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## Science Advice to Governments: An Emerging Dimension of Science Diplomacy

*Sir Peter Gluckman*

One of the most significant manifestations of science's changed relationship with society has been its place within public policy. There is an ever-growing recognition that science has an important role to play in virtually every dimension of policy making at every level of government, from local to international. These dimensions exist in the social, environmental, and infrastructural areas as well as in the innovation and economic sectors. Particularly because of the latter, investment by governments in research and development has generally risen, and one consequence of this increased investment has been a much more utilitarian perspective on the role of science from publics and politicians alike.

At the same time, however, the policy process itself has become more complex as the interaction among civil society, industry, and government has developed. The policy cycle is rarely as tidy as described in textbooks but instead is a rather fuzzy and iterative process with frequent and repetitive interactions between interest groups, policy makers, and decision makers. Very often, the focus falls on issues of "post-normal science"; that is, areas where the science is complex and inevitably incomplete and where the interface with societal values is often in dispute. Examples of post-normal issues are not difficult to find, from the global challenges

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of climate change, food security, population health, and terrorism to more localized considerations of conservation science and environmental management. Many of these issues, in turn, have trans-jurisdictional and diplomatic dimensions.

So within this complex and changing environment, how can science most effectively assist public policy? Across the globe, a wide variety of structures are equipped to facilitate this interaction. National academies, science and technology councils, and science advisors are variously employed particularly at a national level. At the international level, some organizations have advisory mechanisms, but the bulk of international policy making does not.

As the interaction between science and public policy becomes more important to societal development and environmental stewardship at both the national and international levels, there is a growing need to examine the principles underpinning these interactions, as well as the various functions that science must serve in informing policy.

### **International Network for Government Science Advice**

In 2012, I was approached by Steven Wilson, then chief executive of the International Council for Science (ICSU), to consider the prospective value of an international meeting of practitioners operating at the interface of science and public policy. In this discussion, I expanded the concept to include not only individual science advisors but also advisory groups, national academies, and academics with an interest in the science-policy interface. A planning group was established with broad geographical representation, and in 2014 the first international meeting on science advice to governments was held in Auckland, New Zealand, timed to occur just prior to the Thirty-First ICSU General Congress. More than 240 delegates from forty-four countries attended our gathering. Of these, twenty were from low- and middle-income countries (LMICs).

At the meeting's final plenary session, it was agreed that a network should be established to continue the dialogue. One task of such a network would be to respond to the request from a number of delegates, especially from LMICs, to assist with capacity building with respect to this growing boundary role to boost collaboration at the cusp of science and policy. Thus, the International Network for Government Science Advice (INGSA) was formed under the aegis of ICSU but operating as an autonomous unit. It has a steering group of practitioners and academics from countries at a range of income levels. The secretariat is based in my office and is supported by seed funding from ICSU, the Royal Society (London), and the Wellcome Trust (UK).

The network is interested in enhancing the role of science in public policy at all levels of governance from local to global, although to date most of the emphasis has been on national and international needs. Deliberately, the network has focused only on improving the use of scientific evidence in policy formation

and implementation across all aspects of government. This is distinct from the development of policies for the public funding of science. While often the same individuals are involved in providing advice on “policy for science” and “science for policy,” the nature of national science-funding systems is outside the scope of INGSA, beyond observing how it might influence the production of knowledge for public policy.

Similarly, the network has avoided advocating for any particular structure for science advice, recognizing instead that national advisory structures must reflect the context, culture, constitution, and approach to developing societal decisions in a given jurisdiction. The network is primarily focused on exploring the diverse dimensions of science advice, developing practices and principles applicable in multiple contexts and across the different domains of science advice. INGSA sees a particular role with respect to developing and emerging advisory systems.

## **Taxonomy of Science Advice**

Five categories of science advice need consideration. While this taxonomy is described in terms of a single jurisdiction, many aspects apply at either a subnational or transnational level.

1. Technical advice: Ministries/departments and agencies require constant input of technical advice either from internal or external subject-matter experts and scientists. It is important that there are protocols in place, similar to those developed in Britain and the United States, aimed at protecting the integrity of such technical input. Much also depends on the processes of selection of external experts and how they do their work. Where the advice and commentary of technical experts flow into agency committees and then combine with other inputs, the nature of committee processes and reporting becomes critical to protecting the integrity of advice.

2. Regulatory advice: Science and technology are core to the work of regulatory agencies dealing with everything from highly technical matters such as standards, aviation safety, or pharmaceutical regulation, for instance, through to matters involving possibly disputed values such as the use of GMOs, reproductive technologies, and environmental regulation. Such regulatory agencies are an essential science-based service of governance. However, the decision making of most such agencies will not be based on science alone. It is therefore important that processes exist to clearly distinguish and protect the scientific input toward regulatory decision making.

3. Deliberative advice: In this approach, a government requests the scientific community—often via a national academy—to convene a panel of experts to respond to a question or set of questions. These processes take considerable time and may involve workshops, consultations, or other mechanisms to study a given issue. Such deliberative processes are best suited to slow-burning or chronic problems. Sometimes, national academies will offer unsolicited advice based on their own assessment of need. In some countries, the use of academies to provide deliberative advice is well developed, whereas in others it is still emerging. The standing of academies and their capacities vary enormously around the world, but given that their reports are in the public domain, smaller and less-established academies can use the deliberations of other more-established academies as a starting point for developing their expert opinion.

