

Effective interfaces between science,
policy and society

THE SPIRAL PROJECT HANDBOOK



SPIRAL

Interfacing Biodiversity and Policy



This handbook was developed as part of the SPIRAL project. SPIRAL is an interdisciplinary research project that studies science-policy interfaces between biodiversity research and policy to draw lessons and improve the conservation and sustainable use of biodiversity.

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For more information on SPIRAL, please visit our website: <http://www.spiral-project.eu/> or contact us at info@spiral-project.eu

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About this handbook

This handbook provides a manual for projects and individuals interested in designing or improving interfaces between science, policy and society.

It is challenging – but important – to establish appropriate connections between the diverse insights and perspectives of scientists and other knowledge holders, and the needs and interests of decision-takers, implementers and other knowledge users. These connections and interactions are the “science-policy interface” (SPI). Designing and improving SPIs of EU-funded research projects is the aim of this handbook.

The handbook is based on the European Union’s FP7 SPIRAL project (‘Science-Policy Interfaces: Research, Action and Learning’) which carried out research on science-policy interfaces and communication, and contributed at different levels to the design, implementation and improvement of real-life science-policy interfaces, such as the Intergovernmental Platform for Biodiversity and Ecosystem Services (IPBES), the web-based exchange platform AfriBES, and the science-policy work of learned societies and research organisations. Although our focus was on biodiversity science-policy interfaces, our findings and recommendations are relevant to other fields. In addition, while this handbook is designed to support the development and improvement of SPIs of EU-

funded research projects, many findings will be relevant to other types of SPIs.

We acknowledge that the project and its outputs approached SPIs dominantly from the knowledge perspective, including in particular that of a research project where the scientists involved studied and interacted with SPIs in a range of contexts to improve dialogue and interaction in the decision-making process.

The handbook is structured around five main issues. We start with a brief introduction to what SPIs are, and what they are not. We then move on to the issue of why SPIs are needed before looking at certain important attributes of SPIs, namely credibility, relevance, legitimacy and iterativity. In the next part of the handbook, we outline some steps and recommendations for designing, maintaining and improving the SPIs of EU-funded research projects. As part of this we then explore some factors facilitating successful SPIs before outlining some sources and resources that may be of interest to readers.

The issues addressed in this handbook are explored in more details in SPIRAL briefs, reports and articles which are all available from the SPIRAL website: <http://www.spiral-project.eu/>

We hope the results of this work will help in all your “SPI endeavours”.



Eight tips for SPIs: A quick summary

1. Clarify why SPIs are needed

This may seem obvious, but all too often, developing a SPI is seen as ticking the box in terms of communicating research: no real thought goes into why SPIs are developed and how they can help with the real impacts of research. It is important, therefore, as early as the proposal development stage, to spend time with colleagues and start making new links in science and/or policy to clarify whether SPIs are actually needed in the first place, or whether other activities might be sufficient.

2. Clarify what the SPI can and cannot do

It is a good idea to clarify early on what the SPI can and cannot do, and what it should and should not do. This can help avoid frustration, for example from colleagues who may want more out of the SPI. One way is to think of the wider benefits of the SPI for the project, individuals in the project, and the project stakeholders. This can help motivate those working in the SPI. For example, the SPI may build understanding and trust with others, which in turn may facilitate the research process and maybe proposal writing in the future.

3. Know who will form the SPI

SPIs are very much about the people involved in them. It is therefore important to start making those links with policy and science at the project proposal stage. Personalities are important here – the right ‘expert’ may not always be the best communicator, which may affect the SPI in the long run. Investing a little time trying to know people that may become involved in the SPI can help in the long-term.

4. Keep people in the project motivated

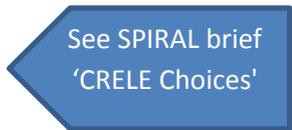
Time spent on SPIs can be perceived as time taken from other activities. A possible way forward is to determine and communicate how the individuals involved in SPIs can benefit from this involvement. Early on in a project, this can involve, for example, writing a review article – this academic output (which is often highly cited) also benefits policy by compacting into a short document current state of knowledge about the topic being considered.

5. Be flexible if possible

All too often, a SPI strategy is developed and participants cannot, or do not want to, budge from original plans. It may be, however, that there is a particular policy need that could be addressed by the project, but which needs a rethink of the work plan. If possible, building in some flexibility into project work plans will help the effectiveness of SPIs. An example would be to commit to running three workshops but not specifying exactly when, how they will run, or who will be involved. Flexibility does not mean that a scientist should forever be jumping from one policy demand to the next. However, once science policy dialogue is initiated, it is likely that ideas will evolve about appropriate activities and initiatives: SPIs should be flexible enough to accommodate this. Such an approach requires flexibility from the funding agencies too.

6. Be ready to compromise

A SPI will never please everyone all the time – there is



See SPIRAL brief
'CRELE Choices'

bound to be some level of compromise and trade-off. However, if good relationships have been developed among those in the SPI, this can increase the likelihood of being able to discuss the best possible compromises.

7. Learn from past mistakes and successes

There is often a lack of institutional memory when it comes to SPIs. As individuals and project participants we can all learn from past and current SPIs. Review or monitoring mechanisms can also help identify what works and what does not work so well, so that SPIs can continue to be improved.

8. Accept it takes time and resources but is worth it

Developing a SPI can take time: time developing relationships, time developing new skills, time listening to others. This is often time we believe we do not readily have. Most efforts, however, can pay off not only during the project but also after the end of the project and can ensure greater impact from project results. Similarly SPIs need to be allocated sufficient resources to be viable and effective.

The SPIRAL team



Science-Policy Interfaces (SPIs) – what are they?

SPIs cover a very wide range of communication forums, situations and methods. They can be formal or informal, long-term processes or one-off events. Their common feature is the potential for exchange of information, joint knowledge production and learning.

Science-Policy Interfaces: a definition

Science-Policy Interfaces (SPIs) are the many ways in which scientists, policy makers and others link up to communicate, exchange ideas, and jointly develop knowledge to enrich policy and decision-making processes and/or research. SPIs involve exchange of information and knowledge leading to learning, and ultimately influencing decisions and changing behaviour – i.e. doing something differently as a result of the learning. These changes may be made by policy makers, local-level decision-makers, scientists, other stakeholders or citizens. As such SPIs can lead to many – sometimes surprising – practical impacts.

See SPIRAL brief
'SPIs under
the spotlight'

Science-Policy Interfaces may comprise very different functions, often more than one, that lead to sharing of knowledge and impacts on understanding and behaviours. SPIs can therefore be instrumental in²:

- ① Allowing for exchange and co-evolution of scientific and policy knowledge, in a dynamic fashion;
- ② Contributing to the scientific quality control process by allowing critical assessment of scientific outputs in light of

users' needs and of other types of knowledge;

- ③ Facilitating timely and coherent translation of research into policy options or advice;
- ④ Facilitating rapid uptake of research results by stakeholders;
- ⑤ Alerting decision-makers and other stakeholders about emerging issues;
- ⑥ Ensuring strategic orientation of research in support of policies and societal issues;
- ⑦ Raising public awareness about important societal issues; and
- ⑧ Raising willingness to act and to support policy amongst the public and stakeholders.



² van den hove, S., Chabason, L. (2009) The Debate on an Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES): Exploring gaps and needs. Idées pour le débat N° 01/2009, Iddri, Paris, on-line at: www.iddri.org.

What types of SPIs exist?

SPIs can operate along different spatial, administrative and temporal scales. They can be very formal and purposively-designed structures, such as the Intergovernmental Panel on Climate Change (IPCC), or the newly created Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). At EU, national and lower levels, it is common to find advisory boards or technical working groups, set up by policy to synthesise and input information. SPIs can also be initiated by science. In particular, when research projects include a component specifically aiming at interacting with policy-makers and other stakeholders—this is also a SPI and is the type which we more specifically focus on later in this handbook.

