SCIENTIFIC ADVICE

IN GOVERNMENT DECISION-MAKING

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Executive Summary

The emergence of the knowledge-based society has underscored the importance of sound, social, scientific and technological advice as a key input to policy formulation both nationally and internationally. Issues are increasingly complex and have widespread and deep impacts on societies and economies.

Governments are grappling with issues that require risk assessments involving large-scale public concerns. Recent examples in the areas of natural resources management and public health and safety abound both in Canada and internationally. As a result, many of the world's leading economies are facing increasing public concern regarding the ability of governments to effectively use scientific advice in reaching policy and regulatory decisions.

These and other challenges have shown that knowledge is a driving force in all major economies in the world and is changing the shape of our societies as well as our ability to manage sensitive issues. Knowledge is a critical input to policy and regulatory decisions, particularly on issues involving people's health and safety, animal and plant protection and the environment. Governments need to respond to these emerging challenges based on sound scientific advice through well developed and effective mechanisms that capture scientific reasoning.

Some countries, most notably the U.K., have developed a series of principles to guide the use of scientific advice in policy formulation and decision-making. International experience in this area may provide useful background information for CFSTAB in its examination of a number of questions related to the use of scientific advice in government decision-making:

- Does the public have confidence that the government has an effective process to identify and use "good science" and scientific advice in reaching policy and regulatory decisions? If not, where are the particular areas of concern?

- If public confidence is eroding, what is required to re-capture it? If particular, what mechanisms are required to ensure public confidence that the government is effectively using scientific advice in making critical decisions? How does government ensure that accountabilities exist to sustain public trust?

Introduction

The government is required to make a range of decisions which have an impact on the public. The government considers a variety of inputs in reaching decisions -- in many policy and regulatory decisions this input includes scientific advice. In order to ensure public confidence in these types of decisions, the government must demonstrate that it employs a consistent, open and transparent process to ensure that "good science" receives full consideration in reaching a decision. This paper examines the issue of public confidence and scientific advice, and reviews recent international experience in this area.

Public Confidence

Government is grappling with issues that are increasingly complex and require decisions that have both widespread and profound impacts. Many of these decisions involve risk assessments that arouse public concern. Recent examples in Canada include the abundance and safety of our Atlantic and Pacific fish stocks, the safety of our blood supply, and the safety of Canada's nuclear generating stations. Canada is not alone: Norway faced similar challenges with its cod stocks in the 1980s; France and Japan have weathered tremendous losses of public confidence over the safety and management of their public blood supplies (HIV contamination); Scotland and Japan have faced public concern regarding the ability of their expert advisory systems to deal with the E. coli virus; and, the U.K. has grappled with the economic and public confidence fall-out resulting from its handling of BSE (Mad Cow Disease).

These examples have shaken the public's confidence in the ability of governments around the world to develop policies and regulations that protect the safety and health of their citizens. The media and some scientists have accused governments of not giving some scientific advice adequate weight in the decision process, of misusing science or relying on faulty scientific studies, and of ignoring the concerns of scientists. According to these groups situations which involved many personal tragedies were made worse by governments' false assurances to the public regarding safety and security.

The public is the ultimate test for government decisions. In many cases public confidence hinges on the effective use of good science. The public expects government to employ measures that ensure the integrity of the research and the scientific advice it supports. The public will not accept personal advancement, economic imperatives and political advantage as motives for misusing or ignoring credible research findings. The public expects scientific advice to be predicated on research undertaken in compliance with scientific traditions (e.g. peer review, correction and verification through repetition, etc.) and codes of ethics. Governments are expected to employ open and transparent processes of decision-making that demonstrate which, and how, inputs are used in reaching a decision. Misconduct in science, improper use of scientific advice and a lack of transparent procedures for

hing government decisions exact a high price for the government (both in terms of public trust and nancial cost). They can also result in tremendous societal costs. The involvement of the courts in legal cases entailing science-based issues is likely to put even greater pressure on governments to demonstrate that their decisions take scientific advice fully into account.

The Importance of Scientific Advice

Knowledge is a driving force in all major economies in the world and is changing the shape of our societies. The advent of the knowledge based society and economy has underscored the importance of scientific and technological expert advice in government decision-making. More than ever before, scientific and technological advice is a critical input to policy and regulatory decisions, particularly on sensitive issues involving people's health and safety (food, medicine, transportation, etc.), animal and plant protection and the environment. The knowledge based society is producing questions and issues that require a knowledge based response from government.

