



ENHANCING SCIENCE-TO-POLICY UPTAKE IN THE WESTERN INDIAN OCEAN REGION



On behalf of



Federal Ministry
for Economic Cooperation
and Development



ENHANCING SCIENCE-TO-POLICY UPTAKE IN THE WESTERN INDIAN OCEAN REGION

BACKGROUND DOCUMENT AND GUIDELINES ON EFFECTIVE SCIENCE TO POLICY INTERACTION



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Acronyms and Abbreviations

BMZ	German Federal Ministry for Economic Cooperation and Development
COP	Conference of the Parties
CORDIO	Coastal Oceans Research and Development – Indian Ocean
FARI	Forum for Academic and Research Institutions
GIZ.....	Deutsche Gesellschaft für Internationale Zusammenarbeit
IIED.....	International Institute for Environment and Development
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
KFS	Kenya Forest Service
KMFRI	Kenya Marine and Fisheries Research Institute
LMMA.....	Locally Managed Marine Area
MPA	Marine Protected Area
SAM.....	Strategic Adaptive Management
SANBI	South African National Biodiversity Institute
SFA	Seychelles Fishing Authority
SPACES	Sustainable Poverty Alleviation from Coastal Ecosystem Services
SPP.....	Science Policy Platform
WIOMSA.....	Western Indian Ocean Marine Science Association

Executive Summary

Scientists are increasingly engaged in supporting policy uptake of their work. Whether this engagement emerges from personal conviction or external pressures, the discussion is increasingly moving beyond whether scientists should be concerned with the policy uptake of their work and is instead now focusing on how this can best be achieved. This report was commissioned by the Western Indian Ocean Marine Science Association (WIOMSA) as part of the MeerWissen: African-German Partners for Ocean Knowledge programme – a programme funded by the German Federal Ministry for Economic Cooperation and Development (BMZ) and implemented with support from GIZ. The researchers involved in MeerWissen projects (www.meerwissen.org) are the primary intended audience for this report, but it is hoped that the report will be of use to other researchers and policy stakeholders in the Western Indian Ocean region and potentially in other regions too.

The report provides an overview of current thinking on the science-to-policy interface, including a brief overview of relevant theory and a discussion of the policy cycle as a key framing concept to inform science-to-policy engagement. The report includes nine case studies from the Western Indian Ocean region and six international case studies, which seek to illustrate how principles of effective science-to-policy uptake have played out in real-world experiences. Key insights from the literature on the science-to-policy interface are presented, with a focus on pragmatic, accessible examples, which are used to develop a set of guidelines on effective science to policy interactions.



1. Introduction

Open any introductory political science text and you are likely to come across some version of the policy-making cycle presented as a simple and intuitive progression. Common stages represented include problem identification, agenda setting, policy formulation, policy adoption, implementation, monitoring and adjustment. It seems reasonable to expect that this process should be 'evidence-based', drawing on what we know about what works and what doesn't to chart a way forward. Open any newspaper or watch footage of a parliamentary debate, however, and it is clear that the daily reality of the policymaking process is quite different. Policy processes are 'complex, multifactorial and nonlinear', in a word: messy.

In our present time, an era of 'fake news' and 'post truth', a time when the inadequacy of global political responses to climate change is ever more apparent, the inherent messiness of the policy-making process is no secret. Yet rather than hand wringing and cynicism, this environment calls for a pragmatic approach that seeks to understand how and why policy-makers demand information, and the political and complex policy-making context in which they operate. Only then, it has been argued, can we produce evidence-based strategies based on how the world works rather than how we would like it to work.

This is certainly true for the complex and pressing challenges facing the world's oceans. Overfishing, illegal fishing, habitat destruction, pollution (including plastics) and the numerous ways in which climate change is affecting the marine environment (for example sea level rise, acidification, and warming) has dramatic and far reaching impacts on the health of marine ecosystems, undermining the ecosystem services on which we rely.

This report was commissioned by the Western Indian Ocean Marine Science Association (WIOMSA) as part of the MeerWissen: African-German Partners for Ocean Knowledge programme – a programme funded by the German Federal Ministry for Economic Cooperation and Development (BMZ) and implemented with support from GIZ. The researchers involved in MeerWissen projects (www.meerwissen.org) are the primary intended audience for this report, but it is hoped that the report will be of use to other researchers and policy stakeholders in the Western Indian Ocean region and potentially in other regions too. The MeerWissen Kick-off and Co-design Workshop, hosted from 5-7 March 2019 in Langebaan, South Africa, provided an opportunity for initial discussions on enhancing science-to-policy uptake. MeerWissen project partners and other stakeholders were again engaged at WIOMSA's 11th Scientific Symposium in Mauritius at a special session on *"Building Capacities for Knowledge-based Policy Making in the WIO Region"*, hosted on 5th July 2019. An online survey was conducted as part of this study that assessed common challenges, good practice examples and success factors related to science-to-policy uptake. The report also draws on the broader literature on the science-policy interface.

The report focuses primarily on the how of science-to-policy uptake, rather than on the why. While there still may be some scientists who are not entirely convinced that promoting policy uptake of their research is a personal responsibility or priority, the greater majority of scientists have accepted that this is now an issue to take up. Whether this shift is driven by pressure from funders, research administrators or peers, or arises from a personal conviction that policy-making and policy evaluation should be evidence-based, this paper seeks to support those scientists wishing to enhance science-to-policy uptake. It should be noted that the science-to-policy interface is just one aspect of a broader debate around science communication. Sources focused on science communication are concerned not only with the science-policy interface, but also the communication of scientific findings to the broader public and specific stakeholder groups such as the private sector and the non-profit sector. There is also a broader discussion related to the role of traditional and other knowledge in policy-making, leading some to argue for a focus on knowledge-to-policy rather than science-to-policy. While acknowledging these broader issues, this report focuses on science-to-policy uptake specifically. A key element of the approach employed is the use of case studies, drawn from both within and beyond the Western Indian Ocean region, to provide practical illustrations of good practice principles related to science-to-policy communication. These case studies, as well as a number of existing guidance documents on science-

to-policy communication, could not be elaborated comprehensively within this report, and so links for further information on the case studies and to a number of existing guidance documents on science-to-policy communication have been provided. Case studies were drawn from the literature, suggestions provided at MeerWissen meetings and survey responses.

When addressing the need for evidence-based policy making, *“the good news is that evidence can matter. The bad news is that it often does not”*. This paper tries to shift that balance, drawing on the literature and practical, real-world insights gained from the region.



2. The Science to Policy Interface: Managing the Boundary

Policy-makers operate in a complex environment, facing a range of demands, often in a time-constrained setting. Decision-making is shaped by personal or institutional values, the availability of resources, personal experience and expertise, pragmatic political considerations, traditions, habits and a host of other influences. In this environment, evidence is a necessary, but not sufficient condition for decision-making.

Researchers, in turn, may for any number of reasons not consider promoting policy uptake of their research as a personal responsibility or a priority. Some scientists have argued that scientific credibility may be undermined when they are seen to be advocating personal positions on policy issues. Even where researchers have bought into the need for policy engagement, they often lack training and support, while competing demands related to publication, lecturing and fundraising may mean that promoting policy uptake drops ever lower down their priority list.

It is clear, then, that the science-policy interface, those *“social processes which encompass relations between scientists and other actors in the policy process, and which allow for exchanges, co-evolution, and joint construction of knowledge with the aim of enriching decision-making”*, face a range of challenges. A number of these challenges are enumerated below:

1. A disjunct in timing – a research project from grant application to completion can take several years, whereas policy-makers work on much shorter time scales.
2. A lack of training for scientists in navigating the decision-making processes that lead to formulation of policy, as well as in transdisciplinary research.

3. A lack of mutual understanding of the scientific process and the policy cycle, which includes the time scale and characteristics of achieving a successful outcome. Success in science is predominantly measured by academic impact whereas managers aim to achieve positive societal impact. Academic impact, generally speaking, often falls short of providing a timely and appropriate contribution to societal change. Conversely, enduring societal impact is not generally possible without timely access to appropriate knowledge.
4. A lack of understanding of the limitations of scientific findings, and equally important, the lack of understanding of the multidimensional decision-making required to address real-world problems faced by managers and politicians.
5. Presented scientific data being ignored because policy-makers have not been convinced of its policy importance, significance, relevance or implications.
6. A lack of opportunities that allow researchers and managers space to engage constructively around the gaps in knowledge production, focusing on policy-relevant data, and to build relationships based on mutual trust and understanding. This includes lack of consultation between policy-makers and scientists when policies are being formulated, and can result in scientists being unwilling to engage in science to enable or inform what they consider to be poorly formulated policies.
7. Mismatch in the language and processes used by scientists and policy-makers. There is a distinct issue that arises from the difference between the language of probability and significance (as used by scientists), and the language of risk, resource availability and perception, used by managers and politicians.
8. Scientists are often unable or unwilling to provide the certainty and absoluteness required and often demanded by managers and policy-makers. On the flip side, there is often a lack of clear policy objectives that would enable policy-relevant science to be undertaken.
9. Lack of data accessibility and capacity to find and evaluate the relevant data and its originators.
10. Poor feedback of scientific impact on policy, which prevents researchers from gauging the actual impact of their work.
11. Lack of accountability (perceived or otherwise) of government and policy-makers.