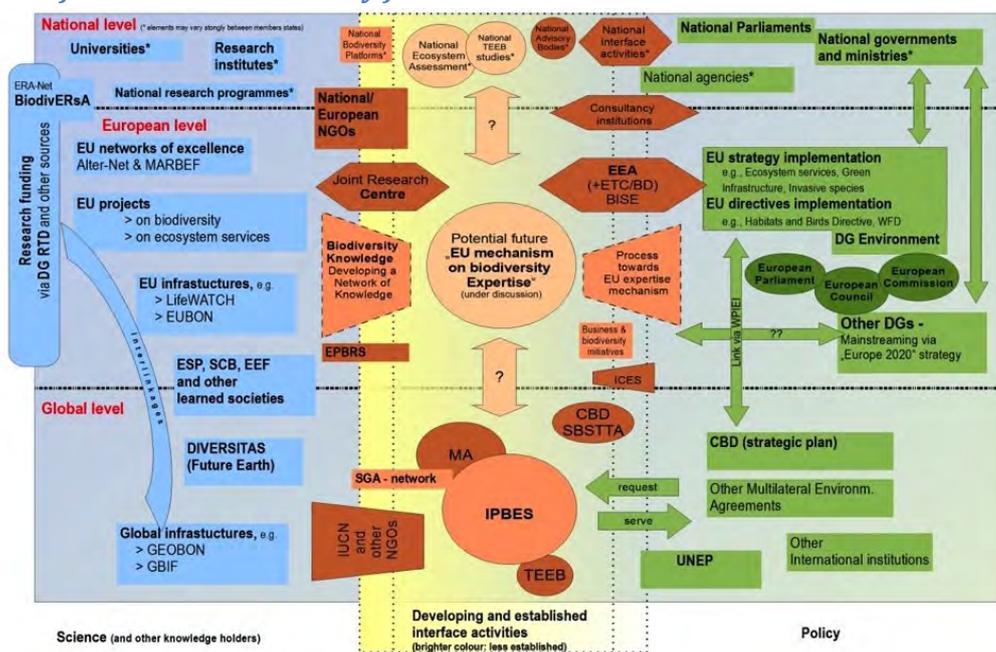
There are also many SPIs with less formalised structures. Discussing a project with funders at the beginning of a piece of work can be a SPI: jointly deciding how to carry out research both to benefit science and to input results into aspects of policy. A workshop with policy-makers and scientists, and maybe other stakeholders, can be a SPI, so can a field trip. Even one-to-one conversations between a

decision-maker and a scientist can be a SPI, as the resulting understandings may influence and enrich science and/or policy.

SPIs are also not limited to direct exchanges between science and policy actors. SPIs may involve multiple other actors such as farmers, fishermen, foresters, land managers, city planners, businesses and non-governmental organisations (NGOs). Other actors can also help shape the policy priorities and the sort of science questions that should be addressed. For example, the media can play a key role in mediating science-policy links. Even lobbying can have many features of SPIs, though usually focused on advocating for particular outcomes. Thus, it can be useful to picture the many different types of actors as interacting in networks to shape and share knowledge. This means that SPIs are very complex interactions and learning processes are not easily predicted. Furthermore, luck often plays a role in why, when and how interactions happen, work, and result in learning.

The following figure outlines some examples of the formal SPIs that currently exist in the biodiversity field.

Examples of SPIs in the biodiversity field



Making sense of acronyms (or MSOA)...

Scientists and decision-makers are excellent at developing and using acronyms. Here are a few common acronyms related to environmental science-policy interfaces (and the above figure):

AfriBES	A social network on scientific and technical information on biodiversity and ecosystem services for Africa
BISE	Biodiversity Information System for Europe (see box page 27)
CBD	Convention on Biological Diversity
CRELE	Credibility, Relevance, Legitimacy (see page 17)
DG	Directorate-General
DG ENV	Environment Directorate-General
DG RTD	Directorate-General for Research and Innovation
EC	European Commission
EEA	European Environment Agency
EoE	Eye on Earth (see box page 30)
EPBRS	European Platform for Biodiversity Research Strategy
ES	Ecosystem Services
EU	European Union
EUBON	Building the European Biodiversity Observation Network
FP7	Framework Programme 7
GEOBON	Group on Earth Observations: Biodiversity Observation Network
GBIF	Global Biodiversity Information Facility
ICES	International Council for the Exploration of the Sea
IPBES	Intergovernmental Platform on Biodiversity and Ecosystem Services
IT	Information Technology
IUCN	International Union for Conservation of Nature
KNEU	Developing a Knowledge Network for European expertise on biodiversity and ecosystem services
MA	Millennium Ecosystem Assessment (also referred to as MEA)
MEP	Member of the European Parliament
NGO	Non-Governmental Organisation
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
SCB	Society for Conservation Biology
SEPI	Science for EU Environment Policy Interface
SPI	Science-Policy Interface
SPIRAL	Science-Policy Interfaces: Research, Action and Learning
SPPI	Science-Policy-Public Interface
TEEB	The Economics of Ecosystems and Biodiversity
UNEP	United Nations Environment Programme
WFD	Water Framework Directive

In the rest of this document we further discuss suggestions and recommendations for designing and improving SPIs, but first we highlight some myths that, if they persist, can impede the improvement of SPIs.

Some myths about science and policy

A series of persistent myths or implicit assumptions underlie many people's

See brief
'A myth-busting
guide to SPIs'

conceptions of science and policy in environmental governance. Even where people are aware that these are myths, sometimes they continue to operate as if they were true. The myths affect how people think of, and operate at, the science-policy interface. They can be traced to expectations of rationality, science, and controllability, and to the difficulty of grasping and dealing with complex social-ecological systems.

Three myths about science are especially relevant for SPIs:

- ① *Complex systems can be fully understood and described;*
- ② *Uncertainty is always reducible or quantifiable;*

- ③ *Simple cause-effect relationships can always be established.*

Three myths about policy are also common:

- ① *A social-ecological system must be fully understood before making decisions that affect it (positively or negatively);*
- ② *With enough effort and knowledge, complex systems are fully controllable;*
- ③ *A decision is the end-point of a linear process of reasoning which includes neutral weighting of pros and cons.*

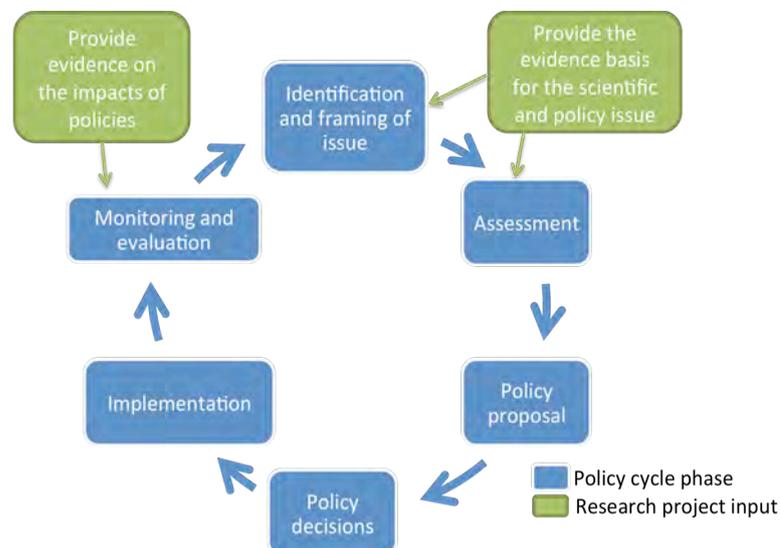
The last myth in the list stems from a failure to recognise that 'decision-making' is a continuous process, punctuated by 'choices' or 'decisions', and that the workings of this process depend heavily on institutional and other contexts. To illustrate this latter point, below is a simplified description of the EU-level policy cycle, including where and when research projects can interact with the cycle.

Finally, there are three common myths about SPIs:

- ① *Science and policy are two independent domains of human activity;*
- ② *SPIs are all about a one-way flow in which 'truth' (science) speaks to 'power' (policy);*
- ③ *SPIs are simple forums through which reporting of science knowledge results in development of policy grounded in evidence, in clear and controllable ways.*

A simplified description of the EU-level policy cycle – and when and how research projects can interact with the cycle

The policy cycle starts with the identification and framing of new or emerging issues that may need to be addressed. The identification of issues may come from different sources, including technical and societal input and scientific findings. Issues can be framed with the input of research projects.



