NATIONAL ENVIRONMENTAL R&D AGENDA SETTING: A COMMENTARY ON ISSUES, OPTIONS AND CONSTRAINTS

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INTRODUCTION

This brief commentary paper explores issues regarding a national environmental R&D agenda process. It is intended as a background analysis to assist Environment Canada and the environmental policy community in appreciating further the nature of key issues in agenda-setting. In broad terms agenda-setting is a process through which issues and actions are clustered and ranked as priority activities and decisions. Through a discussion of key issues, further commentary about the options available and the possible constraints in agenda-setting is offered. By issues we mean issues which are central to the nature of agenda-setting as a political-institutional activity or phase of policy making and resource allocation. The discussion of issues is drawn largely from general public policy literature on agenda-setting and policy analysis. The reader must be cautious, because it is not clear that what can be said about overall policy making or policy making in a given-field is the same as discussing agenda-setting per se.

The kinds of options available and constraints to be faced in developing and managing an agenda-setting process are numerous and interrelated. They certainly involve choices as to: which specific body or agency will conduct or sponsor the agenda-setting process; what will the agenda-setting exercise actually be called; whether the exercise is seen as a "one-off process" or something which is seen as being permanent or continuous; how extensive the stakeholder versus public versus expert scientist involvement should be; the use of Internet-based tools and fora for participation and exchange; the length and scope of the agenda-setting process being considered; and features such as the use or not of intermediaries and facilitators and other choices regarding how arms-length or independent the process might be and how it might be perceived.

The analysis of options and constraints in agenda-setting also raises inevitable practical challenges in managing an agenda-setting process in a political-democratic context and thus in managing how much control the government department wants, or thinks it can achieve, over the process and its outcomes. A cautionary note: very little of the literature or sources consulted are written from the perspective of officials who have to plan and run agenda-setting exercises or of stakeholder participants who have to take part in agenda-setting processes. Nonetheless, some common sense points are raised about options and constraints in the conclusions of the paper, including those which flow from the authors own knowledge, experience, and research on policy making and agenda-setting.

Some caveats must be kept in mind. First, the authors do not advocate any one approach to agenda-setting nor does the paper deal frontally with the substance of environmental agendas. Its focus is on agenda-setting processes and key issues. Second, the paper must be considered to be an exploratory commentary because it only samples some conceptual literature and does not undertake any direct empirical examination of the three federal R&D agenda-setting case studies profiled. Instead, it

relies on a secondary look at published reports, mainly prepared by the departments or agencies involved. Neither time nor the budget allowed a more direct or detailed approach. Nonetheless, the basic intent is to derive insights into agenda-setting processes and characteristics to advance discussion about how national environmental R&D agenda-setting can be thought through in a practical way.

The paper is organized into three main sections. The first section focusses on the key issues of agenda-setting, including different levels and time frames of agenda-setting, issues about thematic versus allocative agenda-setting, and public participation and the role of scientific experts in agenda-setting. This section also draws briefly on some comparative experience in other countries. The second section surveys the three federal R&D agenda-setting case studies: the National Forest Science and Technology Course of Action; the Canadian Agri-Food Research Council National Strategy for Agri-Food Research and Technology Transfer; and the processes regarding the Canadian Institutes of Health Research (CIHR); the third and concluding section then relates these case studies to the set of agenda-setting issues profiled in the first section. It also offers final commentary about the options and constraints involved in agenda-setting processes.

THE NATURE OF AGENDA-SETTING: KEY CONCEPTUAL ISSUES

In this section, we define agenda-setting and explore several key conceptual issues in agenda-setting. These issues partly include different levels of agenda-setting (macro, mezzo and micro) but they also embrace issues of time-frames and the extent and nature of public versus expert and/or elite participation in agenda-setting and also possible differences with the very nature of environmental policy activity in general and environmental R&D in particular. Table 1 provides an initial summary glimpse of these conceptual issues which are then regrouped into the five headings discussed in the section as a whole.