The importance of science to government decision-making and the implications for public confidence has prompted a number of countries to re-evaluate how they utilise scientific and technological advice in reaching government policy and regulatory decisions.

> *"The expanding range of issues on which governments expect and need science to provide insight, the need to maintain and restore public and political confidence in science advice, and the emerging importance of risk assessment in the development of public policy, are all contributing to attempts to develop more sophisticated advice mechanisms... The widespread, popular concern over science and technology, their social implications, the pace of technological change and the manifold impact of science and technology on an increasing range of human concerns all require governments to validate and inform the policy process with the best possible advice."*
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> *Review of Expert Panels for Provision of Scientific and Technological Advice for Development of Public Policy*, Willie Smith, University of Auckland (1997)

Smith has identified four major functions of expert science advice:

- Factual insights to help identify and frame problems and to understand a problem;
- Knowledge to allow assessment and evaluation of the likely consequences of a policy;
- Arguments, associations and contextual knowledge to help policy makers reflect on their situation and to improve and sharpen their judgements; and,
- Procedural knowledge to help design and implement procedures for conflict resolution and rational decision-making.

Smith notes however, that in practice the decision to use expert scientific advice (or not), and the questions this advice is required to address, are political decisions. As a result, scientific advice is often used selectively: as a source of authority; to legitimise policies; and, to rationalise a policy response or justify unpopular policies.

Government policies are not built on scientific evidence and advice alone. There are a number of factors that influence policy and regulatory decisions, including: industry interests such as profit and competition; the cost implications of policy and regulatory decisions; international economic, political and social considerations; and, public activism (e.g. AIDS demonstrations). Scientists are not necessarily experts in these areas. As such, governments need to ensure that their policy-making procedures include mechanisms which identify and incorporate the advice of a diversity of advisors representing sources of interest and knowledge. This balancing of science and other inputs often requires risk assessments which have clear implications for public confidence. Further examination of best practices in risk assessment, risk acceptance and management may be useful in examining the issue of scientific advice in government decision-making.

The International Experience

Many of the world's leading economies are facing increasing public concern regarding the use of scientific advice in reaching policy and regulatory decisions. Crises in public confidence have led governments to examine the relationship between governments, scientists and policy makers, and to establish mechanisms that ensure sound scientific advice is considered in forming government policy and regulations. The ability of governments to effectively use scientific and technological advice is clearly critical to the public credibility of governments' decisions.

Much has been written recently on the need for principles to guide the use of scientific advice in

government decision-making. Some countries, most notably the U.K., have implemented a series of guidelines to ensure that issues requiring scientific advice are identified early and that they are responded to in an open manner. The guidelines also call for an open and transparent decision-making process that utilises a diversity of the best scientific advice available and involves all key stakeholders.

In a similar move, the U.S. has recently debated a scientific integrity bill which would require peer review of all proposed regulations that are supported by scientific data. The bill provides specific requirements with respect to the selection of peer reviewers, the provision of scientific data, public input, reporting, and review by a newly created Office of Regulations Integrity. This Office, which is proposed to report to the President and the Congress, may have the authority to review all regulations to ensure that they represent the expert opinions of a majority of scientists involved in the peer reviews and to ensure that they are adequate and appropriate in every respect. A number of the specifics of this bill are consistent with the principles for scientific advice in government decision-making that are emerging through the reviews being conducted elsewhere around the world.

Guidelines for Scientific Advice

The following represents an amalgamation of various international guidelines and principles on scientific advice in government decision-making. These principles are receiving increasing acceptance and are being adopted in countries such as the U.K., the U.S. and New Zealand. In many instances, expert panels and advisory bodies provide the means of securing the scientific advice and bringing it to bear on issues and problems of public concern. CFSTAB has been asked to address the issue of public confidence and scientific advice in government decision-making in Canada. The guidelines which follow may provide a useful backdrop to this examination.