If an issue is deemed important enough to be taken forward, a proposal will be developed by the European Commission. During the development of policy proposals and options, the Commission proposals are discussed in various informal working groups or formal committees (see the common implementation framework set up as governance structure for EU biodiversity policy <http://biodiversity.europa.eu/policy>). During this period, wide public consultations are also organised through the Europa web site (http://ec.europa.eu/yourvoice/consultations/index_en.htm). Research can feed in at this preparation stage, which is part of the internal decision-making process of the European Commission. The resulting proposal usually includes the policy initiative itself (e.g. a communication or a legislative act), a memorandum explaining the context of the decision, the results of the formal impact assessments (for more information, see http://ec.europa.eu/governance/impact/index_en.htm) and ex-ante evaluations that need to be conducted, financial information, the results of the inter-service consultation, a draft press release as well as a “citizen summary” (an explanation of the decision in more accessible terms than the usual jargon).

When the proposal is formally adopted by the European Commission, it is then passed to the Council of Ministers, which represents all of the elected Governments of Member States, and the directly elected European Parliament which has the power to amend or reject proposals. It is also examined by the Committee of the Regions and the European Economic and Social Committee which provide opinions. This is part of the inter-institutional decision-making process. Once the Council, the European Parliament and the European Commission have reached agreement on the proposal it then goes for adoption before it takes effect as European policy (e.g. Council Conclusions and Parliament Resolutions on EU Communications) or legislation (e.g. adoption of EU Directives or Regulations), which is then implemented in all Member States.

Following implementation, a process of monitoring and evaluation is put in place by the European Commission. Again, research projects can feed in at this stage. Monitoring and evaluation can lead to the identification of issues that may, in turn require the modification of policies, or the development of new policies.

To summarise, while research can feed in at any point in the policy cycle, the most pertinent times are during the identification and framing of issues, the assessment of social, economic and environmental impacts and the monitoring and evaluation of policy implementation. The first port of call for EC-funded research project should be their project or policy officer who should be able to help identify the relevant actors, and help plan the matching of research project and policy cycles.

Key features of SPIs

Considering key features of SPIs, and relating them to SPI design and operational decisions, can help understand SPIs, and to guide choices and trade-offs.

See SPIRAL briefs on SPI features

Goals

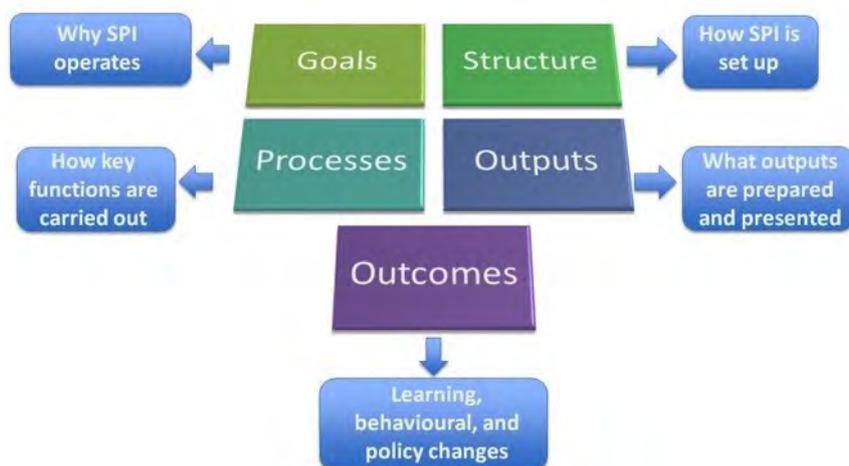
The **goals** of the SPI are central to understanding how and why it operates, why people participate, and set foundations of credibility, relevance and legitimacy (CRELE) of the SPI (see page 17) and the knowledge exchanged. The definition

See SPIRAL brief 'Keep it CRELE'

of goals will involve trade-offs, and different solutions are possible; but lack of clarity or agreement about goals and roles can be a source of serious problems for SPIs. It is important that goals are set up jointly by the participants, and not just imposed by one 'side'. For example, an advisory board of a research project may use its first meeting to jointly discuss and decide on the goals of its work, including the identification of potential outputs. Important aspects to consider regarding the goals of a SPI include the:

- Clarity, scope and transparency of the vision of the SPI;
- Objectives of the SPI; and
- Drivers of the SPI, namely mandates, demand-pull from policy vs. supply-driven promotion of research and/or emerging issues.

The key features of SPIs are goals, structure, processes, outputs and outcomes



Structure

The **structural features** of SPIs describe how they are set up and the constraints within which the processes are defined. This may include the role of different bodies or individuals in the SPI and how they work, for example via meetings and other ways of exchange. Identifying structural strengths and weaknesses can be an important step in improving credibility, relevance and legitimacy and SPI performance. Structural features of SPIs include:

- ③ The independence of the SPI, namely freedom from external control, neutrality or biases in positions, range of membership;
- ③ The range of relevant expertise and interests included, competence of participants, openness to new participants; and
- ③ Financial resources, human resources (e.g. leadership, champions, ambassadors, translators), networks, time.



Processes

The **processes** of SPIs define the way in which the key functions are actually carried out. Again, there are important trade-offs and SPIs need to decide how to allocate scarce resources (financial, time and human effort) across different activities. Aspects to consider regarding the processes of SPIs include:

- ③ Trust building: opportunities to participate in discussions, clear procedures, opportunities for informal discussions, transparency about processes and products;
- ③ Helping policy makers to understand science and scientists to understand policy makers, building capacities for further SPI work;
- ③ Adaptability: responsiveness to changing contexts, flexibility to change.

- ③ Procedures to anticipate science, technology, policy and societal developments;
- ③ Continuity of SPI work on the same issues, continuity of personnel, iterative processes;
- ③ Strategies for conflict management, such as third party facilitation, allowing sufficient time for compromise;

Outputs

The **outputs** of SPIs (e.g. briefs, reports, papers, presentations) can be characterised by a set of features describing how and when they are prepared and presented. Once more, there can be trade-offs, for example between extensive peer review and timely delivery. A number of aspects need to be considered with regards to outputs, including:

- 🕒 Relevance: outputs that are timely with respect to policy needs, accessible, comprehensive;
- 🕒 Processes to ensure quality, comprehensiveness, transparency, robustness, and management of uncertainty;
- 🕒 Efforts to convey messages across different domains and individuals, and making the message relevant for various audiences.

Outcomes

Finally, we can also consider the **outcomes** associated with SPIs, namely the learning, behavioural and policy changes they foster. These are not fully within the control of the SPI and do not follow directly from design or operation choices in the way that the other features do. They will also depend on external factors, including the current policy setting and supportive or hindering activities by third

parties. Nevertheless, it is useful to assess these outcomes and to bear in mind that they represent the 'bottom line' of SPI performance.

Outcomes could include:

- 🕒 Social learning, i.e. whether SPI participants, audiences and the wider public learn and change their thinking;
- 🕒 Behavioural impacts, i.e. whether SPI participants, audiences and the wider public change behaviour as a result of learning;
- 🕒 Policy impacts, i.e. whether SPI information, learning, and associated changes in policy-maker behaviour lead to changes in policy; and
- 🕒 Issue impacts, i.e. whether the above changes lead to positive outcomes in relation to the issue considered by the SPI.

Why do we need SPIs?

We need SPIs to allow for a broader and more salient range of knowledges to be produced, exchanged and taken into account in decision-making processes, and to bring about changes in awareness and behaviour relating to the societal issue in question.

Allowing for a broader and more salient range of knowledges to be produced, exchanged and taken into account in decision-making processes

In the context of decision-making and management, there is often a large amount of uncertainty, complexity and interactions within and between human and environmental systems. This has shifted our understanding of the environment from a sectoral perspective, to a broader approach

involving issues such as sustainable use, natural capital, ecosystem services, benefit sharing, and responsible innovation. With this shift comes a wider variety of values and knowledge - not only from different disciplines, but also from different groups of people. SPIs are needed to allow for this broader range of knowledge and values to inform effective decision-making at all levels.

See SPIRAL brief
'Understanding
biodiversity'

A SPI in action: Local knowledges are brought together to inform decision-making



What is “knowledge”?

It is important to consider what we mean by knowledge, as this and several other terms – e.g. data, information, evidence, knowledge, and truth – are sometimes used interchangeably. Although these concepts are linked, they are not the same. Data are an outcome of research, and are usually understood as known facts or evidence, which, when systematically organised, become information. Knowledge has been referred to as the interpretation of information. As such, evidence from research is one source of knowledge among others, including institutional, political, local and traditional types of knowledge.

