role of research and development in influencing and directing public policy to achieve sustainability across social, economic and environmental spheres of activity (DoECLG, 2012). At the European Union (EU) level, the use of the best available knowledge in policy decisions is a guiding principle of the Council of European Union 2006 Renewed EU Sustainable Development Strategy and an important aim of the EU Seventh Framework Programme (FP7) has been to harness research in service of sustainability.

[1] The WWF calculated these statistics using data supplied by the European Commission

Communicating science within the policy making process

In general, the policy cycle can be broken into six main steps; reviewing the evidence, translating the evidence into policy options, assessing each option (including risk assessment), deciding on the final policy, implementing the policy (including legislation) and monitoring the impact of the policy (see Fig. 2 below). In environmental science policy, environmental scientists may play a role in each of these cycle stages. However, the earlier scientists are involved in the process, the more likely it is that the relevant science will be integrated into the resultant policy. Such early involvement necessitates that the scientists and policy makers are already well integrated and fully aware of policy cycles and scientific practice activities.

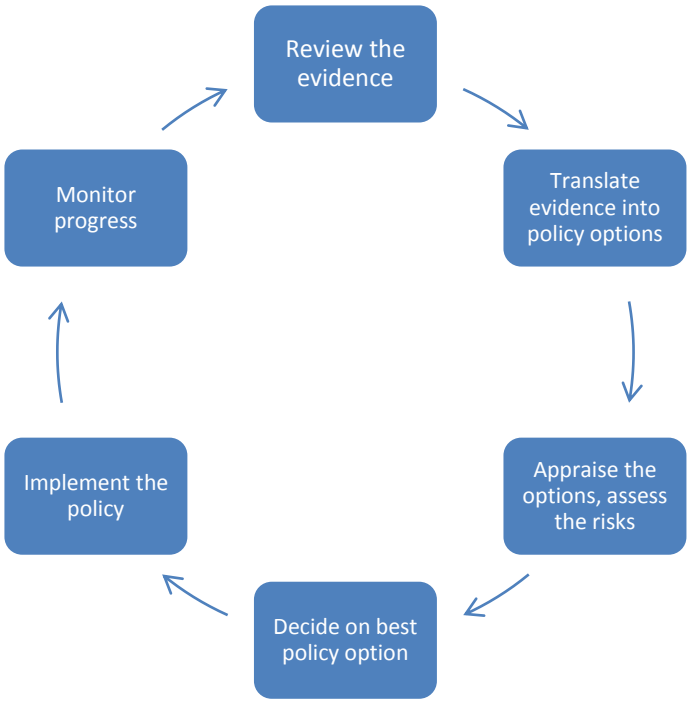

Fig.2 The policy process (adapted from Clayton and Culshaw, 2009, p.5)

Throughout the policy development and implementation process there are specific points where communication between policy makers and scientists is appropriate and useful. Given that there are multiple routes to making policy, from national legislation and regulations to local government by-laws, the entire range of possible communication points is beyond the scope of this good practice summary[2]. Legislation in Ireland goes through a number of stages. Policy papers are drawn up in government departments by officials. These are circulated widely for consultation purposes. Once

[2] For a more complete description of the Irish policy landscape please refer to the policy mapping exercise from AquaTT as part of a parallel sister project to the BRIDGE project.

these papers are finalised, a legislative Bill is prepared. As soon as this Bill passes through all stages in the Oireachtas or parliament, it becomes an Act and has entered into law.

The most opportune times to influence legislation in this process is either in an informal capacity at the idea-gathering phase or formally when the green and white papers are being prepared in the department. Outside of these windows, there is less chance of shaping the policy to any great extent, although amendments to the legislation are possible at the Oireachtas committee stages via members of the committee.

Barriers to science-policy communication

While policy makers and environmental researchers often have broadly similar goals in their desire to protect the environment, there are difficulties in integrating environmental research into environmental policy and implementation. Weakly developed communication between the stakeholders involved, from researchers, through intermediaries to policy makers, can hinder the impact of science on policy (Stevens et al., 2007). Communication about technical information between policy makers, scientists and other interested stakeholders in the policy making process is not a simple matter of presenting research findings and trusting that they will flow easily into policy and practice. Studies in other jurisdictions show that there are significant barriers to science-policy communication (Bielak et al, 2008; Young and Whalen, 2012). Barriers and the extent to which they inhibit communication are likely to differ, not just between sectors, but also within sectors as both science and policy landscapes change over time. Consequently, prior to attempting to 'fix' or improve any given science-policy interface, exploring the barriers and their relative impacts is prudent.

From earlier studies, the main barriers to positive science-policy communication are as follows:

- The respective **timeframes** upon which scientific research and policy decision-making work are often very different so that **policy cycles** and **research agendas** may not match, or even complement, each other
- Although they may have similar goals, policy making and science have very different **cultures and work practices**
- Scientists and policy decision makers speak different languages, with **different vocabularies, meanings and understandings** of terms
- Policy makers may not have the **expertise** or the **time** to **consult** with experts or **access** information from academic research papers
- Research budgets may not provide **funding** for policy focused or lay-person focused dissemination of results
- **Career advancement** within academia is very dependent on the impact of peer-reviewed published academic literature and there is often little career benefit, and maybe even drawbacks for scientists who spend time communicating with publics or policy maker

- The science involved in environmental issues can be complex or may contain significant **uncertainty** while policy makers are required to make specific policy legislation
- Scientists may have **poorly developed communication skills** or policy experience;
- Scientists and politicians have **different ways of constructing and understanding knowledge** in different ways and so may have problems recognising the legitimacy of each other's' views
- Politicians and scientists have **different decision making criteria**, politicians are solution focused and tend to make decisions by building coalitions and balancing between stakeholder needs, scientists are trained to think about problems and have a narrower frame of choices
- **Different scientific disciplines may offer different opinions**, which politicians often find confusing or unhelpful

Good practice for science-policy communication

The challenge of improving science-policy communication is not new and there have been many international science-policy communication initiatives and projects that offer a cache of lessons for good practices aimed at linking science with policy making[3]. Existing science-policy communication research and practice in the key policy areas of biodiversity, climate change and water management, as well as studies in other policy areas may have application for these sectors in Ireland.

