Backgrounder: The Evolving Context of Science Integrity in Canada

Science Integrity Project
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Paul Dufour, Adjunct Professor and Fellow, Institute for Science, Society and Policy, University of Ottawa
Maureen E. Ryan, Lead Researcher, Science Integrity Project, Tides Canada

Introduction

Science integrity[1] and evidence-based decision-making have been in the spotlight in Canada in recent years, and also in other countries such as the United States, United Kingdom, Australia, and Japan. In Canada, there is a growing call for strengthening the way science and evidence are used in policy decisions, linked to increasing concerns over the apparent erosion of evidence-based policy decisions at many levels of government in recent years. In this backgrounder, we focus primarily on the historical relationship between science and policy making in Canada. In the accompanying Synthesis of Pre-Forum Interviews, we address the history and use of both science and indigenous knowledge in policy making.

Canada has been criticized in the international scientific media (e.g. *Nature 2008, 2010, 2012, 2013*), the popular press (e.g. *New York Times, 2015*), and in an open letter signed by over 800 scientists from around the world. Sir Peter Gluckman, New Zealand's Chief Scientist, has argued that many organizations have all been struggling when it comes to the use of evidence and knowledge in decision-making. It is a multi-faceted, complex issue that requires careful attention to the notion of values.[2]

From within Canada, institutions such as the Professional Institute of the Public Service of Canada (PIPSC) and the Royal Society of Canada (RSC) have evaluated the state of science integrity in policy making in Canada and issued sharp criticisms (*Vanishing Science* and *The Big Chill* from PIPSC 2013; *Strengthening Government by Strengthening Scientific Advice: Fully realizing the value of science to Canadians* from the RSC 2015*).* In Canada, and in other Parliamentary democracies, attention is often drawn to evidence-based or evidence-informed decision-making. The rationale is straightforward - make various forms of evidence and their use transparent to ensure accountability within public policy. The 2015 *Dismantling Democracy* report by Voices-Voix describes the process and its justification: *Access to varied and credible information allows the public to properly evaluate the government's conduct and make informed political choices. If taken into account in government decision-making processes, sound information results in more transparent, accountable, and responsive policy.*

These reports - and many others – articulate a range of structural issues affecting the uses of science in the public interest in Canada, including the absence of a national research agenda encompassing basic and applied science; the erosion of institutional mechanisms for providing expert advice and research; threats to basic research and particular areas of applied research; political interference in the

[1] By "integrity" in the use of science and Indigenous knowledge, we mean that public policies are built upon the best available, most relevant knowledge resources and that the transfer and use of knowledge in policy and decision-making is transparent. Integrity in the use of knowledge in policy-making also requires integrity in the production of knowledge, that is, adhering to professional, ethical, and disciplinary standards in the production of scientific knowledge and codified cultural standards in the production of Indigenous knowledge.

[2] Bringing science and policy together for good environmental outcomes, Address by Sir Peter Gluckman, Hauraki Gulf Marine Park Seminar, Auckland Museum 22 August 2012

communication of science; and an overall decrease in Canadian capacity to produce the knowledge required for credible evidence-based policy development and execution.

Of course, there are many other inputs to decision-making than just evidence. In the UK, a group called the Evidence Information Service conducted a survey of parliamentarians. The key messages of the survey responses were that parliamentarians struggle to find evidence that they can trust and to balance this with the politicking of party lines, and that they would welcome routes to access impartial and clear information when they need it.

In Canada, an early exploration of how to engage parliamentarians and scientists by the Science Council of Canada offered a series of similar suggestions on how to improve the interface between these scientific and policy maker communities (Fish 1983). In another case, the Royal Society of Canada along with the House of Commons in 1987 organized a special event (Towards an Effective Dialogue Between Parliamentarians and Scientists, November 1987) that also put forward recommendations on the subject.