Changing awareness and behaviour

SPIs also have a crucial role to play in bringing about necessary changes in awareness and behaviour. SPIs are ways of structuring the interactions between scientists, policy-makers and possibly other knowledge holders and stakeholders. Information exchange and dialogue may in turn result in learning and changes in the behaviour or decisions of participants, including the development and implementation of policy instruments (such as indicators, targets, scenarios, regulations, quotas, charges) that modify peoples’ and organisations’ behaviour.

Thus, one practical set of outcomes of SPIs is how they change behaviour:

- ➊ Directly, through raising awareness of problems and solutions, and triggering action;
- ➋ Indirectly, via policy decisions taken by policy makers informed through the SPI;
- ➌ Indirectly, via the influence of the SPI on research strategies (for example, encouraging scientists to address policy-responsive topics).

Focusing on the impact of SPIs means working out how to boost the mutual understanding and positive behavioural changes the SPI contributes to. Achieving this requires

consideration of SPI features, target audiences, and policy contexts. These must be reflected in the overarching goals and strategy of the SPI.



See SPIRAL brief
'Focus on
impact'

Impacts depend on SPI features (see section on “Key features of SPIs”, page 10)

SPI impacts can be enhanced by certain features of the SPI structure, processes and outputs. There is not a single recipe for success, but rather a suite of features that need to be taken into account in a context-dependent way, including:

- ➊ Capacity building, at all levels;
- ➋ Understanding, trust-building and inclusiveness;
- ➌ Joint, iterative processes and learning, with science and policy communities mutually enriched by their participation in SPIs;
- ➍ Tailoring of information and outputs to the intended audiences, and ensuring appropriate language for the intended audiences;
- ➎ Quality control and balancing the needs of scientific credibility and caution with the time constraints of the policy process.

Impacts depend on audiences

Depending on the possible stakeholders of an SPI, the kind of information needed, the way it is presented and the SPI features that can enhance the impact on behaviour will vary.

For local stakeholders, for instance, emphasis is often needed on capacity building, trust building, feedback mechanisms, and accessible outputs. For policy makers, independence, strong quality control, robustness and clarity of messages may be particularly important. While for experts, technical details, establishing scientific credentials, and demonstrating wide knowledge are often crucial.

But these are not hard rules: audiences vary, and understanding their needs is key. Often there is more than one target group, so it is important to tailor the processes and outputs accordingly, and to make sure that various needs are met.

Impacts depend on contexts

The specific contexts and goals of the SPI will influence the kind of tools that can be used, the kind of outputs produced, and what aspects of the SPI to prioritise.

If the goal of an SPI is awareness-raising within various target audiences, it is essential to tailor outputs according to target groups' needs. Using various media and methods can give wide visibility. Using scenarios to highlight choices can make messages 'real' and stimulate debate. Including procedures for feedback and dialogue can enhance legitimacy and encourage learning on all

sides. A policy mandate, or strong leadership from policy actors, may be counterproductive and may limit ability to explore and raise awareness of emerging issues.

Because SPIs are about fostering learning and influencing behaviour, their effectiveness is highly dependent on the people involved and on the policy processes and contexts within which they operate. Effective learning can benefit from a degree of "functional redundancy", in the sense of having several different SPIs operating in the same area, using different approaches, and from repetition of important activities and learning opportunities. These forms of replication and repetition should generally be viewed more as enhancing opportunities for effective communication than as duplication of effort, though it is also important to avoid "stakeholder fatigue" if repeated requests for contact or attempts to communicate become intrusive.

Many projects, however, still struggle to take into account the needs, constraints and perspectives of practitioners and policy-makers when designing and implementing their work plan. In many respects, the continued institutional separation of research planning, research processes and policy processes makes the identification of appropriate stakeholders and the relevance of their projects challenging. A common example highlighted during the SPIRAL project was the incompatibility of often specialised or narrow research projects with either the broad knowledge overviews or the specifically tailored inputs needed by specific policy processes.



“Credibility, relevance, legitimacy and iterativity” - why do they matter to SPIs?

Building credibility, relevance and legitimacy (CRELE) and iterativity into SPI design is key to ensuring impact. But SPIs have to work with numerous constraints (resources, time, policy cycle and so on), and it is not always possible to enhance all aspects of CRELE. Though it may be tempting to focus on the immediate policy challenges, it is important to consider not just short-term improvements in CRELE, but also the long-term prognosis. SPIs need to make strategic choices regarding what dimension of CRELE to emphasize and what specific features to prioritise to ensure high impact over the long term.

General features that support successful SPIs

Some SPIs are more successful than others. Though there can be no ‘one-size-fits-all’ set of recommendations for the ‘ideal’ SPI, there are some general features that tend to support success: credibility, relevance, legitimacy³, and iteration. These are explored in turn.

See SPIRAL
brief ‘Keep it
CRELE’

CRELE in a nutshell

Credibility, relevance and legitimacy (CRELE) are attributes that can explain the influence and impact of SPIs.

- Credibility is the perceived quality, validity and scientific adequacy of the people, processes and knowledge exchanged at the interface;
- Relevance is the perception of the usefulness of the knowledge brokered in the SPI, how closely it relates to the needs of policy and society, and how responsive the SPI processes are to these changing needs;
- Legitimacy is the perceived fairness and balance of the SPI processes.

These CRELE attributes are widely accepted and used, and can explain an SPI’s influence. The emerging Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, <http://www.ipbes.net/>) considers the CRELE attributes as important. The Intergovernmental Panel on Climate Change (IPCC) uses CRELE to evaluate scenarios, draw lessons from past experiences and explain assessments’ influence.

³ Cash, D.W., Clark, W.C., Alcock, F., Dickson, N.M., Eckley, N., Guston D.H., Jäger, J., Mitchell, R. (2003). Knowledge systems for sustainable development. PNAS 100(14): 8086-8091.

Achieving credibility

To be credible, SPIs must have access to excellent people, skills, and the latest knowledge. But that alone is not enough: the way the SPI is seen by others is vital.

Senior and respected participants enhance the credibility of the SPI. Key human resources, including ‘champions’ in strategic organisations, leaders, science translators, and charismatic ‘ambassadors’ can improve visibility and credibility.

Some continuity in membership of SPIs is useful to ensure that knowledge and skills about running the SPI are built upon and not lost, to maintain relationships, and to build trust.



Independence from external control and from vested interests enhances credibility. SPIs should be both cautious and transparent regarding links to other organisations and interests, in particular where significant funding is involved.

Formal and publicised procedures for peer review and quality control increase credibility, and reduce the risks of costly mistakes. Similarly, attention to accounting for and communicating uncertainty increases credibility.

Transparency and traceability regarding the origins of knowledge and outputs, with a full and open audit trail, enhance credibility and may save the SPI’s reputation (and that of its participants) if things go wrong and scapegoats are sought.

Enhancing relevance

Relevance is crucial for having a real impact. It is also key to motivating participation, not just on the policy side but also among scientists.

Continuous and iterative policy support builds trust with policy makers and enhances capacities for communication on all sides, leading to potentially more relevant processes and outputs. Seeking a policy mandate can be important to further enhance relevance. It buys a direct line to policy but, on the other hand, it may also limit flexibility to explore wider issues and can diminish independence and legitimacy.

Using understandable language adapted to the specific audiences is crucial to relevance. Avoiding jargon, explaining concepts, and establishing common assumptions all help to build understanding and increase the chance of outputs reaching and influencing the intended audiences, thus ensuring that intended outcomes are achieved. Skilled “translators” or knowledge brokers (see page 29) can help to improve knowledge exchange. High-impact communication, for example using pictures, figures, or strong messages such as tipping points or irreversibility, can help get complex points across. On the other hand, if uncertainties are glossed over this may threaten credibility in the long term. Presenting outputs at relevant events, by appropriate presenters for the audience, and at the right time in terms of policy cycle, in accessible format can all increase relevance and efficiency.

Adaptability to changing circumstances is key to relevance. This requires on-going reviews of SPI activities and impacts, and horizon scanning for new knowledge, problems and opportunities. SPIs can even seek to be “gate keepers” for new knowledge, helping policy makers to distinguish between “crackpot ideas” and “strokes of genius”, and ensuring early involvement in new developments. Flexibility is needed in order to modify previous agreements, correct weaknesses, understand changing science and policy contexts, and respond accordingly. Seeking out new members and skills may be

necessary. Iterative and parallel processes of capacity building and SPI development increase relevance and effectiveness of the SPI, and create a sense of continuity and commitment.