In the context of development policy, David Cash and his co-authors make the case for 'managing the boundary' of the science-to-policy interface. This sees an active role for researchers in promoting science-to-policy uptake, with a focus on increasing the salience, credibility and legitimacy of the information produced. Credibility speaks to the authority of the evidence and arguments; salience deals with the relevance of the information to the context-specific needs of decision-makers; and legitimacy reflects the perception that the production of information has been unbiased, fair in its treatment of opposing views and respectful of stakeholders' divergent beliefs and/or democratic channels and processes. The authors outline three important functions of the science-policy interface:

- Communication refers to the importance of two-way, active, iterative and inclusive communication between experts and decision-makers, in order to strengthen research-informed policy dialogues;
- Translation involves the way that messages, having been communicated via various channels and actors, are framed in the appropriate way to guarantee full comprehension by and benefit to relevant stakeholders;
- Finally, mediation is required where the conflicts and trade-offs between different actors in the policy process cannot be resolved by simply improving understanding.



3. Dipping into the theory

The “*Stages*” model of policy-making and policy process, from which the concept of the policy cycle derives, dominated thinking in policy studies until well into the 21st century. While the stages model made it possible to present the complex process of public policy development in a simplified form through the utilization of several stages, this too was its fundamental critique – the ordered, sequential process outlined in the model did not reflect the inherent ‘messiness’ of the policymaking process. The growing criticism of such frameworks led to the demand for new, alternative theories and frameworks to explain the policy process. Current theoretical frameworks include the Institutional Analysis and Development Framework, Multiple Streams, the Advocacy Coalition Framework, Policy Diffusion, Punctuated-Equilibrium and Social Construction and Policy Design.

Multiple Streams

The Multiple Streams Approach is one of the most well-known approaches to the study of public policy, developed by John Kingdon (1984) in *Agendas, Alternatives and Public Policies*. It is used as an analytical framework for understanding public policy agenda setting, through describing, explaining and predicting the public policy issues, drivers, processes, content and outcomes. Kingdon conceptualizes the policy process as a non-linear, complex process, which involves three separate streams. These streams include: the problem stream (issues that demand government attention), the policy stream (refers to a possible solution to the problem) and the politics stream (refers to the factors that influence ‘national mood’). These ‘streams’ flow along different channels and run independently until eventually they converge. When this happens Kingdon famously says that it is “*an idea whose time has come*”. This moment when the three streams converge, creates a ‘window of opportunity’. The ‘window of opportunity’ refers to the opportunities for action to advance engagement on issues. These opportunities are likely to come in the form of external events (such as a crisis or an accident), policy entrepreneurs, or institutionalized events (such as elections, budget deadlines, international law). The Multiple Streams Approach is very popular amongst scholars of public policy because it offers a simple framework to understand the agenda setting of public policy. However, one of the main critiques of this approach is that it is abstract owing to its ‘garbage can model’ approach and its narrative synthesis which fails to capture the essence of Realpolitik.

Advocacy Coalition Framework

The Advocacy Coalition Framework is considered a more sophisticated version of the group competition approach to the policy process. This framework conceptualizes the emergence of networks or communities of interest groups that form policy-related coalitions to maximize their influence or control over policy making. The Advocacy Coalition Framework provides a lens to understand policy not as a single point in time but as a process without beginning or end, thereby sidestepping many of the limitations of viewing policy as a linear set of “*stages*” with a definitive beginning and ending point. Given its basic concepts and assumptions, the framework is somewhat malleable and open to experimentation in developing theoretical expectations and in using different forms of data collection and analysis. It has been criticized, however, for the absence of clearly conceptualized and operationalized institutional variables that structure coalition formation and behaviour, as in the institutional analysis and development framework.

Social Construction and Policy Design

The social construction and policy design framework takes into account the target population of a policy and how this influences the type of policy created, as well as how policy can influence the way the target population acts. As such, this framework uses policy design as both a dependent and independent variable. Recent work in social construction and policy design argues that future work on policy design should analyse the role of policy knowledge and the extent to which this determines policy design. Independent variables include factors such as the way in which policy designs create target populations, how it sets rules on the allocation of resources and how this impacts citizens, as well as how “*policies embed many aspects of the rhetoric in the policy debate*”. Social construction and policy design frameworks further differ from traditional research on policy design in their emphasis on the ways in which target populations of a policy are defined.

There are some emerging trends that Nowlin (2011) highlights, these include framework and theories such as the Narrative Policy Framework, Subsystems, the policy-making and the bureaucracy as well as the synthetic framework of the policy process. These emerging frameworks and theories serve to further unpack existing questions on the role of narrative, agency, levels of analysis, ‘policy regimes’ in the policy process and the influence on policy outcomes. Through this, they offer alternative insights into the complex way in which policy processes are thought of and managed. The Narrative Policy Framework, for example, presents a framework that enables scholars to empirically measure the relevance of policy information

“transmitted and interpreted by both policy elites and the mass public”. This is based on the idea that individuals understand policy issues as ‘stories’ that include a setting, plot, characters and a moral to the story. The Synthetic Framework developed from the recognition that several established theories and frameworks could be grouped together given their similar characteristics. For example, given the similarities between Multiple Streams, Punctuated-Equilibrium and the Advocacy Coalition Framework, these could be joined under one ‘synthetic explanatory framework’. The above-mentioned policy theories and frameworks represent some of the more popular approaches to understanding the policy process; it is, however, by no means comprehensive. Given the complex nature of policy, theories and frameworks that seek to explain the policy process will continue to be adapted and revised in order to develop our understanding of the complex environment of policy process.



4. Revisiting the Policy Cycle

The shortcomings of the 'stages' approach, which the policy cycle emerges from, have already been highlighted. However, as long as its limitations are borne in mind, it remains a useful model to guide thinking about how research findings may be fed into the policy process. As with many models, the strength of the policy cycle lies in its power to guide; however, its weakness lies in its lack of flexibility. In other words, while such a model can never prescribe the specific action that one should take in every situation, it informs the context within which the researcher may act in order to follow best practice. The true nature of policy-making is that each stage in the proposed six stage process has the potential to inform previous and following steps in the cycle, e.g., weighing your options to select the best policy option can often help to deepen and widen your problem definition. Therefore, the process should be seen as inherently iterative, i.e., you will cycle through elements of each of the steps until you arrive at an appropriate outcome. It is also important to note the inherently collaborative and interactive nature of all stages of this process. Most effective policy research and analysis is carried out in teams and involves different levels of interaction with various stakeholders throughout the process. For example, such interactions can range from discussions with policy researchers in the problem definition stage, to researching the cost-benefit of policy options with the target groups, to meeting with representatives of government to promote your policy recommendations.

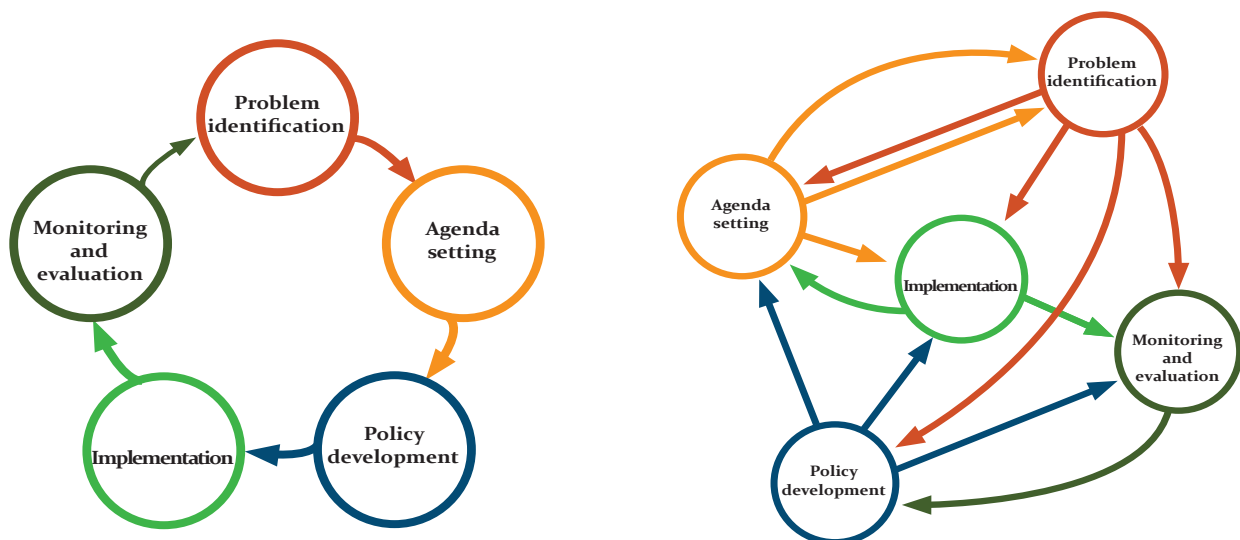


Figure 1: The Policy Cycle: Theory vs. Reality



5. Key Lessons

This section provides a simple, ten-point structure to guide thinking on science-to-policy uptake. The original framework was developed by a group of researchers at the Overseas Development Institute. It is supplemented by insights drawn from other science-to-policy resources as well as discussions emerging from workshops and discussions facilitated through the MeerWissen project.