Scientific integrity has come under fire, in part because the knowledge community itself has often poorly understood the nature of the policy making system, and in part as a result of bad behaviour within science itself (How Science Goes Wrong, The Economist, October 2013). On the former, there is broad recognition within and outside of Canada of the need for mechanisms and spaces for scientists, policy makers, and other knowledge holders to interact to improve mutual understanding. On the latter, international efforts to define principles and practices of science integrity include standards for the production of science, to prevent self-inflicted damages done by the scientific community due to lapses in sufficient policing of its own research practices.

The Union of Concerned Scientists in the United States has formulated a call to action on Scientific Freedom and the Public Good arguing for greater transparency in gathering scientific knowledge and restoring scientific integrity to federal policy making (UCSUSA 2008). The Science Pledge of Evidence for Democracy builds from this effort (E4D 2015). The movement for greater integrity in the use of knowledge in decision-making is now a global effort, as other communities have also adopted various tools to ensure enhanced use of evidence in decision-making. For example, the October 2014 special issue of Euroscientist on research activism spells out a number of these advocacy groups and their activities. And in studying various global practices, the OECD (2015) has laid out a series of principles required to highlight sound scientific advice.

Canada's current picture of advocacy focused on evidence, policy, and science has grown with such groups as Evidence For Democracy, Scientists for a Right to Know, Science en Bien Commun, Get Science Right, Je vote pour la science, Professional Institute of the Public Service of Canada, and others. The new advocacy approach in Canada is unprecedented. In the section below, we provide a deeper context to illustrate how some of these issues came about so as to learn from that experience. The more recent House of Commons motion by the New Democratic Party (NDP) to create a Parliamentary Science Officer underscores the legacy of these types of policy experiments.

A Canadian Evidentiary Picture

It is crucial to note that many relevant patterns and trends have historical roots that cut across parties and issues, far predate the current government, and apply in the non-federal contexts of science used by provincial, territorial, local and aboriginal governments.

As early as 1966 with the establishment of the Science Council of Canada (SCC), attention to organizations designed to provide advice into public policy and to Canadians in general was growing. The Science Council of Canada was the country's national advisory agency on science and technology operating at arm's length from the government and reporting to Parliament through a Minister for science.

Its mandate was to assess Canada's scientific and technological resources, requirements, and potentialities, and to increase public awareness of scientific and technological problems and opportunities. It produced numerous studies in its 25-year life span, before being eliminated in 1992.

In one of Science Council of Canada's 1977 studies, examining the impact of the Berger Inquiry into the Mackenzie Valley Pipeline, it looked carefully at northern needs and northern development. The Berger Inquiry was groundbreaking in its degree of engagement with aboriginal communities and incorporation of indigenous knowledge into its decision. The SCC's study, responding to this, argued that:

...most of the research that is needed by northern peoples is highly relevant to their lives. Where do the whitefish come from that spawn near the mouth of the Mackenzie? What are the seaward migrations of Arctic char from Pond Inlet? What determines where the caribou will go? What is a safe harvest of narwhals? Where are the best stands of timber? What kinds of soil are found near Fort Smith? How can we best relocate musk oxen in the North? For these kinds of questions local knowledge is important not only to help with the answers, but also to help formulate new and better questions. [3]

Both the Berger Inquiry process and SCC study reflect early and rare recognition from within the science-policy establishment of the value of indigenous knowledge for policy, research, and community wellbeing. Progress in the relationship between indigenous knowledge, advising, and policy making in Canada has been slow and highly variable across regions, but is progressing gradually. (See further discussion in Synthesis of Pre-Forum Interviews, Statement of Principles and Illustrative Examples).