Building and maintaining legitimacy

Legitimacy is especially important when knowledge is contested, when policy decisions involve winners and losers, and in all other situations where conflict may arise.

Wide coverage and participation of different expertise and perspectives not only increases the knowledge base and credibility of the SPI, it also helps legitimacy, provided time is taken to explore issues from a variety of perspectives. It may sometimes be necessary to have balanced membership for example through 'seats', voices or votes for relevant interests, sectors, or geographical areas.

Successful conflict management can enhance legitimacy. Clearly stated, appropriate and agreed methods are needed to manage conflict and dissent. Recourse to an external or neutral ombudsman may be necessary. Yet it is important to recognise that consensus should not always be the target. Often, reaching compromise is a more realistic and even fairer objective.

Multi-stakeholder dialogue is often needed for building relationships, trust, and legitimacy. Formal consultation processes may be required, but it is also often helpful to encourage informal dialogue as many people may be more comfortable with this. Procedures may also be required to facilitate participation by those using a second language.

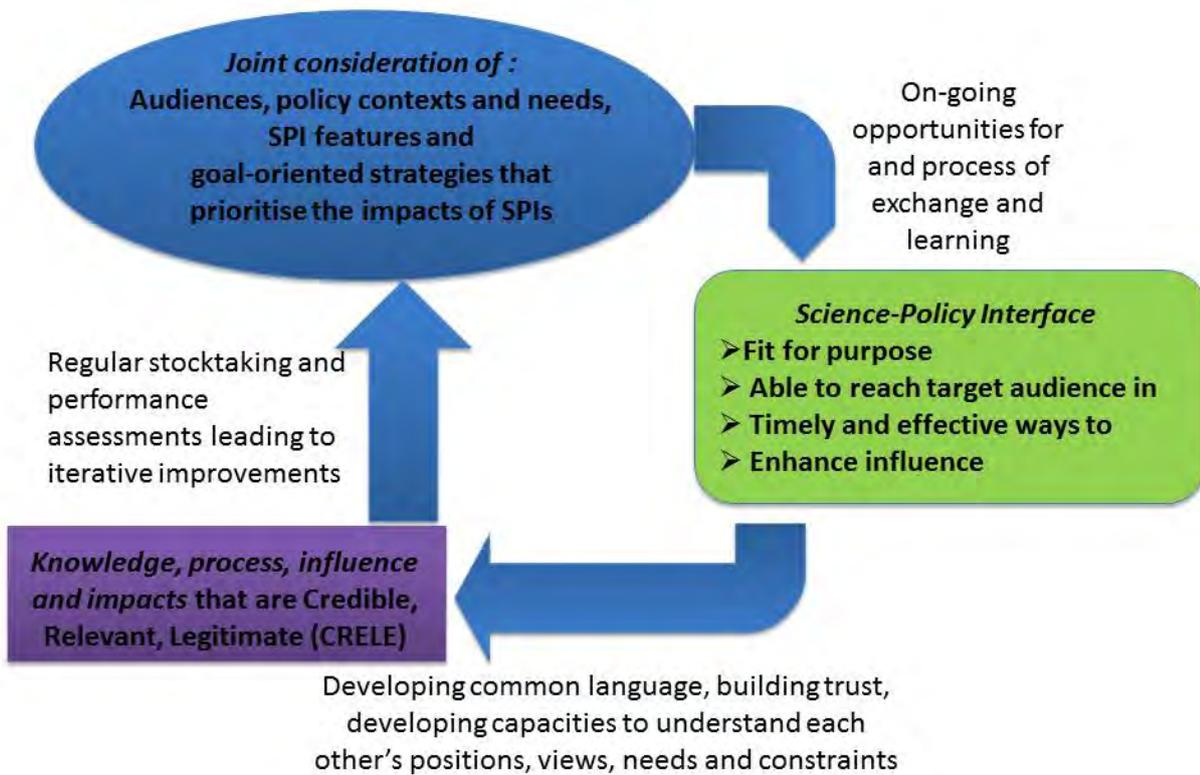
Incorporating extended peer review, including scientists from a broad range of disciplines and also other stakeholders in quality control procedures, can build trust and enhance both legitimacy and relevance.

Iteration and evolution

The CRELE model does not fully capture the way in which processes of iteration and repetition can explain the influence of SPIs. The CRELE at a given point in time may explain the impact of a specific instance of knowledge brokering; but SPIs are complex, dynamic processes, not a linear succession of independent events. Iterativity is needed to put emphasis on the added value of dynamic and repetitive features of SPIs, and on their potential to influence policy and behaviour more effectively through dynamic interaction between science and policy. Iterativity for SPIs encompasses the development and evolution of structures, objectives, processes, outputs and impacts in continuous and repeating science-policy interactions. Iterativity is not completely independent from CRELE, but is rather an important determinant of the medium to long-term development of CRELE attributes. Continuity of participation, funding, and processes help to build trust, mutual understanding, awareness and reputation. Iterativity also enhances possibilities for knowledge to accumulate and evolve, ensuring that results are built on and extended rather than reinvented. Learning takes time, and people may need to hear a message several times, and in different ways, before it sinks in, and even more before it changes behaviour.

The following figure summarises the way in which CRELE features can lead to more successful SPIs.

CRELE and the SPI



Possible pitfalls of SPIs

It is important to acknowledge possible pitfalls of SPIs. Common pitfalls of SPIs can include unclear or poorly thought-through SPIs, power influences, negative interactions with the media, over-reliance on key individuals, and lack of necessary resources.

Unclear or poorly thought-through SPIs

A number of factors contributing to unsuccessful SPIs are related to unclear goals and functions of SPIs. A common problem with SPIs is that insufficient resources are placed at the beginning in terms of understanding the policy and societal context, resulting in poorly adapted SPIs (often using existing structures) and mismatches between science and policy. For example, scientific results may be communicated to policy at the wrong time, missing key policy windows at which research could have a bigger impact.

Another difficulty is in developing scientific objectives that match the needs of policy. Discussing questions, and framing them with science, policy and other stakeholders so that they are workable from a scientific point of view and useful from a policy point of view, can save time and avoid frustration. This is, however, very difficult to achieve in practice. By the time kick-off meetings are organised, the project may have already started planning its work without input from policy and/or other stakeholders. There may also be a lack of time or interest by policy makers to attend to stakeholder meetings or advisory groups.

Projects are often developed with SPI activities planned towards the end. Unless funders place sufficient resources on SPI activities, and emphasise the need to develop SPI activities jointly with policy as early as possible in the project, there will be little incentive for science or policy to interact actively at these early stages. There may also

be serious differences in the expectations of science and policy. Policy actors may be surprised to see that a research project they were expecting practical solutions from instead focuses on further research needs.

Power influences

SPIs are messy processes where different values operate and power games and



influences will necessarily happen. It may be that scientific outputs interfere with policy interests, leading to a bias in policy makers only acknowledging results that fit their current or proposed arguments or policies. This can, of course, hinder new arguments coming into the policy arena, requiring other avenues by which to communicate scientific results. Many SPIs are constrained by conflicts between different stakeholders, not only in science and policy. This may be due to poor involvement of sectors other than science. In certain cases, for example the development of National Biodiversity Strategies, one approach to dealing with contentious issues, such as combining biodiversity conservation with other activities, was to restrict participation of

certain sectors or groups. This can lead to disenfranchised stakeholders and ultimately the poor implementation of decisions. It can also leave scientists in a position they may be ill-prepared for, namely as advocates of a particular side of the political debate.

The media

Interactions with the media are often still perceived by actors in science and policy-making as risky. Better understanding how the media works, training and involving journalists, and understanding how best to work with the media may promote indirect communication into policy very well, as shown by some EU projects (e.g. ALARM).

The role of key individuals

An SPI can be strongly dependent on the involvement of individuals committing their time and energy but also potentially influencing it. When or if these individuals leave, there is a risk that effort/interest in the SPI may dwindle. Possible ways of avoiding this are to keep these individuals on board, training up replacements, and broadening the number of such individuals to build on teams rather than individuals.