Know what you want to influence

Being clear about the policy issue, theme or process you want to change is the first step to effective policy influencing. Are you looking to influence legislation, or a change in government policy? You might want to encourage greater investment in a certain programme or approach, or a change in practice. You might want to influence perceptions or attitudes, or the language people use around an issue. Maria Damanaki, global managing director for oceans at the Nature Conservancy, suggests that researchers can be most effective at changing policy with *“focused, realistic, science-based recommendations that are targeted to the language that policy-makers understand and show a broad level of support from constituents”*. Consider the octopus closures case study (section 7, case study 5), where there was a clear focus on establishing the socio-economic and environmental basis for short term fisheries closures, targeting buy-in from local communities and government officials, with the ultimate aim of enhancing the role of Locally Managed Marine Areas (LMMA's) as part of Madagascar's coastal management strategy.

Know who you want to influence

Who has the power to enact a change in a policy process or change the debate on an issue? Is it a senior government official, a parliamentarian, a government minister or a head of state? You need to be clear about who you want to influence. It's also useful to identify who can indirectly influence your target audience – an adviser, a respected commentator, a media outlet, a well-known academic? Know the routes to the people and organisations you need to influence and build relationships with them. And remember that you might not always be the best messenger. An audience mapping tool can be useful here. In the Mikoko Pamoja case study (section 7, case study 2) researchers prioritised cooperation with the Kenya Marine and Fisheries Research

Institute (KMFRI) and the Kenya Forest Service (KFS), in addition to working closely with the local community. Collaboration and buy-in with these key stakeholders were particularly important for the successful implementation of the project.

Know when to influence

Your research needs to reach your target audience at a moment when they can take action. For example, this could be in the leadup to an election, during a budget cycle, as part of a government consultation, ahead of an international decision-making summit, or at a key meeting. Unexpected opportunities will also emerge. Having the flexibility to react and adapt your plans as you go is important. If you can quickly spot policy opportunities as they arise, you may be able to have greater impact. Consider the important role that Operation Phakisa played in providing a policy window for the establishment of offshore marine protected areas in South Africa (section 7, case study 4).

Build relationships and networks

You can't change policy by yourself, no matter how ground-breaking your research is. You should find and work with other people and organisations who share your policy influencing objective – your allies and collaborators. Working together, building trust and developing a joint plan will increase your impact. This includes building relationships and trust within the policy community itself. Noah Idechong, an environmental activist from the Pacific state of Palau says that *“we should devote more time to asking policy-makers how we can support their decision-making rather than barraging them with what we think they need. Building connections and gaining their trust and respect would be useful for opening doors to information exchange”*. Lenice Ojwang, a researcher with Coastal Oceans Research and Development – Indian Ocean (CORDIO) East Africa, highlights the importance of building trust through long term engagement by cultivating ‘converts’ within the policy arena, *“people you have invested time in and won over to value the information generated by your research”*. Involving policy-makers directly in workshops and other activities of the SPACES project (section 7, case study 1) was a crucial element in promoting policy uptake.

Policy development is not a linear process

It is tempting to think that policy processes are linear: you identify a problem, gather evidence and implement a policy. But they aren't. Policy-making is complex, dynamic and involves a lot of different people and moving parts. Nonetheless, policy formulation does have its own formal and informal rhythms. If you understand these, you'll know where your evidence will be most useful and have greatest impact. Consider how researchers undertaking an acoustic survey in Tanzanian waters to evaluate the status and behaviour of whales and dolphins were able to provide data that was important in addressing government efforts to curb dynamite fishing (section 7, case study 7). While it is certainly important to plan one's engagement, understanding who you want to influence and when, a degree of flexibility is also required to take advantage of unexpected opportunities to inform policy processes.

Policy-making is inherently political

Policy-making is often a very political process. Alongside research, policy-makers' own values, experience and expertise play an important role in influencing how they make decisions. For example, in the lead-up to a general election it's not uncommon to see the same research being used by competing political parties to argue different points. You should factor this into your plans and develop a political strategy. Lida Pet-Soede, with WWF Indonesia, encourages scientists to understand policy-makers' concerns and how the science relates to those concerns. She notes that when scientists engage with policy-makers they are often focused on a particular issue that they have been researching. *"We are now ready to bring it to the decision-maker assuming he or she has nothing else to do other than serve the quite obvious need for a healthy ocean. And we often forget the daily context in which a policy-makers does his or her job."* She notes further that *"when perceptions of the state of the ocean differ...policy-makers find it difficult to support management interventions that reduce options for voters to use the ocean as they like and need, or require other changes in their behaviour"*. Furthermore, *"if a management intervention does not show quick and undebatable evidence that it was the right decision, or when an actual improved situation does not bring benefits to the people most impacted by the changes, a political leader may not choose to support the change"*.

Plan your engagement; consider message and medium

You need to think carefully about how to communicate your research. Policy-makers are busy so won't always have time to read a long report. A short, sharp executive summary or policy brief can be a powerful tool. Focus on clear messages and avoid overly technical language. Infographics can also help to make your data accessible. Consider other outreach activities too, such as press releases, public events, bilateral meetings, presentations or side events at summits and conferences. Consultation with policy-makers can be critical in identifying and taking advantage of these opportunities. Craig Smith, with WWF South Africa, notes that one of the major challenges to effective science-to-policy communication is *"not including policy-makers from the onset in addressing the problem...ineffective consultation with key stakeholders in project design and therefore limited buy-in from stakeholders"*. Dr. Jennifer O'Leary, with the Wildlife Conservation Society, similarly highlights the risk of *"informing policy-makers and government staff about the research results posthoc instead of engaging them in the design phase"*.

Focus on ideas and be propositional

Policy-makers don't need to be told the problem; they need constructive ideas, so be propositional. Based on your research, tell them what should happen, who could take action, when and how. It's also important to frame your recommendations within the realms of what is possible, both technically and politically. Be ambitious, but realistic. Chad English, director of science policy outreach for Communications Partnership for Science and the Sea, says that a common mistake scientists make when communicating with policy stakeholders is forgetting to lead with the 'why'. *"Many researchers start with the 'what' – what they've studied, what they did to study it, what they learned. This is all critical, but policy-makers and managers need to understand why it matters to them before they can really engage with and make sense of the science"*. Jorge Mafuca, with the National Institute of Fisheries Research in Mozambique, urges researchers to build their research questions around policy and management problems, while Ben Boteler with the Institute for Advanced Strategic Studies calls for researchers to link science communication to opportunities (whether political or financial) and not focus overly on negative elements in order to promote policy uptake. Consider the clear link between initial research showing the gap in knowledge needs related to ocean governance among Kenyan sub-national governments (section 7, case study 9) and subsequent partnerships to address these gaps.

It takes time, stick at it

Influencing policy takes time and commitment. Make a plan, break it down, and be realistic about what you can do. Often it can be a slow process with no obvious impact in the short term. But stick with it, recognise that policy influencing is usually a marathon not a sprint, and be sure to set milestones and capture the small successes as you go. Continue to engage with your target audience and always keep up-to-date on the decision-making process.

Monitor, learn and adjust along the way

External factors will affect your plans along the way so it's important to remain flexible and adapt to new contexts and opportunities. You should also seek feedback from allies, partners, and even your target audience. Ask them what they need and when, as well as what format they prefer and adjust your plans accordingly. If you find an approach is not working, you should stop, assess and try something new. Continuously review, and capture your learning as you go so you can apply it to future influencing plans. And, be willing to share your learning with key partners. In South Africa, the ABALOBİ Initiative (section 7, case study 6) has undergone several adjustments resulting from monitoring, evaluation and close engagement with local fishers, policy-makers and other stakeholders.