Including the Science Council of Canada, the list of "experiments" in science advisory mechanisms in Canada is long:

- Royal Society of Canada (1882-ongoing)
- National Research Council (Honorary Advisory Council on Scientific and Industrial Research, 1916-1966)
- Science Secretariat (PCO) (1964-71)
- Chief Science Adviser-Science Secretariat (1964-71)
- Science Council of Canada (1966-92)
- Conseil de la politique scientifique – Québec (1972-83)
- Conseil de la science et de la technologie (1983-2011)
- Chief Science Adviser, Ministry of State for Science and Technology (1983-85)

[3] Northward Looking: A Strategy and a Science Policy for Northern Development, Science Council of Canada, Report No 26, 1977

- National Advisory Board on Science and Technology (originally the National Advisory Board on Industrial Technology, 1987-96)
- National Forum of Science and Technology Councils (1989-93)
- Advisory Council on Science and Technology (1996-2008)
- Council of Science and Technology Advisors-CSTA (1998-2008)
- National Science Advisor to the Prime Minister (2003-2008)
- Science, Technology and Innovation Council (2007-ongoing)
- Council of Canadian Academies (formerly Canadian Academies of Science) (2005-ongoing)
- Chief Scientist for Quebec (2011-ongoing)

The Council of Science and Technology Advisors (CSTA) was particularly influential, as its body of advice became Cabinet policy in the 1990s and 2000s. Following public controversies surrounding issues such as dwindling fish stocks, the contamination of Canada's blood supply, GMOs and growth hormone use in dairy cows, the CSTA's SAGE (Science Advice for Government Effectiveness) report of 1999 was adopted by Cabinet in 2000 as a series of principles and guidelines for the effective use of Science and Technology advice in government decision-making. Specifically, the SAGE principles were:

- Government needs to anticipate, as early as possible, those issues for which science advice will be required
- Advice should be drawn from a variety of scientific sources and from experts in relevant disciplines
- Government should employ measures to ensure the quality, integrity and objectivity of the science and science advice it uses, and ensure that science advice is considered in decision-making
- Government should develop a risk management framework that includes guidance on how and when precautionary approaches should be applied
- Government is expected to employ decision-making processes that are open , as well as transparent, to stakeholders and the public
- Subsequent review of science-based decisions is required to determine whether recent advances in scientific knowledge have an impact on the science advice used to reach the decision.

During its 10-year lifetime, the CSTA produced several other public statements all focused on providing advice to the federal Cabinet on the government's internal Science and Technology enterprise. These addressed such issues as improving advice, strengthening public communication and addressing human resources issues. Examples include:

- Building excellence in science and technology (BEST-1999)
- Science and Technology Excellence in the Public Service (STEPS-2001)

- Reinforcing external advice to departments (READ-2001)
- Employees driving government excellence (EDGE-2002)
- Science Communications and Opportunities for public engagement (SCOPE-2003)
- Linkages in the National knowledge system: Fostering a Linked federal S&T enterprise (LINKS-2005)
- Facing Opportunities and Challenges Underlying Society (FOCUS): Federal S&T Management in the 21st Century (unreleased)

The CSTA was abolished in 2008, and while much has been written on the list of organizations above, it remains unclear what lessons Canada has learned on what works or does not work in facilitating the use of knowledge in policy making from these experiments.

In recent years, the "muzzling" or silencing of federal scientists has come to the fore as a critical public issue. A group of 85 prominent Canadian scientists were the first to issue a statement concerning the government's "mishandling and mistreatment of science and due processes" under the banner of Canadian Scientists against the Politicization of Science. In October of 2008, 17 Canadian journalists quickly picked up this story (O'Hara and Dufour 2014). The Environmental Law Clinic and Democracy Watch sent a request to the Office of the Information Commissioner (OIC) asking that she investigate the federal government's policies and actions to obstruct the right of the public and the media to speak to government scientists. (The report is still not public).

In response to concerns over muzzling and lack of science input into decision-making, Evidence for Democracy was established in 2012, filling a critical knowledge gap by surveying and highlighting influences on government science and media outreach. Evidence for Democaracy has also documented cases – both positive and negative – of science impacting policy and policy impacting science via its True North, Smart and Free website.

Understanding the roots of strengthening government through use of knowledge and science is key to grasping its evolution. The advocacy surrounding the use of evidence in decision-making continues to evolve. It has now engaged the political parties leading into the federal election of 2015. Other levels of government have also taken up the debate to some extent to underscore the civic importance of this national issue.