Lack of resources

Many of the above factors are due to insufficient money and time being dedicated

to SPI activities. In both science and policy, SPIs are perceived as marginal activities that are needed, but often not prioritised for resources and time. In addition, scientific careers might not be reinforced by SPI activities, which can be considered as a sideline activity. SPI activities can also have knock-on effects on scientific results. Projects contributing to policy more broadly than on an ad-hoc basis lead to trade-offs between policy support and scientific work. It can also be difficult for scientists to assess if knowledge effectively feeds into the policy process. Although scientists know that scientific research is a very small part of all other considerations that feed into policy processes, feedback from policy over what (if anything) is included in a process, and why, may be useful and may motivate scientists interacting with policy in the future.



Designing, maintaining and improving SPIs for EU-funded research projects

Research projects often face challenges in implementing their science-policy work. We suggest a number of possible approaches to better frame the project in the broader policy and societal context; work with other projects and learn from past experiences; engage with policy and other actors throughout the lifetime of the project; and interact better and more broadly.

Most scientists and policy makers, and many in other professions, will at some stage engage with a SPI of some sort. That is not to say that all individuals in science and policy can or should engage in science-policy interfaces. Involvement in SPIs largely depends on the type of work, organisational roles, colleagues and hierarchies, and personal inclination, motivation and incentives. However, substantial commitment is needed at the level of teams and organisations in science and policy.

Organisational changes in science and policy

Improving “packaging” of information is often a focus of recommendations for improving science-policy connections, but this is not sufficient on its own. Organisational changes in science and policy sectors must be made so both policy and research have the motivation and opportunity to build better long-term relationships. For example, educating and training researchers in communicating beyond the scientific community is still a major task. This should play a broader role in university education (for example with SPI courses given by practitioners), but could also be part of larger projects or clusters, e.g. via summer schools that address policy, SPI and communication issues.

Most research projects, however, recognise their responsibility to contribute to addressing societal problems and the importance of

developing strong science-policy interfaces. In many cases, involvement or development of an SPI is a contractual obligation. Yet projects are still facing challenges in planning and implementing their interface work. Common challenges include:

- Framing the project in the broader policy and societal context;
- Working with other projects and learning from their experiences;
- Engaging with policy and other actors throughout the lifetime of the project;
- Communicating efficiently and broadly.

In this section we set out some recommendations on how to deal with these challenges when designing, maintaining and improving project SPIs.

See SPIRAL briefs aimed at research funders and policy-makers

Designing project SPIs

Designing SPIs should ideally start in the project proposal writing phase or at least within the first 3 months of a project. Much of this designing phase relates to framing the project in the broader policy and/or societal context, in other words making the project relevant (see above section on CRELE). This can be done with your project or policy officer. Many research projects try to align their results retrospectively with what they think policy and society should be interested in: this approach rarely works. If you want your research project to make a difference, you need to understand *ex ante* the general

context in which your research might fit in. A few steps can help:

- Develop an ambitious and meaningful strategy for science-policy interfaces – see action plan below, expanded in the

following text. Such a strategy should be implemented and revised as appropriate, and include, in particular, timed and targeted actions for different audiences, but also for different types of knowledge (see box page 14).

A possible action plan for projects to improve their science-policy activities

Action	Who with	When	Outputs
Explicitly develop an action plan as a work package (including the actions listed below)	Project partners and EC RTD policy officer(s)	Ideally at the project proposal writing phase or at the latest early in the project	Action plan with clear deadlines and responsibilities
Identify and make contact with policy stakeholders at relevant levels	Project partners, EC RTD policy officer(s), EC (e.g. ENV, CLIMA, AGRI, MARE), MEPs, national and local policy-makers	Ideally from the project proposal writing phase onwards	Policy stakeholder map
Identify and make contact with other stakeholders ⁴	Project partners, advisory board and EC RTD policy officer(s)	Ideally from the project proposal writing phase onwards	Stakeholder map
Develop a database of stakeholders	Project partners and advisory board	From the beginning of the project onwards	Stakeholder database
Identify relevant past and current projects and/or initiatives working on your topic who may want to engage in the project ⁵	Coordinators and WP leaders of past and current projects, EC RTD policy officer(s) and advisory board	From the proposal stage onwards	List of projects and initiatives, and associated contacts Plan for joint actions and partnership (e.g. policy briefs, press releases, workshops, website...)
Set up an advisory board	EC RTD policy officer(s), external experts and stakeholders	First 3 months of the project	Joint plan for meetings of the advisory board
Plan a communication and a stakeholder engagement strategy	Project partners, advisory board, and project stakeholders	First 6 months of the project	Communication and stakeholder engagement strategy (e.g. workshops, face-to-face, email, skype)
Set up a project website	Project partners, ideally with input from project advisory board	First 3 months of the project and then regularly updated	A good, useful, easy to navigate website (including a policy section) ⁶

⁴ We understand stakeholders to be anyone who may affect or be affected by a project and its results.

⁵ See page 25.

⁶ See box page 26.

- Develop and update a database of key contacts.
- Ensure early links with relevant actors in the European Commission and other EU institutions as appropriate (e.g. agencies, Parliament). Projects should ask the project officer at the European Commission to support an early meeting with relevant policy officers from relevant policy Directorate-Generals at the start of the project, preferably before the kick-off meeting of the project to allow work package leaders responsible for interface and communication and the project coordinator to meet key individuals face-to-face and understand their knowledge requirements.
- Improve involvement of policy-makers at relevant levels. Interact with policy-makers from sub-national to international

Clustering project SPIs

It may be helpful and efficient to cluster projects for science-policy interactions and broader dissemination. Such SPI alliances of projects can enhance joint learning, make it easier for policy makers to engage (fewer meetings) as well as provide a broader picture and a more refined input to policy. Projects can learn from each other, and duplication of effort should be avoided. This can be top-down driven if supported by funding agencies (see SPIRAL brief on recommendations to funders) or more informal and bottom-up when initiated by projects. Past and existing examples in the field of biodiversity include partnering of HERMIONE & CoralFish; BeSAFE & BioMOT; OpenNESS & OPERA.

level as appropriate. Be sure to also include some policy implementing partners such as local administrations, NGOs or the private sector in the project.

- Identify and speak to people (or 'stakeholders') you think will be interested in your project and its results. This may require more than just identifying your audiences, ideally it should aim at understanding the motivations of different audiences. Also, different audiences will vary in how they engage with your project, hence how you communicate with them should differ. This should be done early in your project: ideally at the project proposal phase.
- Identify and interact with other projects working on similar issues and build on previous projects.
- Use advisory boards and stakeholder groups. These can include carefully selected policy makers and other key stakeholders. If well run, with the right people involved, they are extremely useful to identify key research avenues of value to policy, identify policy-relevant results, provide input to the implementation plan, alert researchers to priority issues on the policy agenda, help bring research progress rapidly to the attention of policy-makers and other potential users, and help develop targeted policy relevant outputs from the projects.
- You may even consider whether all or some of your stakeholders could be involved in helping you design your research project, if this is appropriate to your and their goals.
- In workshops, interviews or focus groups, make use of interactive participatory approaches. For example avoid PowerPoint over-use and the temptation to lecture your audiences/stakeholders.
- Use existing science-policy institutions such as the European Environment Agency, national environment agencies and national structures platforms (e.g. national biodiversity platforms) to learn more about policy needs and disseminate results.

See SPIRAL
briefs on
learning from
existing SPIs

- Provide scientists in the project with the opportunity to be aware of how policy works (see policy cycle description on page 9). Inform scientists in your project about policy processes, policy cycles, the societal context and what types of results are useful for policy. This can be done, for example, by asking your policy contact(s) directly or by including some policy news in your project meetings, newsletters or websites.
- Develop a policy section on websites (see box on websites below) or specific communication products targeting policy makers. A dedicated section on the project website could make policy-relevant information easily accessible and act as a forum whereby policy makers can ask questions that could be answered by the project.

Dos and don'ts for project websites

- Make sure your communication in general and the website in particular are not mere appendices of the project, but incorporate them into the basic project strategy - make communication one of the key success factors of the project. See to it that the "communication reflex" is present from day one and reflect at all times on communicating the project's parts, and not just executing them.
- Structure your website logically, keep it compact overall and make links to all essential information accessible on the main page and preferably even "above the fold", seen at first glance.
- Consider creating a section where you summarize your project from a policy angle (see examples of the BIOFRESH policy resources web section and SPIRAL briefs):
 - Be concise and summarize: policy makers do not have the time to read big chunks of text or lengthy articles. Provide summaries when you cannot avoid large text blocks but always link to longer information sources.
 - Avoid jargon, abbreviations and technical terms.
 - Be practically minded: include a "call to action", so the project can lead to action and change, and does not remain purely theoretical.