Table 1: Conceptual Issues in Agenda-Setting at a Glance

- Agenda-setting as a process for positioning issues for political attention;
- Agenda-setting as ranking and clustering priorities;
- Agenda-setting as a process whereby policy entrepreneurs take advantage of policy windows of opportunity to advance causes and policies;
- Agenda-setting as an interplay of processes in which issues are moved through a problem stream, a politics stream, and a policy stream;
- Agenda-setting as a multi-level process (macro, mezzo and micro) and therefore both "top-down" and "bottom-up" in nature;
- Agenda-setting in different time-frame periods;
- Agenda-setting as a theme and values-setting communication process versus a resource allocation process;
- Agenda-setting as an expert and elite dominated process versus a public participation-centred process;
- Agenda-setting differences and similarities in general, environmental, and environmental R&D policy realms and arenas;

Agenda-Setting: Definition and Some Key Models

Some policy literature defines agenda setting as the process of positioning an issue high enough on the public agenda to receive attention (Pal, 1997). It can also be defined as the list of subjects or problems to which the public and policy makers are paying some serious attention at any given time (Brinton and Laird, 1996). While these kinds of definitions are a useful starting point they do not sufficiently evoke the notion that agenda-setting also involves a process of clustering and ranking priorities either thematically, as an act of fundamental political communication, or as concrete preferences in actual resource allocation (public spending and investment).

Without doubt, the benchmark model of agenda-setting in the political science literature is that of John Kingdon (Kingdon, 1995). Its focus is on the relative roles of governmental and non-governmental influences on agenda-setting with the analytical focus being on "policy entrepreneurs", inside and outside the state, taking advantage of policy windows or moments of policy opportunity. The processes of advancing issues or items of policy are differentiated by Kingdon into three streams: the problem stream (or characteristics of policy issues); the politics stream (or key features of institutions and specific political circumstances); and the policy stream (or the development of policy solutions). Successful agenda-setters can mobilize and advance causes and issues by taking advantage of the availability of movement along any one or more of these streams (Kingdon, 1995).

While Kingdon's model emerged from a U.S. political-institutional reference point, it has also been applied in Canada. Michael Howlett's work has adapted and built empirically on this approach and found it relevant and useful for Canadian analysis at a macro level (Howlett, 1998). Among the issue areas Howlett explored were nuclear issues and acid rain. But Howlett was not focusing on environmental agenda-setting and certainly not on environmental R&D agenda-setting.

Another conceptual model which was focused on environmental policy (but not necessarily environmental R&D) was Downs 1972 discussion of the environmental "issue-attention cycle" (Downs, 1972). This framework suggested that five stages formed such issue attention cycles: 1) the pre-problem stage which prevails when some highly undesirable social condition exists but has not yet captured much public attention completely; 2) alarmed discovery and euphoric enthusiasm as a result of some dramatic series of events when the public suddenly becomes both aware of and alarmed about a particular problem; 3) realizing the cost of significant progress with a gradual realization that the cost of 'solving' the problem is high; 4) gradual decline of intense public interest which results in a realization of how costly the solution to the problem might be; and 5) the post-problem stage when an issue moves into a prolonged period of lesser attention or spasmodic recurrences of interest (Downs, 1972, pp.39-40). The Downs framework focused on the interaction between public opinion and the role of the mass media and hence does not factor in government-institutional factors or stakeholder pressures and tactics. Nor does it deal with the specific role of policy entrepreneurs inside and outside the state.

These definitional and conceptual insights are important for understanding the likely dynamics of any agenda-setting process and certainly suggest that agendas are unlikely to be clear-cut rational processes of decision making (Dery,1999). But we need to proceed further and highlight five issues in agenda-setting, moving from those which are quite general to those which bring in environmental policy as a field, and then environmental R&D as an element within environmental policy.

Levels of Agenda-Setting: Agendas Within Agendas

Any conceptual discussion of agenda-setting first has to pay attention to different levels of agenda-setting (macro, mezzo and micro). Within the Government of Canada, the macro level clearly includes Prime Ministerial and Cabinet agenda-setting, with the growing role of international and global forces increasingly crucial. The mezzo-level could correspond to the level of departmental priorities but it could also refer to priorities worked out through, and generated by, complex negotiations among smaller sets or groups of ministerial departments (for example, over policy issues such as biotechnology and its R&D elements). The micro-level could refer to priorities at the level of sub-departmental or agency branches, or, for the purposes of this paper, at the level of departmental research or R&D laboratories. Assuming (quite accurately we think) that policy (and R&D) entrepreneurs and stakeholders operate at all these levels, it is not surprising that agendas exist within other agendas in a complex top-down and bottom-up process of discussion, anticipation, negotiation, and the mutual reading of the political, policy and budgetary "tea leaves".