Summarizing the Current Trends

Widespread public arguments of erosion in Canada's science-policy interface point to five primary lines of evidence. First are **disproportionate funding cuts for federal government and public good research** considered essential for creating and implementing informed policies. Such budget reductions have affected multiple streams of basic and applied research; reallocation of funding from discovery to industrial research; cuts to venerable public scientific institutions including labs, field stations, and science libraries; and cuts to environmental, weather, health, labour force, and other monitoring programs.[4]

The second identified problem is the **loss of important evidence-gathering mechanisms,** due to changes in law and governmental practices (e.g. the elimination of the long-form census); changes and cuts to science advisory positions and panels (e.g. elimination of the National Science Advisor to the

[4] For a list of these, see http://scienceblogs.com/confessions/2013/05/20/the-canadian-war-on-science-a-long-unexaggerated-devastating-chronological-indictment/

Government of Canada in 2008, as well as the Council of Science and Technology Advisors and Canadian Biotechnology Advisory Committee and institutions such as the National Round Table on the Environment and the Economy in 2013).

Third, and most publicized recently, are **restrictions on the ability of government scientists to openly communicate their research**, including allegations of muzzling and harassment of scientists. [5]

Fourth are **public policy decisions that appear to contradict strong available evidence or ignore evidence altogether**. For example, changes to the Fisheries Act were enacted without appropriate input from fisheries scientists in government or academia. Finally, critics cite the **withdrawal from international accords and treaties that address science-based concerns** (e.g. the United Nations Convention to Combat Desertification) as well as **neglecting the role of evidence in implementation of aboriginal treaties and other binding agreements**. (The latter, and the independent history and relationship between indigenous knowledge and policy more generally, is addressed in detail in the accompanying Synthesis of Pre-Forum Interviews.)

Currently, there is considerable international cooperation and exchange on the issue of science integrity. For example, at the Science Advice to Governments conference in Auckland, New Zealand in August 2014, science advisors and researchers from around the world discussed the good practices of science advice from a systems perspective, identifying three essential pillars (ICSU 2014).

- **Formal channels** for science advice – Independent and transparent advisory or expert committees or national science academies provide the mechanisms and support necessary for data gathering, analysis, and advice on complex issues.
- **Informal channels** – Advisors that can provide impartial advice in a timely manner (e.g., providing just-in-time scientific information, science background for politicians and bureaucrats, and expert opinion). These channels are often formalized through the office of science advisor (chief science advisor or departmental advisors) and can be highly valued and influential. Advisors are a visible and accessible point of contact for policymakers seeking scientific expertise and for the science community seeking to offer knowledge and evidence to government.
- **Urgent decision-making capacity** – Advisors able to respond quickly in crisis situations and capable of rapid evaluation of information to generate appropriate responses. Such situations may "force a redefinition of the role of the science advice practitioner from advisor to decision-maker" (ICSU 2014). This requires trusted individuals – e.g. a Chief Science Advisor or Head of Academy – who can rapidly synthesize evidence, convene essential experts, and guide decision-making.

Most essentially, effective crisis-based science advising requires a well-established infrastructure, supported by early and ongoing evaluation of emerging risks and active network building, which can be catalyzed by scientific and political leadership to move information and knowledge fast.

Conclusion

Governments come and go — not so with science. Science doesn't just power commerce; it is a mainstay of the country's social and cultural fabric. It is meaningless to argue for a strengthened science culture

[5] For examples, see http://www.truenorthsmartandfree.ca/

and knowledge-based economy if citizens are in the dark about what evidence is used and advice being given, how it affects them, and on what basis they can participate more actively. It's time to democratize science advice and give it a veritable voice (Dufour 2012).

The emerging consensus is that Canada is not where it should be with regard to science integrity and science advisory systems. This consensus presents an opportunity for individuals and organizations across many disciplines, geographies, and sectors (non-profit, governments at all levels, business, academia) to engage in a discussion to more precisely articulate and promote the importance of strong and relevant science, informed decisions, and upholding of core principles of democratic decision-making.

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