Researchers and practitioners pinpoint several essential characteristics of good science-policy communication. In particular, the literature stresses two-way positive communication between scientists, policy-makers and intermediaries and the importance of designing research that addressed the needs of the research users. Furthermore, to be most effective, science-policy communication must occur throughout the research cycle rather than being an add-on activity (Tyden and Nordfors, 2000). Transparency in relation to how science is used in environmental policy decisions is also important. Ideally, evaluation of the impact of research on policy should also form part of the science-policy communication process.

Much science-policy communication research has been carried out within the context of projects which aim to improve such communication. As a result there is a strong element of practice and practicality within such research. There are also remarkable commonalties across the literature in terms of which approaches, strategies and communication tools work best. A study from the EU SKEP (Scientific Knowledge for Environmental Protection) of science-policy communication across Europe, US and Canada for a range of environmental policy sectors showed striking similarities in what communication strategies worked and what did not (Bielak *et al.*, 2009). The various recommendations towards achieving positive two-way communication in the science-policy interface can be categorised into four core components of good science-policy communication practice.

These components, which are generally interdependent on one another and are often used in tandem, include the following:

- institutional buy-in and support
- collaborative spaces for communication

[3] It is worth noting that many academics researching communication between science and policy also act as science-policy consultants and practitioners (for example, see Krantzberg, 2006; Bielak et al, 2008; Shaxson, 2009; Somerville and Hassol, 2011).

- knowledge brokering and intermediaries
- appropriate communication channels, content and vocabulary

Institutional buy-in and support

In order to be meaningful and have a good chance of impacting on policy decisions, science-policy communication must be considered a priority at the highest levels of the institutions involved. These institutions include government departments, government agencies, research funding bodies and research institutions. Committed buy-in for science-policy communication at this level is essential to overcome barriers (Young and Waylen, 2012). Recently, the Director of the ERSI, Frances Ruane stressed the need for engagement between the research and policy making communities in Ireland and the need for genuine political commitment, from both officials and politicians, to make this engagement happen (Ruane, 2012).

Science-policy communication requires resources, decisions and actions that are generally controlled by those in powerful positions within an organisation. Issues such as ensuring professional recognition in the form of money or career development for those who participate in science-policy communication must be sanctioned at the top tiers of an institution or research-funding organisation. Likewise, decisions to provide funding and training to ensure the communication of research findings, which may mean less hard science, require top level support.

There are a number of actions that such institutions can take to facilitate the integration of environmental science into environmental policy. Research funding bodies, for instance, could set out specific required minimum outputs from science-to-policy communication. These outputs could include policy relevant recommendations, policy abstracts, video shorts explaining the research, plain-language policy summaries or seminar presentations aimed at policy makers. Funding bodies may also provide communications training for, in particular, PhD students or early career researchers receiving funding. Either or both research and policy-making units could consider making the responsibility for science-to-policy communication part of an existing role or create a dedicated role for this purpose (Meyer, 2010).

Collaborative spaces for communication

Studies of science-policy interfaces related to biodiversity, climate change and water management emphasise that science-policy communication is a collaborative activity

(Schaefer and Bielak, 2005; Jacobs et al, 2009; Young and Waylen, 2012). Collaborating within networks of researchers, policy makers and other stakeholders can help to ease many science-communication barriers. The formal and informal relationships built within a network can facilitate an on-going dialogue between biodiversity scientists and policy makers. This allows new scientific information to be fed through to the policy process. For instance, Canadian water managers who attended a series of network-building workshops with research scientists found that the information they gleaned from this networking helped to inform policy and changed their policy agendas (Schaefer and Bielak, 2005).

Collaborative communication is important for building trust between actors in the science-policy interface. Policy makers tend to have most trust in information coming from intermediaries and scientists with whom they have a personal or working relationship. This underlines the importance of at least occasional face-to-face contact between scientists and policy makers (Shiekheldin et al, 2010). For the science-policy interface to work well, trust must be a two-way street. Scientists who give their time and expertise to the policy process (often for little gain) are likely to become disillusioned if political considerations or vested interests routinely over-ride scientific evidence in policy decision making.

Networks can be leveraged to help science and policy communities understand each other's timescales, modes of operating and the constraints each must bear. This helps to mitigate the barriers created by differing timeframes between research and policy agendas and also frustrations that might arise due to differences in priorities. A network should be created at the outset of a research project. Prior to establishing a network, those driving the process need to have clear plans with regard to the purpose of the network, how it will be funded, who needs to be involved, how the network will meet or connect and how to promote the network. Ideally scientists and policy makers should already be aware of or in contact with each other prior to the project starting, however, even if this is not the case, there are ways to initiate a network. A stakeholder analysis exercise can be useful in identifying stakeholders who need to be included within the network. Following this, a combination of direct contact and snowballing techniques (where one contact recommends another contact) can be used to build a bank of potential network members. To cast the net wider, a more formal strategy of seeking expressions of interest from policy and research communities can be used to draw in those interested in participating. It is generally a good idea to include external intermediaries, such as ENGOs involved in a relevant area, in science-policy networks.