In introducing the principles developed by the U.K. Office of Science and Technology, Sir Robert May, Chief Science Advisor to the British government, indicates that "the principles apply to the use and presentation of scientific advice in policy making where: there is significant scientific uncertainty; there is a range of scientific opinion; or there are potentially significant implications for sensitive areas of public policy". This is also true of the amalgamated guidelines which are summarized in the following section.

1. <u>Issue Identification - *Recognising When Scientific Advice is Needed*</u>

In the U.K., departments are encouraged to use a variety of sources and contacts (departmental research programs, academia, non-governmental organisations, advisory bodies, provinces, media, international relations, etc.) to identify potential issues as early as possible. Departments, as performers and users of science, undertake an intelligence gathering and review process on issues and problems pertinent to their mandates and ensure that issues are brought to the

attention of Ministers and key stakeholders early. Cooperation between departments, and with their international counterparts, supports the early identification and joint examination of cross-departmental and international issues. In addition, undertaking widespread consultations to define issues and questions avoids public criticism of the government with respect to limiting the scope of its examination.

2. Accessing the Best Scientific Advice – *Good Advice is Critical to Good Policy*

> *"The decision-maker should recognise the inherent nature of science and technology uncertainty and design science and technology advisory decision-making processes to assure that differences in S&T views are given appropriate weight in decision-making and in the composition and procedures of S&T advisory groups."*
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> *A Decision-Maker's Guide to Science Advising*, David Beckler. Worldwide Science and Technology Advice, Wm. Golden, editor. 1991

In the U.K. and New Zealand, departments are expected to draw on the broadest range of scientific advice available, ensuring that they engage a wide range of specialists from within and outside government (including international experts). Advice is sought from individuals with a diversity of "disciplinary expertise, institutional allegiance and stakeholder interests" (Smith). An effective mechanism draws on advisors known to have differing views. Peer review, publication, debate and criticism, and the reproduction and verification of research findings are seen as crucial to the integrity of scientific advice.

Smith has found that the ability to engage the best experts is contingent on a potential member's perception of: independence, authority and visibility the advice will have; the scope of the review that is being undertaken; and, the resources available to secure the necessary advice and implement the resulting decisions.

Countries employing guidelines such as the ones outlined here recognize the implications of conflicts of interest among those providing advice and suggest that all potential conflicts should be avoided whenever possible and should otherwise be disclosed to ensure the credibility of the advice. Written guidelines for those whose advice is sought is an effective safeguard.

3. Access to Information - *Quality Information Leads to Quality Advice*

"If we're going to advocate legislation and decisions based on sound science, we had better be bringing some damn sound science to the table."

John E. Akitt, Chairman, U.S. Chemical Manufacturers Association Committee on Health and Environmental Effects Research

The scientific integrity bill which has been proposed in the U.S. would require all federal departments and agencies which issue regulations supported by scientific data to establish procedures to ensure that the acquisition, interpretation and use of all scientific data is subject to peer review.

All of the countries examined suggest that those involved in providing advice should have access to all relevant data. Data should be made openly available to a "wide range of research groups to tackle the issue" (U.K. Office of Science and Technology). External review of data and research findings produces recommendations which are more credible.

4. Policy Formulation

The U.K. Office of Science and Technology suggests that scientists and others involved in providing advice should also be involved in framing and assessing policy options to ensure integrity of the scientific advice throughout the process.

Advocates of guidelines for scientific advice in government decision-making suggest that advice should be provided at a sufficiently senior level to ensure that the independence and authority of the scientific advice remains intact. A process which takes the advice beyond the bureaucracy may increase public confidence and stakeholder buy-in to the resulting decisions. It must however be able to influence those actually developing the policy. In addition, the individual(s) responsible for assembling and presenting scientific advice should be responsible for this advice only and should not be required to balance the science with other, possibly competing, factors (e.g. fiscal concerns, industry demands, etc.).

Scientific advice often requires risk assessment and an aggregation of a range of scientific opinion and judgement. There is almost always a degree of uncertainty. As such, it is important to undertake, present and communicate any risk assessment, as well as the process involved in reaching the final decision. This includes demonstrating how the diversity of advice received has been balanced to reach a decision.

