



COMMENT

Received 26 Sep 2016 | Accepted 26 Sep 2016 | Published 18 Oct 2016

DOI: 10.1057/palcomms.2016.77

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From paradox to principles: where next for scientific advice to governments?

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ABSTRACT Scientific advice to governments has never been in greater demand; nor has it been more contested. From climate change to cyber-security, poverty to pandemics, food technologies to fracking, the questions being asked of scientists, engineers and other experts by policymakers, the media and the wider public continue to multiply and increase in complexity. At the same time, the authority and legitimacy of experts are under increasing scrutiny. This thematic article collection ('special issue') brings together perspectives on the theory, practice and politics of scientific advice that build on the conclusions of the landmark conference in Auckland in August 2014, which led to the creation of the International Network for Government Science Advice (INGSA). We hope that new papers will continue to be added to this collection over the next year and beyond, making it a living, fully open access repository for new scholarship and policy thinking—and an important contribution to the emerging science and art of scientific advice.

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In their 2009 study of the inner workings of the Netherlands Health Council, Bijker *et al.* (2009) grapple with what they call the “paradox of scientific authority”. In many countries, expert advice is being sought with growing urgency across a proliferating array of policy and public questions. At the same time, and often on the same issues, the legitimacy of evidence and expertise has rarely been so fiercely contested. How, the authors ask, “can scientific advice be effective and influential in an age in which the status of science and/or scientists seems to be as low as it has ever been?”

This paradox persists. Those who advocate the greater uptake of evidence and expertise in policy-making have no shortage of progress to point to. In the past decade, policymakers from Beijing to Brussels, Prague to Pretoria, and Wellington to Washington, D.C., have experimented with new institutions for scientific advice and evidence-informed decision-making (Wilsdon *et al.*, 2014). More established advisory bodies—such as the US Office for Science and Technology Policy, which recently celebrated its fortieth birthday—have become increasingly sophisticated and multi-disciplinary, drawing in the social and behavioural sciences (Shankar, 2015; Koizumi, 2016). An expanding cohort of national academies and learned societies is investing in policy capacity at a national level, and networking to influence global agendas, through new collaborations like the InterAcademy Partnership and the European SAPEA platform (Hassan *et al.*, 2015; Reillon, 2016).

In the international arena, there are now more regular and intense interactions between science advice, foreign policy and science diplomacy (Gluckman, 2016a). Several governments, including Japan, New Zealand, United States and the United Kingdom, have appointed science advisers to their foreign ministries. There has been debate about how to strengthen expert advice across the United Nations system, particularly in support of the sustainable development goals, agreed by the UN General Assembly in 2015 (ICSU/ISSC, 2015). A new UN Scientific Advisory Board was established in 2014, and a recent review calls for its remit to be expanded by the incoming UN Secretary General (UN SAB, 2016).

The role of scientific advice and evidence features prominently in recent UN initiatives, such as the Sendai Framework on Disaster Risk Reduction (as discussed in this collection by Aitsi-Selmi *et al.*, 2016). There are moves underway to strengthen advisory mechanisms in support of international treaties, such as the Biological and Toxin Weapons Convention (IAP, 2016). New mechanisms for evidence-informed assessments have also been created, drawing on lessons from the Intergovernmental Panel on Climate Change (IPCC), which has completed five assessment cycles since its creation in 1988. The largest of these is the Intergovernmental Platform on Biodiversity and Ecosystem Services, formed in 2012 and now involving 125 countries. But the assessment model is being applied elsewhere, for example, through the International Panel for Social Progress, through which social scientists aim to develop “research-based, multi-disciplinary, non-partisan, action-driven solutions” to pressing social challenges (see <https://www.ipsp.org/>). There have also been calls for an IPCC-type body to marshal evidence and develop policy responses to antimicrobial resistance (Woolhouse and Farrar, 2014).