Once established, the network members need to firm up on details such as how the network will feed science into policy, how transparency will be assured and what the benefits of networking will be for the different stakeholders included. The members also need to draw-up a programme of activities for the network. The programme could include items such as skills training and capacity building (in basic science, policy process or communication techniques as required), face-to-face networking events and regular online/electronic communication. Generally, it is advisable to have a couple of members, each from different stakeholder groups, to drive the network and ensure that contact is sustained throughout the life of the project. Strategies designed to foster collaboration between different groups of stakeholders include using exercises such as Reframing Matrix, Six Thinking Hats and Constructive Controversy[4], which allow stakeholders view issues from a number of perspectives and help establish common goals between them.

Innovative collaborative schemes such as work exchange and knowledge exchange activities can do much to foster science-policy communication. Site visits and on-going formal and informal communication between policy makers and scientists can help in bridging the gap between the two groups. In the UK, the National Environment Research Council (NERC) uses knowledge exchange activities and work exchange programmes to link natural science research with policy development as well as with business enterprise and innovation. These knowledge exchange activities act to foster of active engagement between NERC-funded scientists and end users of the research and include policy briefings, open research archives, knowledge exchange portals and the participation of scientists in advisory committees (see NERC, 2007). NERCs work exchanges allow both policy makers and natural science researchers to shadow each other at work in order to reach better understandings of their respective counterparts (Clayton and Culshaw, 2009).

Establishing and maintaining networks and collaborative science-policy communication can present particular challenges, however. Collaborative activity is resource intensive requiring time, personnel and funding. In addition, ensuring that the network or communication space created is reflective of the range of stakeholders involved can be a complex balancing act. All those involved in the communication process need to work at maintaining a two-way or network dialogue. However, some studies suggest that those on the science side may find they need to be particularly proactive in these exchanges (for example, Young and Whalen, 2012).

[4] These three tools Reframing matrix, Six thinking hats and constructive criticism are group exercises used to deconstruct a problem or issue so that it can be viewed from different perspectives in order to find solutions, agreements or consensus on goals.

Knowledge brokering and intermediaries

The critical role played by those operating between science and policy is acknowledged in studies and practice relating to biodiversity (Young and Waylen, 2012), climate change (Somerville and Hassol 2011), water management (Bielak *et al.,* 2008; Shiekheldin et al, 2010) waste management (Shaxson, 2009) and environmental policy in general (Meyer, 2010). Intermediaries (and those acting as knowledge brokers) have a wide range of potential functions aimed at facilitating positive two-way dialogue within the science-policy interface. Their roles may include seeking out scientific research in specific areas and creating directories of experts. They may be tasked with interpreting the science in view of the policy context as well as 'repackaging' and presenting science to policy makers. Intermediates are often ideally situated to tend to the 'social capital' of science-to-policy collaboration, taking a central role in driving networks and organising training or information events, such as seminars and workshops.

As a consequence of the multifaceted nature of their responsibilities, intermediaries often require particular strengths and skills. Usually they have a scientific and/or policy background, good communication and interpersonal skills, an ability to see the 'big picture' and to link information together, good prioritisation skills and confidence to make decisions when faced with incomplete information or uncertainty (Meyer, 2010). Increasingly, the ability to bridge the science-policy gap is an attribute expected at different levels of research and policy organisations. There is a current trend for policy units or research bodies to employ new staff or train existing staff to take on intermediary roles (Holmes and Clark, 2008). However, those active in discussions around environmental issues including ENGOs and journalists also play important intermediary roles in environmental science-policy discussions.

Content, channels and language

Science-policy communication (or knowledge transfer) should strive towards two-way positive communication as opposed to a linear science-to-policy flow of information (Wilkinson and Weitkamp, 2012). Trends in the science-policy communication and knowledge transfer are moving from science 'push' or presenting science, to policy 'pull' where the policy relevant information is extracted from the research and packaged in a more policy-friendly manner, according to a review of science-policy processes in Europe and Canada (Bielak et al, 2008). The process of policy 'pull' involves policy makers and intermediaries working to draw out the policy relevant science, rather than the onus of communication resting with the scientist alone. It also involves scientists imparting relevant,

clear scientific information to policy makers, while policy makers articulate the issues about which they require scientific information and research. The involvement of policy makers in setting research agendas increases the likelihood of the research being integrated into policy as the experience of participating in the research planning engenders an interest in assimilating the results into policy action (Tyden and Nordfors, 2000). This can help to address concerns about a lack of political will to integrate research findings into policy.

Generally speaking, the communication tasks for scientists, policy makers and intermediaries in the science-policy interface tend to overlap in places. These tasks include:

- locating and accessing research and expertise
- ensuring that this information is of good quality and is relevant to policy
- prioritising the applicable and salient elements of the research (to 'pull' from it according to the needs to the policy)

Those involved in the presentation of science, whether scientists or intermediaries need to:

- ascertain the policy implications of the research
- place the scientific information in context
- be aware of who makes policy decisions and where in the policy process they are made
- to target that audience accordingly by using appropriate channels for communication (and more often than not multiple channels)
- pitch and package the information in terms of the scientific understanding of the audience

The literature points to particular tools that can be used to audit existing policy-relevant science and to place new environmental research findings in a policy context. For example, matrix-mapping is a visual auditing exercise that sets existing knowledge against policy needs thereby identifying available knowledge and highlighting gaps in knowledge for research agenda purposes (Shaxson, 2009). Other useful tools include Lines of Argument exercise, which helps to provide policy rationales for new research programmes and Force Field Analysis, which examines potential support and opposition to policy objectives and helps to contextualise environmental research findings as evidence for policy

There are a myriad of mechanisms that can be used to present scientific information. These include visual materials (maps, photographs or diagrams), short policy briefs, policy abstracts, video interviews with scientists, short pod casts on various issues, on-line clearinghouses of information and web site databases containing repositories of background information as well as emerging knowledge. Indirect communication means should also be considered. Both policy makers and scientists should endeavour to make links with interested intermediary organisations such as NGOs, consultancies and so on. Communication with policy makers via mass media can be influential, albeit indirectly, in policy making. Consequently, learning the basics of writing press release and dealing with media interviews are useful skills for those involved in environmental research.