But even a basic distinction among macro, mezzo and micro levels is insufficient for a solid conceptual understanding of agenda-setting. One must also look at the details within each of these levels. For example, when one thinks of the core processes and events of agenda-setting at the macro level in the Government of Canada, then potentially five key interacting processes are crucial:

- the Throne Speech
- the Budget Speech
- Economic Summits (G-7)
- First Minister Meetings
- Periodic Crises

In each event or process, either the Prime Minister's or the Minister of Finance's prestige and credibility is in the public limelight, as is their message about their government's priorities. Getting a proper "read" on these priorities is essential for line departments wanting their policy (and R&D) initiatives to succeed and for branches within departments as well. And of course, a key part of advancing many policy files and/or themes, is to get them on to these macro priority-setting events, documents and processes in the first place.

Similarly, within the mezzo and micro levels there are some agenda-setting processes which, though linked to the macro processes, live lives of their own at these lower institutional levels. Departments usually have their own processes for agenda-setting in part because their minister has an agenda and wants it linked to the department's and also because he or she faces the continuous task of communicating

how those priorities make sense given the department's legal and political mandate and given the government's mandate. At the micro branch or agency level similar processes and imperatives exist for the agency head, all the more so, because, in the last decade officials in general and in R&D agencies have been required to foster partnership networks and resource activities though various kinds of levered or co-funding and with shared personnel and research projects (Doern and Levesque, 2001).

Time Frames and Thematic Versus Resource Allocation Agendas

A second key issue in agenda-setting is the importance of the time factor in agenda-setting, tied as it often is to the importance of agendas as thematic value-setting versus actual resource allocation processes.

For example, regarding time frames, it is essential to link agenda-setting dynamics to the stage the government is at in the four year election cycle. Typically, pressures to cut spending and do unpopular things may be greatest after a successful election, whereas, close proximity to a new election induces a desire to spend more or give the appearance of doing more. However, even these rough rules of thumb are not laws of political priority setting. In recent years, the pre-election Red Book initiatives of the governing Liberal Party have also been crucial for priority-setting. The Government of Canada has paid quite close attention to both the development of these priorities and to following through on them. They have also been under continuous pressure, as have the Opposition parties, to show demonstrably that they have costed their priorities.

In addition, each of the federal government's macro agenda-setting events are time-related in different ways. Throne speeches for example do not occur annually but rather occur approximately every 18 months depending on when a new session of Parliament is deemed to start by the Prime Minister. Budget Speeches are typically annual in nature as are G-7 summits and first ministers meetings of the Prime Minister and the Provincial Premiers. But Budget Speeches must also demonstrate to citizens and markets that the government has a solid medium-term view of where it is going, especially regarding public finances and macro economic policy.

The character of agenda-setting in these events and processes is not uniform (Doern and Phidd, 1992). For example, Throne Speeches were once almost exclusively related to indicating which bills would be brought before Parliament. In the last two decades, Throne Speeches have been more thematic in nature, setting out the government's values and ideas expressed at quite a broad level, but indicative of where it wants to take the country. For example, in recent years the theme of "connectedness" has been present to evoke views about the importance of the Internet as a core technology but also as a new source and medium of national unity. Budget Speeches, on the other hand, are agenda-setting occasions which are more allocative in nature. In other words, real budgetary and staffing resources are being more concretely announced and allocated to give actual meaning to priority rankings.

Both the conceptual insights of the Kingdon, Howlett, and Downs approaches and the realities of the federal multiple agenda-setting events suggest that agenda-setting is by definition complex and consists of both top-down and bottom-up pressures. It is also influenced by intra- and inter-departmental versus external stakeholder pressures shaped further by public opinion as expressed and revealed in diverse ways (including polling and the use of focus groups).