Maintaining project SPIs

Effective SPIs and communication should not be end-of-pipe. In many cases, establishing a dialogue with policy makers and other stakeholders from the onset, and keeping them involved throughout a project (and even, ideally, beyond) can significantly contribute to effective science-policy interactions.

Steps to support this include the need to:

- Build the 'brand' or identity of your project. This will enable interested parties to recognise and follow your work.
- Maintain and improve your SPI strategy (see above).
- Include an internal evaluation process in your SPI and dissemination strategy – so you can identify your weaknesses and address them, and build on your strengths. It is important to allocate enough resources to the implementation and monitoring of the SPI and dissemination strategy.
- Identify at an early stage of the project research outcomes that would be relevant for policy-making and that would benefit from being hosted (stored, documented,

updated) within the EU Environmental Data Centres; this would imply following strict technical specifications (see <http://www.eea.europa.eu/data-and-maps/european-data-centres>)

- 🌍 Disseminate your results to other researchers, policy makers, and the public. Options to do this include EU environmental information services such as BISE⁷ for biodiversity, WISE⁸ for water and marine or Climate-Adapt for climate change adaptation⁹. Projects should ensure they set aside enough resources to prepare and upload some of their results, including metadata in a format that is appropriate for future uses.
- 🌍 Involve policy-makers and other stakeholders in the development of scenarios, storylines, models, policy options and decision-support tools to ensure that they are adapted to user needs.
- 🌍 Ensure interaction events throughout the project, and beyond. Projects must ensure there is sufficient time and resources set aside for interaction via personal meetings and larger events with policy makers at key stages of the project especially if there is a possible need to adapt research activities. In order to foster the uptake of project results in policy, it might be relevant to

maintain a dialogue beyond the project's duration.

BISE: The Biodiversity Information System for Europe

The Biodiversity Information System for Europe (BISE: <http://biodiversity.europa.eu/>) is a single entry point for data and information on biodiversity in Europe. It is a partnership between the European Commission (DG Environment, Joint Research Centre and Eurostat) and the European Environment Agency (EEA). Bringing together facts and figures on biodiversity and ecosystem services, it links to related policies, environmental data centres, assessments and research findings from various sources. It is being developed to strengthen the knowledge base and support decision-making on biodiversity. One of the five entry points of the BISE portal is research. This part of BISE is still in its infancy and input from both researchers and users of research results on how to develop it could ensure that it is adapted to needs and that it is relevant, credible, legitimate, and ultimately helpful for biodiversity-related policy and management.

⁷ <http://biodiversity.europa.eu/>

⁸ <http://water.europa.eu/>

⁹ <http://climate-adapt.eea.europa.eu/>

Improving communication in project SPIs

An important part of SPIs is improved

See briefs on recommendations for communication

communication. Communication is most usefully understood as a network activity, in which there are many

stakeholders involved, at different levels.

There are a number of practical ways in which communication with stakeholders can be improved. A few examples are explored below:

- Adapt communication approaches for your different audiences (identified through your stakeholder map and your communication/stakeholder engagement strategies – see page 24). A way forward is to ask them directly what communication approaches work best for them. This can lead to a dissemination plan jointly developed with stakeholders and adapted to their requirements.
- Produce targeted and attractive briefs (see box page 29). Such briefs are a major policy-influencing product and should be made widely and systematically available,

e.g. via information systems such as the Biodiversity Information System for Europe (BISE – see box page 27). Briefs need to be targeted and readable, they should link the issues to relevant policies or at least provide a “policy hook”, an explanation as to why this matters, and when appropriate what policy-makers could do about it. Briefs should be no longer than 2 sides of A4, include a short summary, suggest further reading, and provide a point of contact. Explore innovative ways of producing and updating briefs, e.g. “wiki-briefs”.

- Ensure you have knowledge brokers on board (see box page 30). Make use of people or teams in the consortium who are good knowledge brokers. Both young and more senior scientists may be interested in contributing to science-policy or science-society interfaces. Consider bringing in partners with specific knowledge brokering skills, and/or providing a PhD position in the project to focus on science-policy interface aspects in the project.

Ways to improve communication between science and policy

- Adapt approaches according to your audience
- Use different communication tools, e.g. visual materials, scenarios, user guides, videos, comics book, children’s books (see box page 31), art pieces, online best practice guides, maps, social media (e.g. twitter – see box page 32, blogs), the ‘Science for Environment Policy’ news and information service of DG ENV...
- Rely on professionals for some specific products (e.g. videos, flyers)
- Contextualise the presentation of research or specific findings
- Preface all reports with accessibly-written short executive summaries
- Allow communication strategies to evolve and be flexible
- Proactively seek out ways to present research and its implications to different audiences
- Write policy briefs but also disseminate and link to other communication outputs
- Plan to publish reviews. These are particularly helpful to non-researchers
- Look for training courses in communication.

Writing (policy) briefs

- Keep it short. This may sound intuitive but 20 page “briefs” are still being produced. Aim for a couple of sides of A4 at most.
- Keep it clear. Think about why you are writing the brief, what the brief covers and who it is aimed at.
- Avoid jargon.
- Be engaging and show you are engaged. A brief should not just be seen as another deliverable, but should aim to convey the effort and enthusiasm of your work.
- Target your audience. For example, there is a difference between policy briefs, and briefs aimed at other audiences.
- Policy briefs usually include the following: an executive summary, a section on context and the importance of the problem in question, a critique of policy option(s) and some policy recommendations.
- In the SPIRAL briefs we usually started with a snappy title, a synopsis of the brief (what it was about and who it was aimed at), then we had a number of sections (usually 3 or 4) where the meat of the issue was tackled, before ending with a summary and information on who wrote the brief and where to get more information.
- Other briefs may also be aimed at non-policy actors, and could, for example, be a summary of results relating to a specific management problem.
- Acknowledge funders and/or other sources of support at the end.
- Cross-review the brief thoroughly (every word matters!). This means asking project members or colleagues or sample member of your target audience to check and comment on what an individual has written. For example, all the briefs produced in SPIRAL were written, edited and then reviewed by other members of the team, often working in other parts of the project. This allowed for briefs to be discussed internally and improved through input from different perspectives.

The above suggestions come from the SPIRAL project, in which researchers wrote over 30 briefs over the course of project to synthesise and communicate its key messages as the project progressed. For all briefs, visit <http://www.spiral-project.eu/content/documents> or have a look at the SPIRAL synthesis report.

What is a knowledge broker?

Knowledge brokers are also referred to as translators, linker or bridging individuals, boundary individuals. They are skilled persons able to speak to multiple communities in understandable ways. They can:

- condense information to deliver accessible, clear and robust messages;
- help scientists understand better the complex and fuzzy policy making context;
- open the complexities of environmental issues into understandable language to policy makers.

Within research organisations knowledge brokers may be knowledge exchange specialists, or within policy departments these may be specialist scientific advisors, but in both cases they can be researchers or policy-makers who are good at and interested in bridging activities. It is important not to confuse knowledge brokers and facilitators. Although some facilitators may have good brokerage skills on some topics, others may either not know enough about a topic or not have the synthetic skills required to be good knowledge brokers. The challenge is in training or recruiting scientists who are able to efficiently communicate with counterparts from other disciplines, as well as with the media, policy makers, and popular audiences. 'Translation' roles are, however, at present not always formally recognised or rewarded. Translators or linker individuals should not and cannot absolve all individuals from having some role to play in seeking out dialogue, learning and sharing opportunities. Otherwise, a risk is that dialogue can become overly vulnerable to the continuity of key personnel, and those personnel struggle to learn and share what is needed.