While, all the above are one-way channels of information flow, they are valuable ways of engaging actors in the science-policy interface and so begin a two-way conversation. Mechanisms that facilitate two-way communication include seminars, world café events[5], social networking groups e.g. linkedin groups, blogs or discussion forums and work exchange programmes. Collaborative communication tools include writeshops, which are writing workshops where policy makers, scientists and intermediaries co-write science-policy communication pieces such as policy briefs and press releases.

Most science-policy communication guides stress the importance of tailoring the communication to the audience. Getting the language and pitch of the communication right is vital. Collaborative communication spaces help scientists, policy makers and intermediaries to develop a common language around issues in their sectoral area. For instance, climate change communication specialists, Somerville and Hassol (2011) pinpoint language difficulties as a particular problem for communications between scientists and policy makers in that sector. They developed a mini-thesaurus to help with the most troublesome terms and avoid misunderstandings (see Table 1 below).

While there may be similar language difficulties in other environmental policy sectors such as biodiversity and water management, the specific terms that may be misunderstood in these areas have received little research attention. However, sectoral or project based networks could devise a similar list of problematic terms and workable alternatives as part of their communication collaborations.

[5] These are workshops, conferences or café scientifique events that mimic an informal venue, such as a café, by using round tables, relaxed atmosphere, refreshments, sitting a mixture of people together in order to foster co-operation and collaboration between the participants.

Table 1: The climate change language barrier (adapted from Somerville and Hassol, 2011, p.57)

Terms that have different meanings for scientists and non-experts		
Scientific Term	Public Meaning	Better choice
enhance	improve	intensify, increase
aerosol	spray can	tiny atmospheric particle
positive trend	good trend	upward trend
positive feedback	good response, praise	vicious cycle, self-reinforcing cycle
theory	hunch, speculation	scientific understanding
uncertainty	ignorance	range
error	mistake, wrong, incorrect	difference from the exact true number
bias	distortion, political motive	offset from an observation
sign	indication	plus or minus sign
value(s)	ethics, monetary value	numbers, quantity
manipulation	illicit tampering	scientific data processing
scheme	devious plot	systematic plan
anomaly	abnormal occurrence	change from long term average

Pitching communication in a way that has salience for the recipient is important. Somerville and Hassol (2011) suggest that scientists invert the academic triangle when communicating with policy makers – in other words they need to begin with the 'bottom line' as a hook and work towards supporting details. Measures such as using well-chosen metaphors and communicating the science 'back story' as well as cutting edge developments are also recommended (Somerville and Hassol, 2011).

The accessibility and structure of communications should be designed to engage policy makers. For instance, the Canadian Foundation for Healthcare Improvement[6] (CFHI) has conducted a good deal of work on better ways to communicate health-based scientific evidence with policy makers. One tool used by CFHI to disseminate research findings to a policy or general audience is the 1:3:25 report. The report is written for a bright, educated but not necessarily research-trained or scientific audience and consists of one page stating the main points of the research finding, a three-page (maximum) executive summary and a twenty-five page (maximum) report of the findings in plain language and including the policy implications of the work (CFHI, 2010).

[6] A pan-Canadian not-for-profit organisation founded in the late 1990s, which collaborates with medical researchers, practitioners and decision makers to improve the delivery of affordable, high quality health care. A key aspect of the organisations work involves accelerating the conversion of medical evidence into policy actions and this involves fostering better communication between the stakeholders.

Quick guide recommendations for actors in the science-policy interface

Scientists

- Make links with policy makers and intermediaries – knowing what they need helps you to set policy-relevant research agendas and to design communications
- Proactively seek to learn about policy processes focusing on when policy decisions are made and who makes them, this could be integrated into PhD programmes or undertaken as continuing professional development (CPD)
- Participate in environmental science-policy networks and other inter-disciplinary events where possible
- Identify the policy-relevance of your work by networking with policy makers and intermediaries, making yourself aware of EU and national policy in the pipeline, keeping abreast of government policy papers and other publications where environmental priorities are highlighted. It's also worth noting that research calls from government agencies are generally focused on policy-relevant areas
- Communicate the policy implications of your work to policy-makers by setting out clear links between your findings and policy impacts
- Make routine use of policy briefs written in a non-technical, accessible style for research projects and papers, keep your messages here clear, sharply focused and to the point
- Remember to include a synopsis of the background science as well as the latest findings, as your audience may not be familiar with the 'back story'
- Invert the pyramid structure of academic communication. Begin with the 'bottom line', tell your audience how they will be affected and then back this up with evidence
- Where possible, work with policy makers to formulate policy options not just one choice

Policy Makers

- Understand that there are many sciences and no one scientist will be expert on all technical or scientific matters relating to your policy area
- Cultivate a bank of scientists covering your policy area
- Participate in environmental science-policy networks and other inter-disciplinary events where possible
- Be clear about policy needs and expected knowledge to emerge from research, feed this information to your bank of scientists and to government research funding bodies
- Seek out opportunities to learn about how science works and to develop communication and media skills as continuing personnel development (CPD)
- Subscribe to science news feeds and updates in your relevant area of policy as part of your working practice

Intermediaries

- Cultivate a directory of environmental scientists and policy makers
- Be proactive in seeking training and building capacity in understanding the processes of science research and policy making as a continuing personnel development (CPD) activity
- Participate in environmental science-policy networks and other inter-disciplinary events where possible
- Ensure that research is relevant and understand how it fits into the policy context prior to preparing for communication
- Understand that knowledge brokering involves a social aspect to it as well as an intellectual one and so requires good people management skills as well as good formal communication skills
- Avoid forming false consensus where it does not exist and be honest and open about uncertainty or contested issues
- Keep appraised of the current state of knowledge by liaising with scientists and science-policy networks and subscribe to useful newsletters to keep abreast of new research and developments