At many levels of government, the ecosystem of institutions and individuals engaged in expert advice and evidence-informed policy-making is more diverse than ever before. Distinct yet overlapping communities of research, policy and practice are congregating around a core set of questions about how to improve the provision, communication, relevance and application of evidence to policy-making. Perspectives from the natural sciences and engineering are being enriched and complicated by a

deeper understanding of public values, cognitive biases and political psychology from the social, political and behavioural sciences. The assumptions of those on the evidence “supply side” are increasingly tempered by the pragmatic insights that come from experience on the “demand side” of policy institutions (Cairney, 2016; Gluckman, 2016b).

A further sign of dynamism of these debates is the breadth of events, projects and publications aimed at the evidence-policy interface. In the space of just 1 month—September 2016—international meetings on this theme take place in Pretoria (Evidence 2016, hosted by the Africa Evidence Network), London (What Works Global Summit, coordinated by the Campbell Collaboration, and Evidence Works 2016, hosted by Nesta), and Brussels (International Network for Government Science Advice) (<http://www.evidenceconference.org.za/>; <https://www.wwgs2016.org/>; <http://results4america.org/policy-hub/work/>; <http://ec.europa.eu/research/conferences/2016/ingsa2016/index.cfm?pg=home>).

Experts, evidence and post-truth politics

Yet despite this progress, it is easy to feel frustrated by the visible failures of evidence to influence policy. On thorny issues like climate change, obesity, biodiversity and migration, the response by policymakers to overwhelming evidence is often sluggish and incremental. While international bodies may have scientific advisory panels, decisions at the international level ultimately require approval and action by member states. So the contributions of science to global policy making are often limited by the capability of domestic advisory systems, which are mixed in structure, influence and role. New developments in science or novel applications of technology may provoke scepticism or resistance from a public that perceives them as allied to elite interests. And populist “post-truth” politicians or social media warriors can too easily tap into the anxieties caused by globalization and rising inequalities, and channel these towards resentment. These dynamics were visible in the UK’s recent referendum on EU membership, with claims by some politicians that “people in this country have had enough of experts” (<https://www.ft.com/content/3be49734-29cb-11e6-83e4-abc22d5d108c>).

Paradox coexists with the possibilities of evidence-informed decision-making. We need to better understand what lies behind the former, and forge alliances to advance the latter. This is why the INGSA was set up, following an initial meeting in Auckland in 2014, which brought together advisers, policymakers and experts from more than 40 countries.

Operating under the auspices of the International Council of Science (ICSU), INGSA’s membership now includes over 800 practitioners, academics, knowledge brokers and policymakers. The network’s focus is on assisting the development of effective advisory systems and the individual skills and institutional capacities that these require, irrespective of particular structural arrangements. Through workshops, conferences and a growing catalogue of case studies and guidance, the network aims to enhance the science-policy interface, and improve the potential for evidence-informed policy formation at subnational, national and transnational levels.

The thematic collection

If we are to practice what we preach, it is also vital that we build the evidence base in this field, through comparative analysis and evaluation of different systems. This thematic collection of *Palgrave Communications* makes a significant contribution to that goal, by bringing together new research on the theory, practice and politics of scientific advice from a range of

disciplines and countries, including Canada, China, Japan, Netherlands, Nigeria, the United States and the United Kingdom.

Worldwide, we see a variety of structures being used to facilitate interactions between evidence, expertise and policy, including national academies, technical committees, science and technology councils and science advisers. INGSA has avoided privileging any particular model, recognizing that different systems need to reflect their particular context, culture, constitution, and approach to decision-making.

This diversity is reflected in the contributions to this collection. Remi Quirion, Arthur Carty, Paul Dufour and Ramia Jabr chart the development of science advice in Canada, at both the federal and provincial level in Quebec (Quirion *et al.*, 2016). Sato and Arimoto (2016) describe the intense political and public attention paid to scientific advice in the aftermath of the 2011 Great East Japan Earthquake, tsunami and Fukushima nuclear disaster, with implications that are still playing out across Japanese policy-making.