When a panel is established by a government without an intermediary such as a science advisor or an academy, the danger exists of inappropriate committee membership leading to what has been called colloquially “policy-based evidence.” Alternatively, deliberative advice offered unilaterally by an academy can sometimes fail to answer the question asked by the government or is provided in a highly academic form that, while reflecting the needs and opinion of the scientific community, may fail to meet the government’s needs. When deliberative advice does enter the policy process, this can only generally happen at a single point in the policy process, and often not at the early stages of policy development when initial options are being framed.

4. Informal advice: Science has a role at every stage in the policy process, particularly at that initial brainstorming phase when policy makers and politicians may be framing an issue. In this process, advice is needed virtually on demand. Effectively, such advice can only be given by individuals, whether they serve formally as science advisors or president of a national academy or national council of science. Such roles require a high level of trust between the individual providing advice and the policy maker and politician. This work is grounded in the integrity of the advisor, which in turn can be assisted by a multilateral process of peer review (e.g., by departmental science advisors). Such advice must be firmly based on principles as I have described elsewhere.

5. Science advice in crises and emergencies: The Sendai Framework of the UN Office for Disaster Relief Reduction (UNISDR) highlighted the need for integrated and holistic scientific advice during crises and emergencies. Too often, science advice in crises has tended to be “siloed” within individual agencies. Increasingly, governments are looking for a more integrated and

planned response from the scientific community to help in crises. Indeed, some countries such as the UK have developed sophisticated mechanisms to do so. Some see the key role of an individual chief science advisor to be that of knowledge brokerage during crises. The net effect is that the advisor becomes a more intimate part of the executive's decision-making process. This is distinct from public communication during a crisis, for which the global community is (sadly, but usefully) rapidly accumulating a considerable toolbox of lessons learned and good practices.

While the bulk of the discussion thus far has implicitly focused on the executive branch of government, a democracy works best when the decision makers and those responsible for holding them accountable have access to current, reputable information. Depending on the constitutional arrangements, parliamentarians and legislators require their own sources of advice independent of the executive. This may be done through distinct units as in the case of the UK's Parliamentary Office of Science and Technology (POST) or the European Parliament's Science and Technology Options Assessment (STOA) Panel. Here, the advice may have a different framing given that it is generally associated with reviewing proposed legislation or an inquiry through a select committee process. In either case, the information and data needs will be structured, framed, and timed differently from those of the executive branch. The science does not change, but the questions asked of it might. This can be particularly apparent in the varying emphasis placed on scientific uncertainties by elected officials, depending on context.

## **The International Dimension**

The issue of science advice in the international arena is complex. Some international organizations, such as the World Health Organization, which have a strong technical focus, have well-developed means for obtaining both internal and external subject-matter advice. But as we have seen in the complex processes associated with the Intergovernmental Panel on Climate Change (IPCC), sometimes very elaborate processes are needed for globally driven science to influence domestic policies and to diminish the role of national interests in shaping the science. It could be argued that the elaborate nature of the IPCC exercise was the inevitable outcome of a situation where very distinct national interests and values were at play with regard to the economics of climate change. Inclusiveness builds trust, so it was important for the IPCC to broaden the scope of expertise and clearly demonstrate that the scientific consensus was international. Similarly, most of the sustainable development goals imply a strong role for the social, environmental, and other natural sciences, and a wide variety of international organizations will have a role. An inclusive and principles-based approach to developing science

advice for these organizations is desirable; strengthening of scientific inputs will be essential.

Beyond the formal structures of international organizations, an important role exists for science in many bilateral and multilateral negotiations and arrangements. The Asia-Pacific Economic Cooperation (APEC) forum has a “chief science advisors and equivalents” group. In 2015, this group was charged in the APEC Leaders’ Declaration with working to enhance regional capacities to use science in and around emergencies. Similarly, the European Union has been strengthening its integrated approach to science advice through the development of its Science Advisory Mechanism and the funding of cooperative arrangements for obtaining deliberative advice from the many scientific academies across Europe.

An increasing component of science diplomacy is directed at achieving common scientific understandings between policy makers in different jurisdictions. For example, science plays a critical role in sustaining the global trade system and resolving trade disputes and in dealing with many trans-boundary resource-management issues. Quality interactions between science and policy communities are needed by each party to address such issues. Interactions between national science advisory mechanisms can assist.

## Activities of INGSA

The issues outlined in this paper are at the heart of INGSA’s goals. The network has established four streams of activity:

1. Networking and convening: INGSA brings together those interested in the principles, practices, opportunities, and challenges of science advice to governments, providing them a platform for discussion and interaction. Its website ([www.ingsa.org](http://www.ingsa.org)) serves as the main hub for this work, along with workshops and a biennial meeting. The next international meeting will be jointly hosted with the Research Directorate of the European Commission in Brussels on September 29–30, 2016. The network has initiated topic-specific workshops—one on the issues surrounding scientific advice in the international arena was held in Budapest as a satellite to the World Science Forum in 2015. INGSA has developed a number of partnerships to assist in this work. Specifically, it operates under the auspices of ICSU; with the Wellcome Trust, which has been instrumental in seeding INGSA’s operations; and with UNESCO, with which INGSA is developing a formal memorandum of partnership.