Drivers and co-ordinators of science-policy networks

- When setting up a network, be clear about the purpose of the network, the people who need to be involved, the place or space communication will occur (online and off line) and how the network will be funded
- Ensure the network provides benefit or added value for the different types of stakeholders involved
- Plan the network programme, preferably in conjunction with the other members, ensuring that such a programme balances the activities evenly between the needs of the different stakeholders
- Sustain the network through regular interactions, which will generally be a mixture of face-to-face time and electronic contact
- Where a network is run for a specific project, plan time and funding for science-policy communication. In addition, maintain and expect communication throughout the lifetime of the research project
- Provide fora for regular science information events and policy discussions and foster mutual understanding among members through tools such as work exchanges and field trips
- Facilitate and encourage network members to undertake training in policy processes, research processes and communication skills as continuing personnel development (CPD)

Good practice case studies for science-policy communication

The following good practice case studies were taken from the three sectors of interest to the BRIDGE project; biodiversity, climate change and water. The examples were chosen as they provided interesting, innovative or novel ways of communication between scientists, policy makers and intermediaries. While there were many case studies that could have been used here, these ones were chosen to show a range of different communication strategies and tools that demonstrate aspects of good science-policy communication practice set out in the literature and that have been used to some success in real-life situations. For each example used here, some indication of its impact is included, whether this is a direct or indirect influence on policy, or whether it is an evaluation by a participant in the communication process described. In addition, possible limitations are noted for each examples and ideas about how these limitations might be mitigated.
The case studies covered are:

1. Land-use planning in Sumatra
2. Knowledge exchange in Belize
3. Roundtable expert group on sustainable consumption in the UK
4. Climate Science Day on Capitol Hill
5. Linking Science to Policy Workshops in Canada
6. Targeting students and early stage researchers in the EU
7. Lights, camera, research! Using video shorts to disseminate research findings in the EU
8. Soil erosion PhD research in Africa informs UK policy
9. Science for Environment Policy – an e-News Alert in the EU

Case study legend key

Title	Descriptive title of the good practice example
Area	Geographical area involved
Date	When the initiative was carried out
Sector	Biodiversity, Climate change, Water quality or management or Other
Tools	Tools and communication methods used
Short description	A short account of the initiative or research including the institution funding and managing it
Aims and objectives	The aims and objective of the initiative or research
Target audience	The science-policy audience
Activities and outcomes	A detailed description of the good practice activities, recommendations or findings of the initiative or research in question.
Limitations	Limitations of the process or tools used
Examples of dissemination	Web links to project reports, examples of outputs, dissemination materials
References and web links	Web link to home page of initiative or project web site References to research papers, where relevant

Case study icon key

	Biodiversity science-policy communication good practice example
	Climate change science-policy communication good practice example
	Water quality or water management science-policy communication good practice example
	Science-policy communication good practice example in a sector other than biodiversity, climate change or water
	Good practice example of institutional support for science-policy communication
	Good practice example of creating collaboration spaces for science-policy communication
	Good practice example of intermediaries operating in science-policy communication
	Good practice example of creating and presenting science-policy communication content in terms of channels and language

Title	Land use planning in Sumatra
Area	Sumatra, Indonesia
Date	2008
Sector	Biodiversity
Tools used	Scenarios, visual communication, maps
Short description	The Natural Capital Project's[7] inVEST scenario modelling tool was used to help the Indonesian government to plan land use for development purposes, while at the same time protecting the biodiversity and ecosystems of the area.
Aims and objectives	To provide the Indonesian government with scenarios from which they could develop policy options for sustainable land use
Target audience	Policy makers
Activities and outcomes	The Indonesian government wished to explore policy options which would allow them to generate revenue from sustainable land use while still managing to protect biodiversity, habitat quality and areas of high conservation value. Using quantitative and qualitative data, a range of map-based scenarios were built by using the existing land use situation, the national government spatial plan and the stakeholder vision maps for the area developed through a stakeholder forum. The analysis needed to show the social and economic benefits of sustainable spatial planning to district governments. In this particular case, the scenario outcomes were mapped depictions of government plans, but scenarios can also be presented as qualitative narratives or quantitative data. The scenarios allowed the technical and environmental data to be placed within a policy context. The resulting analysis showed that the government's plan for sustainable land use was viable and the scenario presentation could be scaled to regional levels and was easily understood by district policy makers.
Limitations	Scenario building, particularly where it involves stakeholder input can be time consuming and expensive. Scenarios can include different levels of detail, but even very detailed scenarios will probably not be able to account for all variables or risk factors and so should not be seen as prediction tools.
Examples of dissemination	The full case study, and other scenario case studies can be found at http://www.naturalcapitalproject.org/pubs/ScenariosGuide.pdf
References and web links	Natural Capital Project Web Site Short document explaining what Scenarios are and why they are useful Scenarios – A primer

[7] The Natural Capital Project is led by a partnership of Stanford University, University of Minnesota, The Nature Conservatory and the World Wildlife Fund. It aims to promote understanding among governments and corporations of the value of natural capital and has developed a number of models and tools to facilitate this.