Miles Parker reflects on a landmark contribution to science policy and advisory structures in the United Kingdom: the 1971 Rothschild report (Parker, 2016). And Willie Siyanbola, Adedamola Adeyeye, Olawale Olaopa and Omowumi Hassan provide an interesting case study at the boundaries of science for policy, and policy for science, through their analysis of the process through which the Nigerian government developed indicators for science and innovation policy (Siyanbola *et al.*, 2016).

National academies are the focus of two papers: Li *et al.* (2016) explore the changing role of the Chinese Academy of Sciences as an advisory body; and Blair (2016) tracks the different path taken by the US National Academies.

Many of the trickiest dilemmas in scientific advice have trans-jurisdictional and diplomatic dimensions. Saner (2016) sheds light on how temporal and spatial factors influence the selection of advisory models. Aimina Aitsi-Selmi and colleagues outline the role of scientific evidence within the UN's Sendai Framework on Disaster Risk Reduction (Aitsi-Selmi *et al.*, 2016). Candice Howarth and James Painter look at the IPCC's influence on local decision-making on climate change in the United Kingdom, as a case study in multi-level governance (Howarth and Painter, 2016).

The messiness of policy processes, and the need to draw on a diversity of perspectives, is another theme running through several papers. This applies particularly in areas of “post-normal science”, where facts are uncertain, values are in dispute, stakes are high and decisions are urgent (Funtowicz and Ravetz, 1993). In her article, Kunseler (2016) uses developments at the PBL Netherlands Environmental Assessment Agency to illuminate the challenges that scientific advisers face as they attempt to become more reflexive and interactive. Cooper (2016) explores the changing role of social science expertise and advice in the UK government, revealing tensions between relevance and influence, on the one hand, and scientific objectivity and independence, on the other.

Cooper's article is complemented by Kattirtzi's (2016) analysis of the role of government social researchers in policy development at the UK's Department of Energy and Climate Change. Finally, Stilgoe (2016) revisits the UK controversy over the health risks of mobile phones in 1999–2000, and suggests that this can be understood as an example of a public experiment, in which experts, rather than seeking closure, opened up the issue, made explicit previously obscured uncertainties and invited new research questions. Such an example, Stilgoe argues, challenges the distinction between science-as-expertise and science-as-experiment, with implications for advisory practices and structures.

Where next for scientific advice?

The launch of this *Palgrave Communications* collection coincides with INGSA's second international summit in Brussels (September 2016), organized in partnership with the European Commission. This meeting brings together around 500 experts from seventy countries to debate the state of the art in scientific advice and evidence-informed decision making, across a variety of national and international policy contexts.

The insights from this collection and the deliberations of the Brussels meeting will inform the future of INGSA's work, and that of its expanding membership. They will also make an important contribution to one of INGSA's priorities for the next year: to develop a set of principles and guidelines to underpin effective advisory systems.

In November 2015, the concluding declaration of the World Science Forum (WSF) in Budapest included a request for “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” (WSF, 2015).

In response to this, INGSA is organizing a series of roundtables over the next year, before seeking endorsement for a set of principles and guidelines at the next WSF in Jordan in late-2017.

In undertaking this task, INGSA will be synthesizing and building on a substantial body of earlier efforts to codify approaches in particular national systems, or international bodies. Common principles and guidelines could sit in some tension with a respect for diversity. But as the contributions to this collection illustrate, there are also valuable features of effective advisory systems, and lessons that can be transferred sensitively from one context to another, that can be codified in this way.

The open access model of *Palgrave Communications* means that this collection is fully accessible to policymakers, practitioners and stakeholders across civil society. We hope that new papers will continue to be added over the next year and beyond, making this collection a living repository for new scholarship and policy thinking—and an important contribution to the emerging science and art of scientific advice.

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Additional information

Competing interests: The authors declare no competing financial interests.

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How to cite this article: Gluckman P and Wilsdon J (2016) From paradox to principles: where next for scientific advice to governments? *Palgrave Communications*. 2:16077 doi: 10.1057/palcomms.2016.77.



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