6. The Regional Science-Policy Interface: The role of the Nairobi Convention

While efforts at enhancing science-to-policy uptake are often focused on national government stakeholders, regional and global institutions can also play a critical role in enhancing the uptake of research findings. At the global level, for example, the Intergovernmental Panel on Climate Change (IPCC) plays a critical role in synthesising the latest research on climate change and presenting this in a format appropriate for policy-makers. The Science Policy Platform on Biodiversity and Ecosystem Services (IPBES) plays a similar role in relation to biodiversity. Multilateral institutions use a variety of mechanisms to engage with research findings in support of specific policy questions. These may range from the commissioning of specialist studies or background papers, setting up of task teams or advisory committees or panels. These mechanisms may have a limited time span, as is typically the case with the establishment of a high-level panel to explore a particular issue, or form a permanent part of the institutional structure, as is the case with the scientific committee of the International Whaling Commission. Synthesis reports released by major institutions such as the World Bank, the Organisation for Economic Co-operation and Development or UN institutions can also play an important role in agenda-setting and awareness raising, drawing on the latest scientific findings on a variety of issues. Box 1 provides a summary of just some of the most important multilateral conferences, initiatives and reports that have helped to shape the debate on ocean governance.

Within the Western Indian Ocean region the Nairobi Convention, working with regional partners such as the WIOMSA, plays an important role in ensuring that ocean governance efforts have a sound scientific basis. The Nairobi Convention, which was first signed in 1985 and entered into force in 1996, is part of UN Environment's Regional Seas Programme. The programme aims to address the accelerating degradation of the world's oceans and coastal areas through the sustainable

management and use of the marine and coastal environment. It does this by engaging countries that share the western Indian Ocean in actions to protect their shared marine environment. The Nairobi Convention has established several expert groups and task forces, as well as hosting workshops and publishing a number of reports and guidelines by leading global and regional researchers; examples include the Mangrove Network, Marine Turtle Task Force, Coral Reef Task Force, the Ad Hoc Open-Ended Expert Group on Marine Litter and Microplastics, the Regional Outlook on Marine Protected Areas and guidelines on mangrove and seagrass ecosystem restoration. In 2016 the Nairobi Convention published the Regional State of the Coast Report for the Western Indian Ocean, which synthesised the latest research on a variety of coastal ecosystems (e.g. mangroves, coral reefs) and issues (e.g. pollution).

At the eighth Conference of the Parties (COP) of the Nairobi Convention, Contracting Parties requested the Nairobi Convention Secretariat to establish a dialogue platform to strengthen links between science, policy and action. The Nairobi Convention subsequently established the Forum for Academic and Research Institutions (FARI) with WIOMSA playing the Secretariat role of hosting the Forum. The Forum comprises of experts from academic/universities and research institutions in the region with a mandate in marine sciences. In convening science-to-policy platforms, the Convention has been inviting government representatives and FARI members to support science-policy dialogues, with many recommendations from these engagements informing COP Decisions. Building on this success, the Convention is currently developing a permanent Science-to-Policy Platform (SPP) as *“a multi-stakeholder platform comprising of representatives of formal and informal knowledge generating institutions, practitioners, policy makers, communities and the private sector within the WIO region which serves as an intermediary body to bridge the gaps between science, policy and practice”*. The SPP is intended to *“support the efforts of the Contracting Parties of the Nairobi Convention to integrate relevant scientific evidence and findings into their efforts to protect, manage and develop their coastal and marine environment in a sustainable manner”*. It is also expected to *“act as an intermediary or boundary agent between science and society and to facilitate and promote a better understanding of on-going and emerging regional environmental problems and of the strategies needed to address them”*.

Box 1: Selected Blue Economy Initiatives and Panels

- 2001 – Establishment of World Ocean Forum
- 2002 – World Forum on Sustainable Development (addressed relationship between oceans and human development)
- 2002 – United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea (ICP) established
- 2008 – Establishment of World Ocean Council
- 2009 – World Ocean Conference (and related Manado Ocean Declaration)
- 2009 – Sunken Billions report
- 2010 – Aichi Biodiversity Targets (CBD) articulates goal of 10% coastal and marine areas to be protected by 2020
- 2011 – Launch of High Seas Alliance
- 2012 – Rio+20 and launch of the “Green Economy in a Blue World” report (UNDP, UNEP, FAO, IMO, UNDP, IUCN, World-Fish Center, GRID-. Arendal); “The Future We Want” outcome document, including specific section on oceans and seas. See also Rio Ocean Declaration
- 2012 – Global Partnership for the Oceans launched – linked to this was a ‘Blue Ribbon Panel’ which published the report Indispensable Ocean: Aligning Ocean Health and Human Wellbeing in 2013.
- 2013 – Global Ocean Commission established; The Commission published its principal report and recommendations, “From Decline to Recovery: A Rescue Package for the Ocean”, in June 2014, and released a follow-up report, “The Future of Our Ocean: Next Steps and Priorities”, in February 2016.
- 2013 – Expert Group Meeting on Oceans, Seas and Sustainable Development: Implementation and follow-up to Rio+20 was organized by the United Nations Department of Economic and Social Affairs (UNDESA)
- 2013 – Launch of FAO Blue Growth Initiative
- 2014 – World Ocean Summit (February); Global Oceans Action Summit (April); Our Ocean Conference (June)
- 2014 – Global Oceans Action Summit for Food Security and Blue Growth
- 2014 – The Oceans Economy: Opportunities and Challenges for Small Island Developing States (UNCTAD report)
- 2015 – Agenda 2030, Sustainable Development Goal 14
- 2015 – Indian Ocean Rim Association, Mauritius Declaration on Blue Economy
- 2015 – Sustainable Oceans Initiative launched (UNEP)
- 2015 – WWF, Reviving the Oceans Economy: The Case for Action
- 2015 – Economist Intelligence Unit. Investing in the Blue Economy—Growth and Opportunity in a Sustainable Ocean Economy.
- 2016 – African Charter on Maritime Security and Safety and Development in Africa (Lomé Charter)
- 2016 – Ocean Prosperity Roadmap: Fisheries and Beyond (report series)

Box 1: Selected Blue Economy Initiatives and Panels

- 2016 – The Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (PSMA) entered into force
- 2016 – OECD report The Ocean Economy in 2030
- 2016 – Ocean Health Index published for the first time
- 2016 – James Michel ‘Rethinking the Oceans: Towards the Blue Economy’
- 2017 – United Nations “The Ocean” Conference
- 2017 – UNESCO Global Ocean Science Report
- 2017 – Indian Ocean Rim Association, Declaration of the Indian Ocean Rim Association on the Blue Economy in the Indian Ocean Region
- 2017 – World Bank report The Potential of the Blue Economy
- 2017 – OECD Green Growth and Sustainable Development Forum focused on “Greening the Ocean Economy”
- 2017 – UNEP report Realizing Integrated Regional Oceans Governance – Summary of case studies on regional cross-sectoral institutional cooperation and policy coherence
- 2017 – World Bank report The Potential of the Blue Economy: Increasing Long-term Benefits of the Sustainable Use of Marine Resources for Small Island Developing States and Coastal Least Developed Countries
- 2017 – A Sustainable Ocean Economy, Innovation and Growth: A G20 Initiative
- 2018 – The Nairobi Statement of Intent on Advancing the Global Sustainable Blue Economy (outcome of the Sustainable Blue Economy Conference, hosted by Kenya)
- 2018 – UN Environment - Development of Ocean Governance Strategy for Africa: Summary of Scoping Study and Gap Analysis
- 2018 – WWF ‘Principles for a Sustainable Blue Economy’
- 2018 – Commonwealth Blue Charter
- 2018 – The Blue Economy Handbook of the Indian Ocean Region
- 2018 – High Level Panel for a Sustainable Ocean Economy formed
- 2018 – UNECA report Africa’s Blue Economy: Opportunities and challenges to bolster sustainable development and socioeconomic transformation
- 2018 – Sustainable Blue Economy Finance Principles launched
- 2018 – Charlevoix Blueprint for Healthy Oceans, Seas and Resilient Coastal Communities
- 2019 – OECD report Rethinking Innovation for a Sustainable Ocean Economy



7. Case Studies

7.1. Case studies from the Western Indian Ocean

7.1.1. Case study 1: SPACES

The essentials: The Sustainable Poverty Alleviation from Coastal Ecosystem Services (SPACES) project sought to explore the relationship between ecosystem services, poverty, and human wellbeing, focusing on coastal communities in Kenya and Mozambique.

The story: SPACES is a collaboration between Stockholm Resilience Centre, Exeter University, Kenya Marine and Fisheries Research Institute (KMFRI), Wildlife Conservation Society (WCS), Kenya Forestry Institute (KEFRI), Eduardo Mondlane University, and a number of other institutions in Kenya, Mozambique, the UK and North America. The project had a strong research component (producing 14 peer reviewed journal articles). In addition to its research activities, the project also built capacity between researchers at all levels. The project was an ongoing interaction between 39 academic researchers and 28 research staff, interns, and master's students. The project also created jobs opportunities for the field teams in Kenya and Mozambique.