Title	Knowledge exchange in Belize
Area	Belize
Date	2007
Sector	Biodiversity
Tools used	Face-to-face meeting with intermediaries
Short description	Scientists in Exeter and California researching the role of parrot fish in keeping coral reefs healthy, communicated their findings at a meeting of the Fisheries Cooperative in Belize. As a result, the fishermen successfully lobbied the Belize government to introduce legislation to protect that species.
Aims and objectives	To promote more sustainable fishing of parrot fish
Target audience	Intermediaries, stakeholders – in this instance fishermen
Activities and outcomes	A research project carried out by scientists Peter Mumby from Exeter University and Robert Carpenter from California State University found that parrot fish play an important role in keeping coral reefs healthy. The parrot fish do this by eating seaweed that might otherwise smother the reef. However, in Belize the overfishing of this species was a threat to the region's coral reefs. Imposing bans on overfishing would protect the parrot fish and so help to ensure the conservation of important coral reef habitats. Such overfishing was already a focus of campaigns by conservation groups such as the Wildlife Conservation Society. An article about the study published in the News Section of *Nature* magazine came to the notice of the Belize Fisheries Cooperative. The cooperative invited Peter Mumby to speak to a meeting of its members about the role of parrot fish in maintaining the coral reef ecosystem. Mumby explained his study and also detailed the links between protecting the parrot fish, ensuring the health of the coral reef and the positive effect this would have on populations of other fish stocks. During the meeting, the 170 fishermen attending voted unanimously to recommend a ban on the overfishing of parrot fish, mainly to protect stocks of their target fish species. Support for this measure coming from within the fishing industry, helped provide a political impetus for the policy makers. Mumby worked with the Belize government to draft a raft of new laws to protect the parrot fish and these laws were passed in 2009.
Limitations	The communication process described here was largely unplanned and in some ways was a result of a series of happy accidents. However, this example does demonstrate the potential power of intermediary groups in creating political will for better environmental legislation and the role of that good science communication can have it that process.
Examples of dissemination	See the original Nature article at: http://www.nature.com/news/2006/060102/full/news060102-9.html
References and web links	See details of this and other NERC Knowledge Exchange[8] examples at: http://www.nerc.ac.uk/publications/corporate/documents/knowledge-exchange.pdf Mumby P, Dahlgren C, Gill A, et al. Fishing, Trophic Cascades, and the Process of Grazing on Coral Reefs. *Science* [serial online]. January 6, 2006;311(5757):98-101.

[8] Natural Environment Research Council, UK Knowledge Exchange Programme

Title	Roundtable expert group on sustainable consumption in the UK
Area	UK
Date	2004 to 2006
Sector	Climate change
Tools used	Roundtable meetings, consumer forum, final report, 13-page final report summary, brochure to summarise process and findings, regular briefings for government throughout the lifetime of the project.
Short description	An expert group, the Sustainable Consumption Roundtable, was set up to advise the UK government on practical sustainable consumption solutions. Funded by Defra[9] and DTI[10] , the group consisted of researchers and intermediary stakeholders. The recommendations set out in the group's final report in 2006 were used as a basis for the Welsh Climate Change Engagement
Aims and objectives	The aim of the Sustainable Consumption Roundtable was to advise government about how to create consumer choices that stayed within environmental limits. Many of these choices, which involved items such as electrical goods, food and transport, have a significant bearing on carbon footprints of individuals and businesses. A key part of the groups remit was to devise a strategy for government to communicate with the public in order to achieve CO_2 limits.
Target audience	Researchers, intermediaries, policy makers
Activities and outcomes	The Sustainable Consumption Roundtable group consisted of experts in sustainable consumption and industry, representatives of retail and consumer associations (such as the NCC[11]) and the director of the Sustainable Development Commission[12]. Using existing scientific, economic and social research as well as original primary research, the group set out a proposed set of actions and strategies for the UK government. The primary research involved a consumer forum where over 100 members of the public were surveyed about their sustainable consumer behaviour and this social science research was fed into the Roundtable's work. In addition to the two-way communication between the various stakeholders in the roundtable group, the group as a whole communicated with policy makers through regular briefing documents produced by the Sustainable Development Commission, their final report and the summary and brochure of the projects findings. The recommendations made by the group in their briefings and final report, *I will if you will*, formed the basis for the Welsh government's 2011 Climate Change Engagement Strategy document.
Limitations	The data used by the group is mostly social and economic data with the 'hard' sciences taking a background role. However social science data informs efforts to encourage more sustainable behaviours at societal and individuals level.
Examples of dissemination	Summary of final report, *I will if you will* , Sustainable Development Roundtable work plan, Welsh Government Climate Change Engagement Strategy
References and web links	Sustainable Development Roundtable brochure, Sustainable Development Commission archive web site

[9] UK Department of Environment, Food and Rural Affairs
[10] UK Department of Transport and Industry
[11] UK National Consumer Council
[12] This was a non-departmental public body which acted as an independent advisor on sustainable development to the UK government until 2011, when it was wound up.