While these initial conceptual features are indeed crucial, it is important to stress that the published literature on agenda-setting per se does not tend to deal with the concrete practical problems of developing and managing planned agenda-setting processes or exercises. Moreover, it is only beginning to deal with some of the issues of how to deal with this in the era of digital democracy. There is considerable analysis of public participation in policy formation and policy consultation as a whole but much less on public participation in agenda-setting at the levels of macro, mezzo or micro-agenda-setting where inherently clusters and rankings of priorities are involved. Some of these participation issues are also inherent in the next sub-section where the issue of expert versus public participation in science and technology policy agenda-setting overall is profiled.

Expert Versus Public Participation in Science and Technology Agenda-Setting

It is at this juncture that any conceptual discussion of agenda-setting has to deal with a third issue, namely, the larger developments in ideas and practices about expert versus public participation in science and technology issues, policies and agenda-setting. There is a very old and a very new set of literatures on these developments. The old refers to analyses from the 1960s onwards of "technology assessment" and how to develop institutions for democratically assessing technologies (Durant, 1999; Bimber 1996). The focus in this perilously brief section is on a more recent sample of issues and insights that have emerged in the last decade in the context of changing views of democracy, the impact of globalization, the suspicion by the public of experts of all kinds, including scientists, and the emergence of digital democracy.

The case for greater public participation in science and technology is first grounded in democracy itself but this in turn depends upon what particular kind of democracy one is advocating (e.g. Cabinet-Parliamentary representative democracy; interest group/stakeholder democracy, and direct citizen democracy).

It also turns on what Durant calls the "deficit model". According to the deficit model, "scientists are knowledgeable experts, the public are (to varying degrees) ignorant lay people, and the key task is therefore to arrange for more and better communication of expert knowledge from one community to the other. Simpler forms of the deficit model focus on the products of scientific inquiry- facts, theories, and so on- while subtler forms concentrate instead on the processes of scientific inquiry" (Durant, 1999, p.314). But this deficit model is also criticized partly on the grounds that its advocates underplay the fact that "much scientific knowledge is partial, provisional and

deeply controversial: the formal knowledge scientists bring to their relationship with the wider society is often deeply problematic" (Durant, p.314). Such concerns are bound to emerge in any environmental R&D agenda -setting process where scientists inside and outside Environment Canada seek to define their own priorities for research.

Recent concerns about public participation and variously perceived deficits in understanding S&T and risk have resulted in different experiments with a variety of approaches, including: scenario workshops and consensus conferences; integrated assessment focus groups; citizen's panels; and Internet-centred consultation (Joss, 1999). These are occurring in a variety of countries and in a variety of policy fields where science and technology are crucially involved including, genetic engineering and biotechnology, energy policy, and environmental policy (Durenberger, Kastenholtz and Behringer, 1999).

Space does not allow an assessment of these approaches. Our point simply is to say that a variety of approaches are actively being experimented with and each is premised on some considered view that a democratic deficit exists in the interplay between scientists and the public. Not surprisingly, the results are very mixed and problematical. For example, an analysis of Internet based consultation in the UK regarding the work of the UK Advisory Committee on Genetic Testing concluded that "although the general public was encouraged to make an input, media coverage was disappointing and all responses came from health care professionals. The chief benefit of electronic consultation is its cost-effectiveness. Opening up the consultation process may help to create awareness in the community of the constraints under which advisory committees work. Problematic issues remain to be resolved, such as the role and status of public input in a system predicated on expert advice" (Finney, 1999, p.361).

In 1993, the Clinton Administration created a cabinet level National Science and Technology Council (NSTC) to establish clear national goals for Federal science and technology investments. Through a coordinated approach, utilizing subcommittees, it was able to provide leadership for strategic planning, coordination and prioritization of research objectives across all federal agencies (Committee on Environment and Natural Resources, 1995, p.vii). To set R&D priorities, it was important to consult a wide range of stakeholders. "R&D priorities have been developed in concert with a wide range of stakeholders from academia, industry, other private sector groups, and state and local governments. By taking full advantage of this nation's enormous scientific and technological resources, critical gaps in our understanding of important environmental issues can be identified and filled and the key issues of the future anticipated." (Committee on Environment and Natural Resources, p vii).