SPACES developed and applied novel methodologies and processes. The project included two innovative workshops with stakeholders that brought together fuzzy cognitive maps, scenarios, stress testing, and the seeds approach. In addition, the project team convened in-depth community dialogues and individual meetings to discuss key findings. The team developed the SPACES Data Explorer, which allows stakeholders to explore data on basic needs, ecosystem services, and access that can be used when planning development interventions. SPACES had a focus on impact throughout the project. This has made the project less abstract and allowed it to become more embedded in society.

Key science-to-policy insight: The SPACES project underscores the need to understand the policy context within which a project is implemented (a detailed policy review was conducted in both Kenya and Mozambique in the early stages of the project), and further illustrates the opportunities to involve policy-makers as a key stakeholder group within project activities. Policy-makers were among those involved in the workshop, learning about new methodological approaches and being creatively engaged through scenario-building exercises. The SPACES website is also an example of how project information, including research findings, can be made easily accessible to policy-makers.

Learn more: <http://www.espa-spaces.org/>

7.1.2. Case study 2: Mikoko Pamoja

The essentials: A mangrove conservation and restoration project on Kenya's southern coast draws on several years of collaborative scientific research to allow for the sale of carbon credits, benefiting local ecosystems and communities.

The story: Mikoko Pamoja is the first community-based project of this kind in the world to successfully trade mangrove carbon credits. Communities protect and restore mangroves and in turn sell the carbon credits to international buyers, for about \$5–\$6 per tonne. This revenue then goes into financing forest protection and restoration, and to other community-chosen projects. The project supports community development projects such as provision of schoolbooks, construction of school buildings and the provision of clean drinking water.

Planning for Mikoko Pamoja was developed by a Community Forest Association (CFA) and includes a zonation map, detailing activities of different stakeholders in the project area. The plan is approved by the Kenya Forest Service (KFS), Kenya's state agency in charge of forest management. This agreement is a legal tool for the implementation of the Participatory Forest Management Plan and officially secures community ownership of carbon credits.

The project is managed locally by the Mikoko Pamoja Community Organisation, which consists of staff from the Kenya Marine and Fisheries Research Institute (KMFRI), KFS, a representative of the Tidal Forests of Kenya Project and a representative of the community organisation. Carbon-offset projects are complex and require a rigorous scientific basis to determine carbon stocks and baselines, as well as a range of technical expertise. KMFRI has provided this support in collaboration with a range of international researchers. The Association for Coastal Ecosystem Services, a charity registered in Scotland, also helps to facilitate the transfer of international funds, reporting to the Plan Vivo Foundation.

Mikoko Pamoja has received a lot of international attention and was awarded the prestigious UN Development Programme's Equator Prize in 2017 for its contribution to finding innovative solutions to tackle poverty, the environment and climate change. Mikoko Pamoja is currently being replicated on Kenya's south coast at Vanga.

Key science-to-policy insight: While detailed studies over a number of years were required to establish the scientific basis for carbon credit certification, the actual sale of credits and ensuring that the community benefited directly from the proceeds required significant engagement with the Kenyan Government, through the Kenyan Forest Service. Researchers, working with international NGOs, had to understand the policy environment to ensure the necessary local institutions could be established that would allow for the governance of carbon sales.

Learn more: <http://www.planvivo.org/project-network/mikoko-pamoja-kenya/>

7.1.3. Case study 3: SMART Seas Network

The essentials: The SMART Seas Network helps managers and fishing communities in the Western Indian Ocean region to link science to active and evidence-based management, ensuring that MPAs deliver expected ecological and social benefits.

The story: Working with Kenya Wildlife Service, Tanzania Marine Parks & Reserves Unit, and the Seychelles National Parks Authority, along with associated fishing communities, SMART Seas and the agencies co-designed an approach to effective and science-based MPA management in the Western Indian Ocean. SMART Seas, through the Strategic Adaptive Management (SAM) approach, helps managers and fishing communities in Western Indian Ocean MPAs to incorporate science into management techniques ensuring that the MPAs deliver ecological and social benefits for all. Through SAM, MPA staff and community members develop targeted objectives focused on what MPAs can achieve in the short-term (2-5 years) and make these their management priorities. The objectives span ecological and social aspects of MPAs and dictate what indicators should be tracked to assess progress and what data is needed. Supported by the SMART Seas Network, all MPAs in Kenya, Tanzania, and Seychelles have established monthly monitoring programs to do rapid checks of MPA status and create new awareness of MPA social and ecological systems. Managers use this information to assess status in relation to targets, determine areas where action is needed, and to assess the impact of action. The work began with a pilot programme in a single MPA in Kenya in 2009. The SAM approach is now a national MPA programme with the Kenya Wildlife Service in Kenya, Tanzania has launched a pilot programme in Mafia Island Marine Park with plans to expand nationwide, a private MPA in Tanzania (Chumbe Island Coral Park) has adopted the approach, and other Western Indian Ocean nations have been asking to join. The SMART Seas Network and SAM approach meet a critical global need: lack of management effectiveness has been identified as the single biggest issue in global protected areas (terrestrial and marine) and identified as a priority issue in the Western Indian Ocean.

Key science-to-policy insight: Scientists are often called upon to contribute to capacity development activities, which can be an important avenue through which science-to-policy uptake can be promoted. This raises questions around how capacity building can best achieve its intended outcomes. Rather than inviting a small group of representatives from a number of state institutions, SMART Seas has found it far more impactful to engage a large group of representatives from a single institution, thereby ensuring that the insights from capacity building are taken up more broadly within target institutions as part of a new culture of learning and action. SMART Seas focuses on elements of policy implementation, rather than policy-making. In most cases, appropriate regulations for MPAs were already in place, but effective implementation of these policies was lacking.

Learn more: <http://www.smartseas.org/>; <https://vimeo.com/325723740>

7.1.4. Case study 4: South Africa's Offshore Marine Protected area

The essentials: In May 2019 the South African Government gazetted 20 new Marine Protected Areas, adding more than 50 000km² to the country's marine conservation estate and increasing the protection in the oceans around South Africa from 0.4% to 5.4%.

The story: The South African President launched Operation Phakisa in 2014. Based on the 'Big Fast Results' methodology pioneered in Malaysia, the programme sought to establish an inclusive, focused and results-oriented framework that would allow the Government and other stakeholder to rapidly make progress around specific themes. The first theme selected was the Ocean Economy. Government convened teams from various ministries, as well as labour, business, academia and other sectors to work together in experimental social laboratories, seeking to unlock the potential of South Africa's more than 1.1 million km² ocean territory. Operation Phakisa presented an important policy window for stakeholders who had been working to expand South Africa's marine protected areas – with the South African National Biodiversity Institute (SANBI) playing a supporting role. Through engagement in early phases of the Operation Phakisa process, these stakeholders contributed to the inclusion of 'marine protection and ocean governance' as one of six priority work streams within the Phakisa Oceans Lab. While Operation Phakisa helped to provide the political support necessary, scientists and other stakeholders had been working for many years preceding this policy window to identify appropriate areas for an expanded MPA network and assess the socio-economic benefits and trade-offs associated with these. SANBI initiated a project to expand South Africa's Marine Protected Areas in 2006 after the 2004 National Biodiversity Assessment showed that oceans are the least protected ecosystem types across the country. SANBI also developed co-operative research projects with industry to increase marine biodiversity knowledge base and established the Offshore Environment Forum in 2010 to facilitate information sharing with multiple sectors.

Key science-to-policy insight: Operation Phakisa presented a policy window where scientists and other stakeholders who had been working towards the expansion of South Africa's marine protected areas could leverage heightened political awareness and political will around the maritime domain. Sometimes these policy windows are not evident at the time when research is conceptualised or even published, but researchers should make an effort to assess any possible policy windows of relevance, while stronger relationships with key policy stakeholders may allow for early indications of upcoming policy windows even before these are broadly apparent in the public domain. Targeted messaging in line with government priorities is a critical element in advancing science to policy.

Learn more: <https://www.sanbi.org/media/south-africa-announces-new-marine-protected-area-network/>

7.1.5. Case study 5: Octopus Closures

The essentials: Research on experimental artisanal octopus fishery closures in Madagascar has shown over time that these closures can have significant benefits for coastal communities. Temporary closures of octopus fisheries are now widely adopted in Madagascar and is being piloted in many other areas within the Western Indian Ocean region.

The story: Marine scientists from Blue Ventures Conservation studied octopus landings in the remote southwest of Madagascar over an eight-year period, during which villagers periodically set aside designated areas of their fishing grounds as temporary closures to octopus fishing. The study sought to quantify the impacts of this short-term closure model by examining landings from 36 periodic octopus fishery closure sites and comparing these landings to control sites where no fishing grounds were closed. Describing the study's findings, lead author Dr. Tom Olive said: *"This fisheries management regime brings substantial returns for these communities, with individual octopus catches increasing by almost 90% and village-level fishing income more than doubling in the month following each closure"*. The approach also receives strong support from fisheries authorities. *"We encourage temporary closures set up by fishers, because communities see many benefits,"* said Gilbert François, General Director of Madagascar's Ministry of Fisheries and Marine Resources. Following the rapid uptake of this periodic fishery closure model by villages along the western coast of Madagascar and beyond, many of these communities have moved on to establish more ambitious marine management initiatives, including the creation of Locally Managed Marine Areas (LMMAs); zones of coast and ocean incorporating permanent reserves, seeking to protect marine biodiversity and rebuild fish stocks.