- Make use of existing science-policy dissemination channels. Projects should more systematically provide articles to Science for Environment Policy, the news and information service set up by the EC Directorate General for Environment and to similar SPI channels. Your project or policy officer can help identify some appropriate dissemination channels. There are more and more peer-reviewed journals accepting commentaries or papers with an explicit science-policy focus, in which projects could aim to publish.
- Use open policy meetings for dissemination. A number of broader open policy meetings exist (e.g. high level conferences, Bridging the Gap series, Green Week), where projects can improve their impact and



Eye on Earth

Eye on Earth (<http://www.eyeonearth.org>), facilitated by the European Environment Agency (EEA), is a 'social data website' for creating and sharing environmental information. Data and information can come in a variety of formats such as maps, graphs and tabular spreadsheets, alongside various tools. Maps can be viewed, created, interacted with, manipulated and shared. Users can choose to share information with closed groups or everyone. Examples of potential users include policy makers, environmental organizations, emergency responders, GIS professionals, communities and citizens. Eye on Earth has a high potential for use by research projects. It can serve (i) in the dissemination of results; (ii) as a science-policy interface tool; (iii) for joint work in projects and with stakeholders, and (iv) involve the wider society.

recognition. Also joint presentations of related research results from several projects showcasing on-going research can be a good way to reach policy makers.

- Be innovative. Try out different ways of reaching audiences, including short 1-2 minute presentations of project headlines at meetings, which could pique stakeholders' interests, and who could, in turn ask for more information.
- Disseminate more broadly. Better dissemination to the wider public is key. Communication should encompass more than just science and policy and be multilevel. Indeed, we are dealing with a complex network of interfaces and governance structures (from local to global

levels) that may be very different depending on the scale at which, and where, they operate. Possible actions include:

- striving for more dissemination through the media, including European initiatives (e.g. Euronews);
- production of popular or children's books;
- using new media such as video via Youtube and social media (e.g. Twitter);
- using tools such as Eye on Earth;
- explore opportunities to use specific professional partners for dissemination, including NGOs, professional communicators, Science Museums, Aquaria, Planetaria.

Children's books

"Message in a bottle" is a children's book on contamination in the deep seas. It was a collaborative outreach product between the HERMIONE (<http://www.eu-hermione.net/>) and INDEEP (<http://www.indeep-project.org/>) projects, freely distributed to schools and other venues around the globe, and published in five languages.



A guide to Twitter

Social media can be useful both to find out about science, policy, and activities at the interface between them, and to disseminate information. Amongst the scientific community, Twitter in particular can be useful in finding out about institutions such as the partners involved in SPIRAL (@CEHScienceNews, @UFZ_de, @ymparisto etc), individual research scientists such as Bill Sutherland (@Bill_Sutherland) and Roger Pielke (@RogerPielkeJr) and networks such as ALTER-Net (@ALTER_Net_News), the International Network of Next-Generation Ecologists (@INNGEcologist) and the Global Biodiversity Information Facility (GBIF, @GBIF). Projects using Twitter include Biodiversity Knowledge (@BiodivKnowledge), EU BON (@EUBON1), BioFresh (@biofreshproject) and, of course, SPIRAL (@SPIRAL_project).

Policy information is also available on Twitter from government departments (e.g. the UK Department for Environment, Food and Rural Affairs, @DefraNature), the European Commission (e.g. @EU_Commission) and those involved in it, including Janez Potočnik (@JanezPotocnikEU) and Anne Glover (@EU_ScienceChief).

Information on many science-policy initiatives can be found through on Twitter, including the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES, @IPBES), The Economics of Ecosystems & Biodiversity (TEEB, @TEEB4ME) and the Intergovernmental Panel on Climate Change (IPCC, @IPCC_CH). Organisations working at the science-policy interface also use Twitter e.g. the European Environment Agency (@EUEnvironment), and the Belgian Biodiversity Platform (@Biodiversity_be), and many NGOs (e.g. BirdLife Europe, @BirdLifeEurope).

Twitter is also useful for disseminating information (see paper by Darling et al. <https://peerj.com/preprints/16.pdf>) and, directly or indirectly, making contacts. For example, @SPIRAL_project tweets information on its outputs and meetings, other relevant meetings and publications, and useful information on the web. It is important to establish an identity on Twitter: @SPIRAL_project disseminates information relevant to the science-policy interface, including different views on policy issues such as biodiversity offsetting, GMOs and the impact of insecticides on pollinators.

140 characters aren't enough to get a complex message across but a lot of information can be compressed in a single tweet. Links are particularly useful, either to a specific web site (e.g. <http://bit.ly/i6aSbG>), publications (<http://bit.ly/OeexFY>) or other information (<http://bit.ly/OeexFY>). And using bitly (<https://bitly.com/shorten/>) helps to keep tweets short!

For more information on Tweeting see the "Twitter Tips" guide by Mark Reed and Anna Evelyn (<http://bit.ly/peue5X>).

Sources and resources

For more information on SPIs, we can recommend a number of useful websites and papers, which we have found useful in the SPIRAL project. We hope these can help you too.

Useful websites

SPIRAL

<http://www.spiral-project.eu/>

ECNC communication manual:

<http://www.ecnc.org/publications/technicalreports/communicating-nature-conservation>

NERC “Science into policy” handbook:

<http://www.nerc.ac.uk/publications/corporate/documents/science-into-policy.pdf>

SPI-Water

http://www.spi-water.eu/index.cgi?s_id=28

Over the course of the SPIRAL project, we have developed a number of briefs exploring different aspects of SPIs, and learning from existing SPIs.

SPIRAL briefs include:

Understanding science-policy interfaces

- 🕒 A myth-busting-guide to science-policy interfaces (SPIs)
- 🕒 Useful references on science-policy interfaces

Understanding biodiversity

- 🕒 A beginner’s guide to understanding challenges of communicating about biodiversity
- 🕒 What’s so special about biodiversity?

Improving communication

- 🕒 General recommendations for improving science-policy communication
- 🕒 Recommendations for improving science-policy communication for individuals
- 🕒 Recommendations for improving science-policy communication for teams
- 🕒 Recommendations for improving science-policy communication at the level of organisations

Strengthening science-policy interfaces

- 🕒 SPI under the spotlight: ways to think about science-policy interfaces
- 🕒 Key features of effective SPIs
- 🕒 Designing for success: SPI structures
- 🕒 Goals and roles: SPI objectives and functions
- 🕒 Science-policy interface processes: fitting activities to evolving contexts
- 🕒 SPI it out: making a splash with outputs
- 🕒 Focus on impact
- 🕒 Adding and sustaining the value of research: recommendations for research funding institutions
- 🕒 Integration of research results into policy making: recommendations to policy makers
- 🕒 Improving the use and impact of your research: recommendations to EU research projects

Integrating credibility, relevance, legitimacy and iterativity

- 🕒 Keep it CRELE: credibility, relevance and legitimacy for SPIs
- 🕒 CRELE Choices: trade-offs in SPI design
- 🕒 Iterativity and dynamism in science-policy interfaces

Learning from existing science-policy interfaces

- 🕒 Reality check for science-policy interfaces
- 🕒 Reflections on recent experiences with the UK National Ecosystem Assessment
- 🕒 An emerging multi-level and multi-function SPI for the implementation of the Water Framework Directive in Romania
- 🕒 Co-constructing INBO's policy relevance
- 🕒 Recent reflections on science-policy communication in the context of deer management in Scotland
- 🕒 Reflections on recent experience with the Water Framework Directive in Scotland
- 🕒 Reflections on Science-Policy Interfaces in the development of National Biodiversity Strategies
- 🕒 Tools for Science-Policy Interfaces: Recommendations on BISE and Eye on Earth
- 🕒 Towards strengthening environment science-policy interfaces at EU-level: the SEPI exploration
- 🕒 Afribes: Towards a social network of scientific and technical information for Africa
- 🕒 The Economics of Ecosystems and Biodiversity – TEEB
- 🕒 Spiraling IPBES

Moving from interfaces to alliances

- 🕒 From interfaces to alliances: a shift in how we do science and policy

SPIRAL papers include:

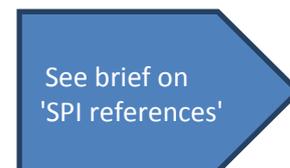
Nesshöver, C., Timaeus, J., Wittmer, H., Krieg, A., Geamana, N., van den Hove, S., Young, J., Watt, A. 2013. Improving the science-policy interface of biodiversity research projects. *Gaia* 22(2): 99-103.

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In addition to these, below is a non-



exhaustive list of references on SPIs which we, in the SPIRAL project, found useful:

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