It was also found to be important to have the advice come from a wider range of stakeholders than was previously obtained. "Advice has been, and will continue to be, sought from a wide range of stakeholders from academia, industry, other private-sector groups, Congress, and state and local governments. Although the research strategy is designed to be responsive to regulatory time frames and needs, it is also designed to

be anticipatory and to support long range problem identification and solving." (Committee on Environment and Natural Resources, 1995, p.1).

The role for the public goes beyond simply consultations. "Critical steps in building successful R&D programs are improving education and training in all areas related to understanding our planet and providing educators at all levels, beginning with kindergarten through high school, the results of federal environmental programs in useful forms." (Committee on Environment and Natural Resources, 1995, p.2). Thus, they have identified an education and communications component that is very important for the future success of their federal initiatives.

The role of the public is expressly stated. "The public is the ultimate policy maker. The CERN will enhance the effort to clarify environmental issues; improve dialogue on risks, costs, and benefits; and account for the effectiveness of public decisions regarding the well-being of our citizens." (Committee on Environment and Natural Resources, 1995). While the establishment of the National Science and Technology Council in the United States is a large step forward, it is unclear what the tangible results of its creation will be. "In the United States there has been substantial progress in setting federal priorities for environmental and natural resources research, although it is less clear how much impact these priorities have had on the spending decisions taken by individual federal research agencies in that country" (Committee on Environment and Natural Resources, 1995, p.3).

Environmental Agenda-Setting: More of the Same?

The first three issues highlighted above deal mainly with agenda-setting in an overall sense or regarding S&T. But a logical next, or fourth, issue is to probe whether environmental agenda-setting is the same or raises separate issues. In one sense it can indeed be argued that environmental agenda setting does share the core characteristics of overall agenda-setting or agenda-setting within any particular policy field. Published analyses certainly suggest that Environment Canada's history is filled with several nominal efforts to plan its research and its overall policy agenda. These were cast initially as ten year and five year plans whose content and priorities were a mixture of top-down and bottom-up initiatives (Doern and Conway, 1994, chapter 3). These plans reflected ministerial preferences by a succession of ministers (basically one every 18 months over Environment Canada's history) and also departmental and branch initiatives emerging from regulatory challenges or from opportunities to advance Canada's international agenda as a good global environmental citizen.

In the 1990s, environmental priority-setting was successively influenced by, or became a part of, three types of planning and allocative exercises each different in scale and context.

The first was the 1989-90 Green Plan. As its name indicates, it was a plan and it pro-offered an agenda. It was backed by a $3 billion funding commitment and headed by a then powerful Environment Minister, Lucien Bouchard (Toner, 1994). The process for developing the agenda was initially kept close to the Environment Canada bosom but by its very nature it eventually became quite interdepartmental in nature and involved stakeholder consultation. But the Green Plan was certainly not seen by many as an elegant or participative agenda-setting process and it quickly encountered difficulty as the federal deficit mushroomed and as a 1992 recession loomed.

The second agenda-setting dynamic, again of a one-off kind, was the 1994-95 federal Program Review process (Swimmer, 1996). A government-wide process designed to cut spending and deal frontally with reducing the federal deficit, it was nominally informed by a set of roughly common criteria. However, for Environment Canada (and for other departments), this process involved agenda-setting as retrenchment and it included significant cuts in its scientific staff and research (Environment Canada, 1999).

The third agenda-setting dynamic of the 1990s was the introduction (as part of an approach to reinvented government) of managerial requirements for business plans and performance targets. Intended to be a regular normal part of management, it also constitutes a form of agenda-setting, albeit clothed in the ethos and terminology of business-like government.

Thus Environment Canada, as the lead federal environmental policy department has certainly had experience with numerous kinds of agenda-setting efforts. The published analyses of these exercises do not tend to focus on the environmental R&D elements or on the extent to which R&D criteria or science-based priorities drove overall environmental priorities. It would be surprising, politically and institutionally, if they did in any reliable predictable way.