Key science-to-policy insight: Collaboration between scientists and NGOs has the potential to provide the evidence-base to secure buy-in from policy-makers, contributing to achieving impact at scale. The success of the initial octopus closures led to rapid adoption by adjacent communities, which was further supported by a government-led project, funded by the African Development Bank, that supported the expansion of the model to other regions of the country. Madagascar's first national LMMA forum took place in Andavadoaka in June 2012, which provided opportunities for direct exchange between coastal communities and government representatives, and further led to the establishment of a national network of LMMAs, named MIHARI, with the goal of creating a structure to continue dialogue.

Learn more:

- <https://blueventures.org/marine-management-pays/>
- <http://bjyv3zhj902bwxa8106gk8x5-wpengine.netdna-ssl.com/wp-content/uploads/2014/12/97321-253876-1-PB.pdf>

7.1.6 Case study 6: The Abalobi Story

The essentials: ABALOBI is an African-based, fisher-driven social enterprise that has chosen to take a radical approach to disrupting and re-inventing seafood supply chains and related food systems to support the development and sustainability of small-scale fisheries.

The story: In 2012, the South Africa government adopted and began the roll-out of a new Small-Scale Fisheries Policy, seeking to improve the traditional rights of fishers, and involve them in co-management of fishing resources. This led to meetings between researchers at the University of Cape Town, national fishery authority officials, and fishing communities' representatives in order to consider innovative approaches to governance. In 2015, the ABALOBI Initiative was born out of this collaboration. Developed from readily available open-source software, it is a suite of apps aimed at improving the monitoring, traceability and transparency of fisheries data, while also including fishers in governance decision-making, and in the development of their businesses. After a successful trial period, ABALOBI was endorsed as the official platform for implementation of the policy. The aim is to create software that acknowledges fishers as holding critical knowledge and having agency within the value chain and goes some way towards empowering them further. ABALOBI is also designed to reflect the institutional structures of the policy, which calls for fishers to organise in cooperatives, and engage in co-management of the resource with government through self-reporting, landing site catch monitoring and a series of data visualisations.

One of the most significant successes of ABALOBI is that fishers are not only being incorporated into data collection, but are now also playing an active role in a larger component of the supply chain. The link between horizontal value chain activities (harvest, processing, sales) has been strengthened through the use of a common communication platform, and a transparent pricing process. The vertical value chain has also been strengthened through the inclusion of fishers in data collection and monitoring, the dissemination of information through the info hub, and the presence of up-to-date catch data at all levels. Most importantly, the link between strategic governance and basic operations has been improved by positioning fishers in a more consultative role alongside decision makers. ABALOBI is about to formalise the first Community-level Fishery Improvement Project (FIP) in South Africa.

Key science-to-policy insight: Initially the ABALOBI app was seen as a mechanism to ensure that small-scale fishers get a fair price for their catch, but the potential of this tool to contribute to enhanced governance was quickly realised. Trust building among all stakeholders, including particularly fishing communities and policy stakeholders, was essential, as was couching the objectives of ABALOBI within the policy context of South Africa's Small-scale Fisheries Policy.

Learn more: <http://www.abalobi.org>

7.1.7 Case study 7: Tanzania Dynamite Fishing

The essentials: Researchers across a wide spectrum of disciplines have worked to understand the scale, patterns and drivers behind blast fishing in Tanzania, contributing to effective efforts by the Government of Tanzania to combat this destructive practice.

The story: Dynamite fishing involves the use of explosives to stun fish, rupturing their swim bladders – the organ that controls their buoyancy. After the blast fish float to the surface to be collected by the fishermen, while others sink to the seabed. This practice affects not only target fish but also all the surrounding fauna, flora and marine species within a 15–20m radius, such as juvenile fish, fish larvae and eggs, and hard corals. Concerns have also been raised on the impact of noise pollution generated by these blasts on whales and dolphins. While coral reefs can recover gradually from limited dynamite fishing, extensive blasting can transform coral reefs into expanses of shifting rubble on which coral recruits are often unable to survive; in these cases recovery can take several decades to centuries.

Tanzania has long had a challenge with dynamite fishing. Various initiatives to combat dynamite fishing were implemented, particularly over 1999-2003, but despite some successes these did not produce lasting results. In 2015 scientists conducting acoustic monitoring of the Tanzanian coastline were able to present a national assessment of the intensity of dynamite fishing along the entire coastline. The results showed that the dynamite fishing was pervasive, but could also highlight periods of the day when dynamite fishing was most intense and identify geographic hotspots. Over the coming years many other factors came into play in the fight against dynamite fishing in Tanzania. Dynamite fishing came to be addressed as an organized crime, with a focus on supply lines, socio-economic drivers and effective prosecution. A multi-agency task team, led by the Ministry of Home Affairs under the guidance of the Inspector General of Police, was established to coordinate efforts. There was also an important increase in political will to stamp out dynamite fishing. Dynamite fishing has decreased dramatically in recent years in Tanzania.

Key science-to-policy insight: The researchers conducting an acoustic survey of the Tanzanian coastline were not initially focused on dynamite fishing, in fact, the acoustic survey was part of a study to evaluate the status and behaviour of whales and dolphins in Tanzania. However, it soon became apparent that the data could be used to contribute to a policy priority for the Tanzanian Government.

Learn more:

- <http://www.fishcrime.info/assets/JD-Kotze-James-Bulongo-On-Blast-Fishing-Case-Study-in-Tanzania.pdf>
- <https://www.sciencedirect.com/science/article/abs/pii/S0025326X17307713>

7.1.8. Case study 8: Closure of Seychelles Live Fish Trade

The essentials: Close monitoring of a trial live reef food fish (1998-1999), drawing on various studies within Seychelles and other regions, lead to legislation in 2005 prohibiting the fishing, trade, and export of wild-caught, live finfish.

The story: Live reef food fish were not traditionally fished, marketed or traded in Seychelles. In late 1997, a local fishing company made a request to the Seychelles Fishing Authority for permission to fish for and export live reef fish to Hong Kong. The request was accepted on a trial basis and the fishery operated over two fishing seasons in 1998 and 1999. At the end of the trial the fishery was reviewed. Data obtained during the trial, combined with a review of studies of live reef food fish fisheries in other parts of the world raised a number of concerns. These related to the sustainability of the fishery given the intensity of fishing activities over particular areas, sensitivity to overfishing of target species resulting from their demography and reproductive biology, and the possibility that spawning aggregations may be targeted by the fishery. There were also biodiversity concerns relating to international frameworks, specifically, the targeting of species listed on the IUCN Red List of threatened species. It was also noted that the fishery was not well perceived by local fishers. Finally, there were concerns around the economic viability of the fishery. While the fishery was being reviewed, the Seychelles Fishing Authority implemented a four-year research and management programme for reef fish spawning aggregations (2002-2005), which contributed to the evidence base informing a decision about the future of the fishery. Ultimately, the Government of Seychelles introduced regulations in 2005 prohibiting the fishing of all finfish for the live fish trade, including both the food and aquarium trades.

Key science-to-policy insight: The commitment to evidence-based policy-making by the Government of Seychelles is clearly evident in this example, while the Seychelles Fishing Authority, as a government agency mandated to guide the governance of the sector, was well placed to assess the experimental live reef food fishery and make recommendations related to this. Nevertheless, take up of the research recommendations was no doubt strengthened by the incorporation of social, economic and environmental studies and couching recommendations within the existing political priorities related to the sector.

Learn more: https://www.researchgate.net/publication/242592262_Closure_of_the_live_reef_food_fish_fishery_in_Seychelles

7.1.9 Case study 9: Integrating coral reef and coastal ecosystem data into local government decision-making in Kenya

The essentials: Effective governance anchored on evidence-based plans and policy frameworks is integral to sustaining the benefits derived from coastal and marine ecosystems. Building off earlier research, a non-profit is working with coastal subnational (county-level) governments in Kenya to support ecosystem-based management and building resilience of vulnerable communities.