2. Thought leadership and research: INGSA produces and disseminates comparative analyses and discussion papers on the science and art of scientific advice. This work began with material prepared by the secretariat

for the initial science-advice meeting in Auckland. An impending project will soon establish a broader consultative process on a statement of principles that underpin science advising, irrespective of national model.

3. Domain-specific expertise: Working with partners, INGSA is engaged in developing policy-related analyses and guidance for: science advice in emergencies, and in the science-and-diplomacy interface.

4. Capacity-building workshops: INGSA partnered with the Future Earth initiative for capacity building and is working with a number of partners, including the International Institute for Applied Systems Analysis (IIASA), to develop capacities in science diplomacy. In February 2016, INGSA conducted a capacity-building workshop for Africa in Hermanus, South Africa. Forty delegates were selected out of more than four hundred applicants from fourteen African countries. Funding was provided by the New Zealand Ministry of Foreign Affairs and Trade, the Royal Society (London), the Wellcome Trust, and the South African Department of Science and Technology, with considerable in-kind support from the Academy of Science of South Africa (ASSAf). A case-based teaching approach was used, with bespoke cases prepared as training material for discussion and role playing. The feedback on the course was overwhelmingly positive. In addition, INGSA is currently planning a workshop for francophone Africa, to take place in Dakar, Senegal, in 2017, and other workshops in Africa and the Middle East are being planned. Interest has also been expressed by potential partners to undertake training in Latin America and Asia. This will depend on successful funding of the network, for which a number of approaches are under discussion. Several developed countries have also sought the network to assist with capacity building.

Arising from INGSA's work to date, an African chapter of the group is being established with a steering group comprising INGSA course alumni from South Africa, Uganda, Nigeria, and Egypt. ICSU has agreed to provide organizational support to this effort. The goal is to continue identifying ways to build capacity in Africa and to sustain a transcontinental network of those facing the challenges of developing science advice in the African context.

## **Principles and Guidelines**

INGSA's work, and indeed the practice of science advising more generally, must be underpinned by consensus-based principles for the advice to be accepted and—increasingly—for it to be applicable across ideological boundaries and jurisdictional borders. This point was also recognized in the closing declaration

of the 2015 World Science Forum in Budapest, which noted that “the need to define the principles, processes and application of science advice and to address the theoretical and practical questions regarding the independence, transparency, visibility and accountability of those who receive and provide advice has never been more important,” and called for the “concerted action of scientists and policy-makers to define and promulgate universal principles for developing and communicating science to inform and evaluate policy based on responsibility, integrity, independence, and accountability.”

Consequently, INGSA is establishing a working group comprising science, technology, and society (STS) scholars, advice practitioners, and ethicists to consider principles that might be applied at all levels of science advice, irrespective of structural arrangements. The goal is to consult widely on draft principles and present these to the World Science Forum in Jordan in 2017. This work is being undertaken in close liaison with UNESCO, ICSU, and other relevant parties.

## **Final Comments**

This rapid growth of interest in science advice and its role in science diplomacy has not been without its challenges. Many such challenges stem from the large scope of relevant issues, a situation made particularly complex by the range and variable state of development of advisory mechanisms across countries with different cultures, modes of government, and levels of economic development.

While many scholars, national academies, and advice practitioners have engaged readily in discussion and debate to shape our thinking on science advice, the conversation must keep growing to do justice to the broader range of issues. For instance, engaging the considerable diversity of actors on the “demand” side of science advice in a sustained discussion on the practice is complex because of the political contingencies to which they must respond. But at the September 2016 INGSA global conference, a number of elected officials, legislators, policy makers, and regulators have committed to attending.

There is also the need to think about the balance of advisory mechanisms internal and external to government and the need to assist with both formal and informal advice, while also developing robust technical and regulatory scientific frameworks. These issues must be considered in light of the needs of cities and regions on one hand, and the increasing importance of transnational approaches on the other.

Consequently, one of the greatest challenges for INGSA is to balance expectations among its major streams of activity: building the dialogue internationally; providing practical capacity-building opportunities; developing principles and guidelines; and supporting relevant research and the development of resource material. The network faces growing demand in all these areas. Later this year, we will be hosting a workshop to train mentors to assist with the capacity-building

workshops that are so important to enhancing the diversity of participants and building a cadre of emerging scientists and policy makers. Indeed, we sense great interest among this demographic in understanding and engaging with public policy.

Expectations for the network have grown very rapidly, and its capacities will obviously depend on successful resourcing, which is creating large demand on a small core group of individuals. At the same time, the demand for the network's engagement would suggest a major unmet need to build momentum and skills around the boundary functions of science advice. Thankfully, there are indications that foundations and development agencies are beginning to recognize the importance of improving the science-policy nexus in order to address our shared global challenges. **SD**

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