Title	Climate Science Day on Capitol Hill
Area	Washington DC
Date	2011, 2012, 2013
Sector	Climate change
Tools	Face-to-face meeting between scientists and policy makers
Short description	This is a one day event held in Washington where scientists have a series of intensive face-to-face meetings with policy makers. While some of these meetings are difficult, given the low priority given by some US politicians to climate change issues, the scientists taking part believe that speaking directly to politicians is making a difference to political attitudes on climate change.
Aims and objectives	The aims of the initiative are to allow the scientists to communicate directly with policy makers and to give policy makers the best scientific advice in making policy decisions about climate change.
Target audience	Policy makers
Activities and outcomes	This is an annual event whereby around 50 scientists from various disciplines working on climate change issues meet policy makers in Washington DC. The event is attended by representatives from 15 scientific associations. Prior to the event the scientists involved mobilise on a geographical basis into multi-disciplinary teams and prepare for the event in terms of their messages and the materials they wish to present. This science-science communication helps to consolidate the overall message. The day before the event all the participating scientists meet for an afternoon preparation meeting. At the 2013 preparation meeting, the scientists heard from Professor Susan Hassol, an expert in climate science communication who has extensive experience in communicating with policy makers about climate science and is a director of Climate Communication[13]. The following day the scientists met with politicians, political aides and researchers. The meetings were small group meetings where scientists on a one-to-one basis or in groups of 2, met with the policy makers in a series of pre-arranged meetings each lasting about a half an hour. In the meetings the scientists discussed the science of climate change, their research and policy implications and options with the policy makers. Scientists participating in the event believed it to be a worthwhile and successful event, even though the reception they received varied from policy maker to policy maker and the exchanges of views were often frank.
Limitations	A limitation of this event is that it amounts to short (if intense) contact between policy makers and scientists as opposed to an on-going dialogue. However, it is a useful model which could be used to develop informal networking and collaboration between policy makers and scientists. A further limitation is that the impact that this event may have on policy is very dependent on political will.
Examples of dissemination	Information about Climate Science Day on Capitol Hill from the American Meteorological Society
References and web links	For accounts of Climate Science Day News Item about 2012 event News Item about 2013 event (Includes meeting schedule) This research blog from a climate scientist gives an interesting first-hand account of the Climate Science Day experience

[13] Climate Communication is a non-profit outreach project located in Boulder, Colorado which aims to provide better communication about climate change to policy makers, journalists and the public. The organisation runs an excellent web site which explains climate change issues in plain language

Title	Linking Science to Policy Workshops in Canada
Area	Canada
Date	2005
Sector	Water
Tools used	Workshops with a café style setting, science and policy seminar talks
Short description	A series of five water management workshops on different water-related topics, led by Environment Canada successfully facilitated dialogue between scientists, policy makers and water managers. These groups reported that the experience contributed positively to their work.
Aims and objectives	The aims of these workshops were to connect water science researchers with water management policy and programme managers and to foster dialogue between the two communities. The intention was to highlight recent science which could inform new policy initiatives and to allow policy requirements to influence future research
Target audience	Water research scientists, policy makers, water management professionals
Activities and outcomes	Environment Canada's Science and Technology (S&T) Liaison Division acted as knowledge brokers to arrange workshops aimed at bringing water science researchers and research users (national and regional policy makers and water managers) together. Themes for the workshops in this series included: • the effects of agriculture on water quality • groundwater quality • water reuse and recycling • water quality monitoring • wastewater treatment for small communities The 2-day workshops were run as café style events where participants were seated at round tables to mimic a relaxed 'café' atmosphere. Participant numbers ranged from 40 to 60. The workshops consisted of talks from national and international experts in water management science and policy. The talks were a mixture of policy and programme initiatives with research information in order to draw in the participants. The talks focused on the synthesis of current knowledge, research gaps and policy implications of recent research. Each talk was followed by a facilitated discussion covering broader science-policy issues rather than specific scientific details. Evaluations from the workshops suggested that they were extremely successful in linking science with policy. A majority of the policy makers who responded to the evaluation survey claimed that the information they gleaned in the workshop subsequently informed policy formation and implementation. Similarly, researchers who attended indicated that the experience had influenced their research agendas.
Limitations	The participants articulated the need for sustained science-policy dialogue as a network to optimise the value of the workshops. They suggested using regular electronic interaction with occasional face-to-face contact.
Examples of dissemination	Workshop report : Effectively Bridging the Gap: The Case for Science-Policy Workshops
References and web links	Environment Canada's Science-Policy Links Study Series

Title	Targeting students and early stage researchers in the EU
Area	Barcelona and Rome, EU
Date	2011 and 2012
Sector	Water
Tools used	Summer school 5-day course using talks, work groups, round table discussions, study visits and meetings with water managers and industry figures
Short description	The Summer Schools held in Barcelona (2011) and Rome (2012) were part of the EU STREAM science-policy-industry communication project to aid the dissemination of water research. The summer school format was a training/dissemination activity which fostered science-science communication as well as science-policy-industry communication.
Aims and objectives	The Summer Schools aimed to bring researchers together with policy makers and industry leaders to facilitate collaboration in on the areas of water management, technology and governance. There was a particular emphasis on involving early stage science researchers.
Target audience	Early stage researchers (MSc, PhD, post-doc), water practitioners, SME researchers
Activities and outcomes	Stream was an EU science-policy-industry communication project (2011-2013) under the SPI-Water cluster. Stream has a number of partners which include non-profit organisations (European water partnership, Menon Network), business (Europe for Business) and communications consultants (Minerva). Each Summer School consisted of 25 participants from water related research areas and different EU countries. The participants were chosen from an application process. While the Summer Schools were free to attend, participants covered their own travel and accommodation. Each Summer School ran for 5 days and consisted of an intensive programme including seminar talks, round table discussions and site visits. The programme focused on fostering interaction and experience sharing between the participants and experts in water management, legislation and innovations. The experts were drawn from sources such as the European Commission, leading EU research centres and the water industry. The summer School allowed the participants to gain an in-depth knowledge of the subject area and to network with international water technology stakeholders. According to an evaluation of the process, participants considered the Summer School to be a useful and positive experience especially the diversity of the speakers and the quality of the discussion. In particular, participants valued the synergies and networks created between science, industry and policy, but also between the different sciences involved.
Limitations of the tools and process	The Summer Schools were good examples of training from early-stage researchers however there are a number of limitations. The numbers that can be catered for is quite limited, particularly as it is bound to be an expensive and resource intensive activity. However, using this with a shorter timeframe and creating some on-going networks from the participants and speakers might be an option.
Examples of dissemination	Stream Newsletter containing a short report about the Barcelona Summer School Summer School Programmes and other information about the process
References and web links	Stream Web Page