The story: The research project *“Emerging knowledge for local adaptation (2014-2017)”* provided novel insights on local coastal governance in three countries in the Western Indian Ocean region. In Kenya, the study identified some of the key frameworks that require coastal and marine biodiversity information and highlighted availability and access challenges faced particularly by subnational (county) governments. The overall effect has been limited inclusion of coastal and marine information in planning frameworks at the sub-national level. In early 2019, Coastal Oceans Research and Development – Indian Ocean (CORDIO), a non-profit research organization, received funding aimed at addressing some of the county-level knowledge gaps. A key output is the development of a data portal for county-specific knowledge products, combining several tools including a webpage, GeoNode (spatial data infrastructure), dashboards and ArcGIS online story-maps. To improve the project’s impact, CORDIO through a memorandum of understanding, joined the County Government of Kwale in developing their first County Spatial Plan (CSP), and was tasked with complementing the ongoing efforts of the other partners through reviewing the marine aspects of the draft plan as well as collating and generating some of the required information and knowledge products.

Key science-to-policy insight: Devolved governments with different degrees of autonomy present new frontiers and challenges for uptake of scientific information and knowledge for management, planning and policy-making. Focus should shift to providing timely, comprehensible, and spatially relevant knowledge products covering various aspects (i.e ecological and socio-economic). Formalisation of relationships is key to promote commitment to the co-generation process and ownership of products and outcomes, and provides a framework for engagement beyond the life of any one project. Facilitating face to face meetings is more productive as compared to working remotely. Cooperation between non-state actors involved in supporting policy processes is key in strengthening the role of science and navigating the science-policy-practice interface through capitalising on synergies. Broadening the scope of engagement is critical including policy-level officials to get buy in and endorsement of the project as well as technical staff and practitioners to frame needs and identify information gaps in various policy and planning processes.

Learn more: <https://cordioea.net/servir/data-portal/>

7.2. Case studies from beyond the region

7.2.1. Case Study 10: DEVOTES

The essentials: EU-funded scientists have developed new software to assess marine environments that unites existing research and new research into one, publicly-accessible tool. Over four years (2012-2016) the EU-funded project DEVOTES (DEvelopment Of innovative Tools for understanding marine biodiversity and assessing good Environmental Status) has developed the technology that allows EU Member States, the European Commission, scientists and managers to assess the environmental status of our seas.

The story: DEVOTES aimed at improving understanding of human activities impacts (cumulative, synergistic, antagonistic) and variations due to climate change on marine biodiversity, using long-term series (pelagic and benthic). DEVOTES aimed to address three main challenges in determining environmental status: (i) assessment of anthropogenic pressures, including climate change, to which biodiversity responds; (ii) selection of appropriate indicators to assess the status; and (iii) integration of those indicators across a number of ecological scales, into a unique biodiversity assessment. The overall aim of DEVOTES was to test the indicators proposed by the European Commission, and develop new ones for assessment at species, habitats and ecosystems level, for the status classification of marine waters, integrating the indicators into a unified assessment of the biodiversity and the cost-effective implementation of the indicators (i.e. by defining monitoring and assessment strategies). DEVOTES developed a wide set of innovative indicators, models and tools to assist in the characterization, quantification and assessment of marine biological diversity, non-indigenous species, food-webs and seafloor integrity status at an European scale. DEVOTES was a large, collaborative project, it involved 23 partners from 15 EU countries, including two non-EU partners (from Saudi Arabia and Ukraine) and four SMEs, along with two observers (EPA and NOAA) from the US. A panel of independent scientists form the Advisory Board (AB) which will provide strategic guidance and support the partnership to ensure that the project's results meet the objectives.

Key science-to-policy insight: The DEVOTES project is a good example of a large, collaborative project designed to address specific needs of a particular policy actor, in this case the European Commission. In seeking to improve understanding of human activities impacts and variations due to climate change on marine biodiversity, it took as its starting point indicators proposed by the European Commission itself, but it also developed a wide set of innovative indicators, models and tools. These are effectively communicated through a comprehensive and user-friendly online platform.

Learn more: <http://www.devotes-project.eu/>

7.2.2. Case Study 11: Bangladesh's Hilsa Fishery

The essentials: Researchers at the International Institute for Environment and Development (IIED), working with the Department of Fisheries of the government of Bangladesh and local research institutes, assisted the Government of Bangladesh to assess and improve policies and incentive structures aimed at promoting the sustainability of the critically important hilsa fishery.

The story: The Government of Bangladesh declared four areas as sanctuaries to ensure the sustainability of the country's hilsa fishery, a critical source of food and income for many Bangladeshis. In return for not fishing in these areas affected, fishing communities or households were rewarded with sacks of rice or provided with microcredit to start up small businesses to replace the lost income. However, it became apparent that further research was required into the effects the sanctuaries had on hilsa stocks, and also how the scheme reached and affected those people who depend on the fish for a living, particularly the poorest and most marginalised fishing communities.

Working in partnership with Bangladesh Centre for Advanced Studies and Bangladesh Agricultural University and in collaboration with the Department of Fisheries of the government of Bangladesh, IIED worked with affected communities and ecosystems to learn what is working and what is not, and found ways to improve it. This project helped generate political will to create sustainable, bottom-up solutions that can both preserve hilsa and enhance livelihoods on a regional level. The researchers showed the government how it could improve its approach, making it more efficient, effective and sustainable. At a workshop organised by the partners, the government sat down as an equal partner with a diverse group of stakeholders. And as a consequence of IIED and its partners establishing trust at an early stage, it was open to modifying policy to increase the social, economic and ecological sustainability of the fishery. The project changed the government's perceptions. As a result, it committed to increasing economic incentives to the wider community (increasing the coverage and extending the commitment period), as well as the amount of support to fisher men and women.

Key science-to-policy insight: By acknowledging the government's good intentions and positive results, IIED and its partners established trust, opening the door to constructive suggestions and opportunities for more effective, equitable and sustainable approaches. Giving space for stakeholders to share their views helped to build solidarity and partnership, strengthening collaboration. The participation of high-level government officials created buy-in to the process of change, and helped generate and maintain political will.

Learn more: <https://www.iied.org/bangladesh-protecting-hilsa-overfishing>

7.2.3. Case study 12: Surging Seas

The essentials: The Surging Seas tool was developed by Climate Central, a leading US-based science communication organisation, to help vulnerable countries and regions better understand their exposure to flooding and rising sea level. Through the Raising Risk Awareness project, the Climate and Development Knowledge Network could promote the application of the Surging Seas tool in Bangladesh.

The story: Due to its unique topography and high population density, Bangladesh is extremely vulnerable to rising sea levels. The Raising Risk Awareness project sought to promote an understanding of this changing risk, to aid evidence-based decision-making regarding recovery, reconstruction, and risk reduction. The Surging Seas tool helps communities, planners and leaders better understand sea level rise and coastal flood risks. It was adapted for use in Bangladesh and translated into Bengali to make it more accessible. A workshop in Dhaka brought together the technical team that had produced Surging Seas to train a wide range of stakeholders from government and NGOs. They exchanged ideas, local stakeholders learned how to use the tool, and together they identified ways to improve the tool in the future. The technical team also produced an 'exposure report', which estimates the population and land that would be at risk of inundation in the period 2050-2100 under worst-case and best-case greenhouse gas emission scenarios.

The Surging Seas toolkit could provide crucial information to help Bangladesh plan effectively for water-related disasters. Through the project, links have been forged the Climate Central team, and local Bangladeshi experts in sea level rise, floods and disaster management, such as the Institute of Water Modelling (IWM). Climate Central are now looking at future partnership opportunities to continue to tailor the tool to the Bangladesh context. By collaborating with in-country counterparts, they aim to incorporate expertise from Bangladeshi scientists and practitioners, and ensure the tool is complementary to local disaster risk reduction efforts.

Key science-to-policy insight: Working with local partners was key to promoting policy uptake of a tool developed in the United States within Bangladesh. In this case the Climate and Development Knowledge Network played an important role in facilitating exchange between Climate Central, the developers of the Surging Seas toolkit, and Bangladeshi policy stakeholders. An interactive and 'hands on' workshop allowed partners to illustrate directly the relevance of this tool for the Bangladeshi context.

Learn more:

- https://cdkn.org/2017/05/combating-surging-seas-bangladesh/?loclang=en_gb
- <http://sealevel.climatecentral.org/>

7.2.4. Case study 13: Ocean Science Trust

The essentials: The Ocean Science Trust is an NGO based in California that works closely with the scientific community and government agencies to promote enhanced ocean governance.

The story: The Ocean Science Trust was created by the California Ocean Resources Stewardship Act, passed in 2000. Recognizing the value of independent science and the opportunity to better connect the wealth of scientific expertise in academia with policy and management decisions in the state, CORSA mandates the creation of a science trust 'to seek and provide funding for ocean resource science projects and to encourage coordinated, multiagency, multi-institution approaches to ocean resource science' ...'many management issues are broader than the mandates of individual agencies, and existing means for coordinating agency efforts need to be improved.' Subsequent legislation in 2004 - the California Ocean Protection Act - created the Ocean Protection Council to help protect, conserve and maintain healthy coastal and ocean ecosystems, and the economies they support, for current and future generations. A cabinet-level state policy body, and the Governor's advisor on coastal and ocean policy in California, the Ocean Protection Council is an essential partner to Ocean Science Trust. The Ocean Science Trust is the Secretariat of the Ocean Protection Council Science Advisory Team. This advisory team evaluates the scientific underpinnings and technical merit of state actions, translates scientific knowledge related to state priorities, provides scientific recommendations for policy and management decisions and acts as a conduit to the broader scientific community.