5. Presenting Policy - *Openness is the Golden Rule*

> *"Public fear ... can escalate significantly in the absence of a dedicated, long-term effort to explain the meaning of a complex scientific analysis. For governments there is no avoiding the responsibility to make a much better effort in the future to undertake competent public communications about risks of special concern. The main reason is that the costs of failing to do so can be very high."*
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> *The Perils of Poor Risk Management*, W. Leiss.
> Statistics, Science and Public Policy, Hertzberg and Krupa, editors. 1998.

In the U.K., departments are encouraged to publish all scientific evidence and analysis, issues, uncertainties and policy options underlying policy and regulatory decisions and show how analysis has been used in developing the policy or regulation. Dissenting opinions are to be noted. Scientists are also encouraged to publish their own research findings. Whenever possible, scientists are engaged in explaining their advice on the science, including: processes and protocols used; the limitations of their studies; and, why they have reached their conclusions. The entire advisory process benefits from transparency and openness. Openness stimulates public debate and accountability, and may unearth conflicting research findings that have been overlooked. Openness may also avoid even greater controversy in the long run.

In the U.K. that government's handling of the BSE crisis met with considerable public criticism. Although officials were first aware of the possible link between British beef and Creutzfeldt-Jakob disease in 1986, it was years before the government took action to secure the safety of that country's beef supply. As Sir Robert May, the current Chief Science Advisor to the British government, indicated, "We're learning to do the messy, difficult thing of getting the best people and letting the differences of opinion contend in the marketplace".

In the U.S. all advisory committee meetings are publicly advertised in advance and open to the public unless the issue under examination is related to national security.

6. Review

In the U.S. and U.K. senior officials and Ministers are accountable for demonstrating the extent to which guidelines on scientific advice and peer review have been followed.

The Canadian Experience

According to media reports, there is an increasing distrust in Canada of government

organisations involved in science and of how the science and scientific advice they produce is used. The media claims there is widespread public concern regarding the government's ability and credibility in addressing science-based issues, particularly as they relate to regulations and policy development. News articles have focussed on the difference between the views of scientists and bureaucrats, and have accused the federal government of discounting, suppressing and ignoring scientific evidence and advice in regulation and policy formulation.

In the past, some Canadian government policies and regulations have been developed in an hierarchical, and often closed, environment with little public consultation. In an effort to increase the flow of outside advice on science and technology issues, the 1996 federal strategy, *Science and Technology for the New Century*, called for science based departments and agencies (SBDAs) to establish external advisory bodies. The Liberal Party's Red Book re-iterated the Liberal Party's commitment to engage science advisors to provide expert and independent advice to ministers of SBDAs as a means of better integrating scientific findings into policy formulation. SBDAs now have these advisory bodies in place. Most, however, perform their roles in private, feed their results directly to officials or Ministers, and operate exclusively within the mandates prescribed by the department to which they report. While they are used to inform public policy, the process varies across departments and is ad hoc in nature. The Committee of Federal Science and Technology Advisory Bodies (CFSTAB) was established to help address S&T issues of common concern to federal departments, including the harmonization of S&T policies.

The importance of science in government is an issue which has been receiving increasing attention in recent months. An ad-hoc committee of ADMs on "Science in Government" has undertaken a number of initiatives to raise the profile of science in government, and to ensure the ongoing ability of government to conduct and use sound science. For example, Health Canada, under the direction of this committee, is currently spearheading an initiative to develop a code of best practices for the conduct, management and use of science in government. The code will apply to science and policy stakeholder groups and will address best practices in a number of areas, including:

- review processes, including internal and external peer review;
- the use of science in balanced decision-making;
- evidence-based decision-making (risk assessment);
- transparency;
- communicating results; and,
- accountability.

Conclusion

Scientific and technological advice are key knowledge inputs to credible and effective policy

and regulatory decisions in many areas. CFSTAB has been asked to examine a number of questions related to the use of scientific advice in government decision-making.

- Increasingly the media in Canada has raised concerns regarding the government's ability and credibility in addressing science-based issues, particularly as they relate to government regulations and policy. Does the public have confidence that the government has an effective process to identify and use "good science" and scientific advice in reaching policy and regulatory decisions? If not, where are the particular areas of concern?

- If public confidence is eroding, what is required to re-capture it? In particular, what mechanisms or processes are required to ensure public confidence that the government is effectively using scientific advice in making critical decisions? How does government ensure that accountabilities exist to sustain public trust?