Title	Lights, camera, research! Using video shorts to disseminate research findings
Area	EU
Date	2011 - 2013
Sector	Water
Tools used	Audio-visual communication
Short description	This initiative was part of the EU Stream science-policy-industry communication project. Five five-minute videos were produced, each for a particular water science or water technology project.
Aims and objectives	To communicate, in plain language, the findings and significance of research projects in an accessible and novel way
Target audience	Policy makers, water industry people
Activities and outcomes	Five-minute videos were produced for each of five research projects. The projects looked a range of water management aspects including: • providing sustainable water solutions for a range of industries (AquaFit4Use) • helping innovative water solutions to reach the market (INNOWATER) • developing rehabilitative technologies for polluted soil, groundwater and surface water (Aquarehab) • resource management governance for agriculture in water stressed areas (Sirius) • sustainable water for cities (TRUST) The video shorts featured project co-ordinators, knowledge managers, research scientists, engineers and other experts such as economists explaining in plain language the aims, relevance and potential application of findings for the respective projects.
Limitations	These videos are examples of one-way rather than two-way communication and therefore it would be expected that they would form part of a communications strategy. They could be used to open a conversation between stakeholders, or as one novel online way of sustaining communication within a network setting. A further limitation is that the production of such videos would require having individuals who could speak on camera with some skill. Also some technical skill and know-how in filming and editing techniques would be needed to produce professional level videos.
Examples of dissemination	Stream project videos Other audio-visual communication tools used by the Stream project
References and web links	Stream Web Page

Title	Soil erosion PhD research in Africa informs UK policy
Area	UK
Date	2006
Sector	Other
Tools	Science-policy work exchange placement, policy brief, meetings with scientists and other stakeholders
Short description	A PhD student studying soil erosion in Africa was seconded to a 3-month work placement scheme to work with policy makers on issues such as top soil erosion and soil nutrient decline in the UK. His work with the Parliamentary Office of Science and Technology (POST)[14] help to inform policy, but it also helped him learn about the policy making process and about the work involved in integrating science into policy.
Aims and objectives	To promote knowledge exchange between scientists and policy makers
Target audience	Scientists, policy makers
Activities and outcomes	As part of its science-into-policy programme NERC[15] runs a number of schemes for researchers and policy makers to take part in work exchanges, work shadowing or fellowship schemes. For post-graduate research students, the NERC/POST Fellowship scheme allows them to work with POST. This case study details the experience of a one NERC/POST Fellow. John Butler, a PhD student studying soil degradation in Africa, undertook a NERC/POST Fellowship in 2006. While his work as a PhD student was science based, his work for the fellowship was quite different. His brief was to examine the relevance of soil degradation for the UK and how that related to policy options and needs. John became aware that while soil degradation in the UK was not as severe as that in his research area of South Africa, soil erosion, nutrient loss and the attendant issues of flooding cost the UK millions of pounds each year. His task was to liaise with the scientific community to pull together existing and forthcoming research in the area. He also worked closely with policy makers and stakeholders (such as farmers and businesses) to identify policy needs and gaps in the scientific knowledge. He prepared a POST note, or policy brief, on the issue for use by policy makers. His work helped to inform policy and future research agendas for tackling soil degradation in the UK. Describing his experience, John commented on how much he learned about the policy process, about the amount of work involved in transposing science research findings into policy proposals and about the importance of scientists becoming involved in policy making.
Limitations	While work exchanges, shadowing and fellowships are useful such schemes are likely to be resource intensive, both in terms of finance and the staff-time. In the present economic climate, short-term work shadowing arrangements might be a viable option to help build understanding, connections and knowledge exchange
Examples of dissemination	John Butler's account of his time NERC/POST Fellow John's POST note (policy brief) on soil degradation
References and web links	Find out about all the NERC knowledge exchange schemes

[14] UK Parliament's in-house source of independent analysis of public policy issues related to science and technology
[15] Natural Environment Research Council, UK

Title	Science for Environment Policy; an e-News Alert in the EU
Area	EU
Date	2005 to present
Sector	Other/ Various
Tools	E-newsletter
Short description	An online e-newsletter targeted at policy makers and containing plain language accounts of science research for use in environmental policy making. The service is provided free by the European Commission and an evaluation in 2010 found that European policy makers using the service find it to be a valuable source of accessible environmental science information
Aims and objectives	The aims of the Science for Environment information and news service is to help policy makers keep abreast of environmental science research and information needed for policy formulation and implementation
Target audience	Policy makers
Activities and outcomes	This is a free, weekly email service which provides a range of science for environmental policy communications targeted at policy makers. These communications include • A Science for Environment Policy News Alert, which offers plain language summaries of recent studies on environmental topics • Thematic Issues, where each issue concentrates on a current hot topic • Future Briefs, which explore emerging environmental issues likely to be of relevance for future policy • A Research Repository, which is an online database of policy relevant environmental research results. • In-depth Reports on the latest science for key policy topics Each report is accompanied by the reference to the relevant academic paper and the contact details for the scientist involved allowing policy makers to get in touch with the researcher directly and in many cases this does happen. The service providers survey users and commission independent evaluations of the service regularly to ensure that it is achieving its objectives and it has gone through a number of updates and improvements. An independent evaluation of the service in 2010 showed that its audience consisted of local, national and EU policy maker as well as those in academia, NGOs and industry. It also concluded that the policy makers using the service found it to be a highly useful source of environmental information for policy.
Limitations	The Science for Environment Policy information and news service is a one-way rather than two-way communication service. However, it does act to open up conversations between scientists and policy makers and acts as an intermediary or knowledge brokering service in this respect
Examples of dissemination	Science for Environment Policy
References and web links	An evaluation report of the News Alert service, Science-communication experts Claire Wilkinson and Emma Weitkamp write about the role of the Science for Environment Policy services as a knowledge broker

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