Key science-to-policy insight: While there are many strategies that scientists can implement at an individual level to enhance the policy uptake of their work, it may also be necessary to create institutions that facilitate this exchange. Such structures benefit from the ability to establish more formal and systematic arrangements with the policy audience. This also benefits researchers as a channel to understand the needs and priorities of the policy audience. Individually then, it is incumbent on researchers to familiarise themselves with existing organizations or institutional arrangements that seek to promote science-to-policy uptake.

Learn more:

- <https://www.oceansciencetrust.org/about-us/>
- <https://fisheries.legislature.ca.gov/sites/fisheries.legislature.ca.gov/files/OST-Vision%202020-Final.pdf>

7.2.5. Case study 14: The Shy Albatross as a Brightspot

The essentials: Researchers at various state institutions, academia and civil society organizations have collaborated to ensure that policies to protect the critically endangered Shy Albatross are supported by management interventions that have resulted in a recovery of this species.

The story: The Shy Albatross (*Thalassarche cauta*) is unique to Tasmania, Australia. They are listed as vulnerable under the Tasmania Threatened Species Protection Act 1995, and are threatened by fishing, disease and climate change. Traditionally the management agency took a preserve-and-protect approach, focused on the reduction of existing stressors (e.g. bycatch reduction interventions). Despite these initiatives, long-term population monitoring continued to show declines. It was recognized that existing management approaches were insufficient, particularly for mitigating against the impacts of disease and climate change. Direct interventions had not previously been considered, but given declining numbers such interventions were subsequently considered as a possible supplement to existing management measures. Given the pace of climate change, rapid scientific research was required to identify, test and refine suitable interventions to conserve the species. A wide range of interventions were identified and prioritised based on their cost, benefit and risk. This led to the first field trial – treating chicks for ecto-parasites that were known to increase mortality. The trial was successful, and increased survival rates of chicks to the fledgling life stage increased by 10%. This intervention was subsequently expanded and new interventions are being tested, including the use of artificial nests to offset climate impacts.

Key science-to-policy insight: As in other examples, we see how research has focused not on amending or establishing new policies, but rather on more effective implementation of existing policies. The Shy Albatross was already protected and of concern to conservation authorities, but it required studies that were structured to be responsive and relatively rapid to address the failure of existing strategies.

Learn more:

- <https://www.nature.com/articles/s41467-018-05977-w/tables/1>
- <https://www.wwf.org.au/news/news/2018/shy-albatross-chicks-a-promising-sign-for-an-innovative-conservation-trial#gs.1sppir>

7.2.6. Case Study 15: Grenadines Marine Resource Space-use Information System

The essentials: The Grenadines are islands in the Caribbean nations of St. Vincent and the Grenadines, and Grenada. In an inclusive and collaborative process, the Grenadines Marine Resource Space-use Information System was developed to bring together a variety of social, economic and environmental information drawn from both scientific and local knowledge into a single information system to support enhanced governance.

The story: The Grenada Bank (including both of the countries of Grenada and St. Vincent and the Grenadines) was chosen as a site for development of an integrated Marine Resource Space-use Information System (MarSIS). From 2006-2012, this participatory geographic information system was created together with a wide range of stakeholders including: a variety of people who work in the sea (including fishers, diveshops, daytours, watertaxis, yachting charter companies and ferries), marine management agencies of both countries (including the Fisheries, Planning, Tourism, Environment, Port Authority, Coast Guard and Forestry Departments), the Grenadine island communities, local and regional NGOs (Sustainable Grenadines Inc., People in Action, Friends of Tobago Cays, EPIC) and academia (including the University of the West Indies, St. Georges University, Vassar and Middlebury College). From 2010-2012, the SusGren NGO was awarded a grant to use the MarSIS to carry out a marine spatial planning exercise to develop a transboundary marine multi-use zoning plan for the Grenadine Islands. In tandem, the Global Environment Facility Small Grants Program (GEF SGP) provided funds to ensure the involvement of Grenadines marine resource users in this planning process. The development of a transboundary marine multi-use zoning plan builds on the MarSIS initiative and the Protected Area Systems Plans of St. Vincent and the Grenadines and Grenada to increase the effectiveness of Protected Areas. The primary objective of this exercise was to collaboratively develop a vision for the development of the Grenadine Islands and increase the capacity to protect, manage and sustainable use the resources of the Grenada Bank.

Key science-to-policy insight: Inclusive co-development is a key element of enhancing science-to-policy uptake. In this example a highly inclusive process, including researchers from multiple institutions as well as state agencies and NGOs have collaborated to develop a system that responds directly to the needs of policy actors, thereby enhancing buy-in and uptake of the project outputs.

Learn more:

- <http://www.grenadinesmarsis.com/>
- <https://panorama.solutions/en/solutions/grenadines-marine-resource-space-use-information-system-marsis>



8. Science to Policy Resources

- VakaYiko Evidence-Informed Policy Making (EIPM) Toolkit, produced by INASP (Theme: General). **Available at:** <https://www.inasp.info/publications/evidence-informed-policy-making-eipm-toolkit>
- EPA Resource Kit: Bridging the Gap Between Science and Policy. Resource 1 – BRIDGE: Tools for science-policy communication, produced by EPA (Theme: Environment). **Available at:** https://www.epa.ie/pubs/reports/research/spr/131_BRIDGE_Toolkit.pdf
- Communicating climate change: A practitioner's guide. Insights from Africa, Asia and Latin America, produced by CDKN/UNFCCC (Theme: Climate Change). **Available at:** https://unfccc.int/sites/default/files/resource/Communicating%20climate%20change_Insights%20from%20CDKNs%20experience.pdf. Guide includes lenses for Government and public policy audiences. Ch 6 also focuses on *“Engaging with public policy and its implementation”*.
- Guidelines on the Use of Scientific and Engineering Advice in Policy Making, produced by the UK Gov. Office of Science (Theme: General). **Available at:** https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/293037/10-669-gcsa-guidelines-scientific-engineering-advice-policy-making.pdf
- Practical considerations for communicating evidence to policy makers: identifying best practices for conveying research findings, produced by the National Information Platforms for Nutrition (Theme: Health). **Available at:** <http://www.nipn-nutrition-platforms.org/IMG/pdf/communicating-evidence-to-policy-makers.pdf>
- How to communicate research for policy influence, produced by CIPPEC (Argentina). (Theme: General). **Available at:** <http://www.vippal.cippec.org/toolkit-series-how-to-communicate-research-to-achieve-influence/>
- Communicating research for evidence-based policy-making: A practical guide for researchers in socio-economic sciences and humanities, produced by European Commission (EU) (Theme: General). **Available at:** <https://publications.europa.eu/en/publication-detail/-/publication/579cb7ba-821f-4967-b3a2-d87556a0bcfe>
- Impact toolkit, produced by Economic and Social Research Council (UK) (Theme: General). **Available at:** <https://esrc.ukri.org/research/impact-toolkit/>
- Research Uptake Guidance, produced by the Department for International Development (UK) (Theme: General). **Available at:** <https://www.gov.uk/government/publications/research-uptake-guidance>
- ROMA: A guide to policy engagement and policy influence: <https://www.odi.org/features/roma/home>
- Research Utilization Toolkit, produced by K4Health (Theme: Health). **Available at:** <https://www.k4health.org/printpdf/book/export/html/6223>
- Improving Science-Policy Interfaces: Recommendations For JPI Oceans <https://meam.openchannels.org/news/meam/turning-science-policy-what-scientists-should-and-should-not-do-when-talking-policy-makers>



9. Conclusion

The barriers to effective science-to-policy uptake are many. Policy processes remain complex, multifactorial and nonlinear, and they are unavoidably and fundamentally political processes. However, this report has shown that there is a great deal that lies within the power of researchers to overcome these barriers. Researchers wishing to promote the uptake of their work must be clear on what, precisely, they want to influence, who they want to influence, and when would be most strategic to deliver this message. Planning is essential, but so is the need to monitor, learn and adjust along the way. Building relationship and networks, both with your targeted policy audience and with like-minded researchers or members of civil society goes a long way in building trust and momentum, both of which can be essential. Getting the messaging right is equally important – not in the sense of ‘dumbing down’ the writing, but in ensuring the message is appropriately framed and contextualised. No doubt, there will be frustration and even failures along the way, but the principles outlined here can certainly help improve the success rate. Politics has been referred to as the ‘art of the possible’, and the same can be said of the art of science-to-policy communication.

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Response drawn from an online survey conducted for the purposes of this report.

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