A useful example here is that of acid rain as an R&D and pollution priority versus pulp and paper effluents (Doern and Conway, 1994, Chapter 7). In Environment Canada's very earliest days, the pulp and paper industry and its pollutants were quickly identified by Environment Canada's regulators and scientists as a logical highest priority area for R&D and for regulation. But it took almost two decades for real action to occur partly because of industry counter-pressure but also because of complex federal-provincial relations involving virtually every province. Acid rain was certainly seen as a serious pollution problem but it arose on the R&D and the policy agenda at a more accelerated pace than pulp and paper, in part because it was a useful and strategic issue for dealing with Canada-U.S. relations. Both the acid rain and the pulp and paper cases are more complex than this but, when seen in terms of issue management and agenda-setting, there is no doubt that they reflected some of the key aspects of agenda-setting raised by Kingdon, including the taking advantage by policy advisors (including scientists) of policy windows such as summit meetings between the Canadian Prime Minister and the President of the United States.

But there were also changes in the last decade or so which suggest that environmental agenda-setting is different from other kinds of policy agenda-setting. The core change is linked to the emergence of the sustainable development paradigm as the overarching way of thinking about the environment and the environmental agenda (Toner, 2000). This change immediately broadens and extends the agenda-setting process, first because within the government it is unambiguously horizontal and multi-departmental in nature. Second, it is by definition more preventative and hence implies that a capacity exists for identifying problems before they occur. Third, it is inter-generational because it implies processes that will allow the interests and needs of future generations to be taken into account so that sustainable development can occur. These changes are now a part of environmental policy making and have certainly been incorporated in some aspects of environmental policy making. But, as must be stressed throughout this paper, it is not sufficient to simply speak of environmental policy making. We are dealing with agenda-setting which is conceptually and qualitatively a different type of activity to think about and plan processes around than normal policy making.

Is Environmental R&D Agenda-Setting Different?

The fifth and final linked issue about agenda-setting is to ask whether environmental R&D agenda-setting is likely to be much different than the other levels profiled above. And again, the first answer is that in many respects it will likely be characterized by similar dynamics arising from normal agenda-setting and from environmental agenda-setting.

Given that this realm of agenda-setting is about R&D then a key potential difference may arise over whether environmental R&D is different from other kinds of R&D. This does bring us back into the discussion above about sustainable development in that R&D which is policy or socially relevant in anticipating, inter-generationally, the need for new government policies, rules, or guidelines is different in scope and scale. Another difference may be that environmental R&D is likely to be more interdisciplinary in nature in that it often does pose problems that cannot be dealt with through the intellectual frameworks of traditional scientific disciplines, and that such interdisciplinary crossovers include the social sciences. Another difference may be inherent in devising and communicating research priorities which assess inter-generational impacts and which are likely to include the need to think about both substantive science and technology but also research on the invention of effective new institutions of democratic control and long term efficacy (e.g. the long term storage of nuclear wastes; or climate change policies).

Another possible difference, though it has some parallels elsewhere, is that environmental R&D agenda-setting must be increasingly networked, partnership-funded agenda-setting between the needs, priorities and interests of government scientists, academic scientists, and business-based scientists.

We resume discussion of some of these and other themes in the final concluding section of the paper. But first, we need to look at our three case studies in federal R&D agenda-setting.

THREE FEDERAL R&D AGENDA-SETTING CASES

In this section, we sketch, with the aid of Table 2, some key features of three federal and/or national R&D agenda-setting process case studies: the National Forest Science and Technology Course of Action; the Canadian Agri-Food Research Council National Strategy for Agri-Food Research and Technology Transfer; and the processes regarding the formation of the Canadian Institutes of Health Research (CIHR). Where appropriate, we also set some context for these sectors/realms of policy and R&D garnered from published sources other than the federal departments concerned. Each descriptive profile provides some contextual information about the area and approach, a brief description of the program, some potential lessons from the process used, and some sense of the broader expected outcomes and nature of the process. For the most part, we let the agencies involved speak for themselves (through quoting their reports and website material) about what these exercises were about.

We leave to the concluding section of the paper, our own overall views about these experiments/exercises when seen in relation to our five key issues of agenda-setting and then in relation to options and constraints. Nonetheless, we have no difficulty in agreeing in a general way with the observation that "In recent years, specific research communities in Canada and the United States have made real progress in creating research priority and planning systems. In Canada, there is evidence of success in the agriculture and forestry research sectors" (Environment Canada, 1999, p.25).

Table 2: Summaries of Three Federal Case Studies on R&D Agenda-Setting

	The National Forest Science and Technology Course of Action	Canadian Agri-Food Research Council (National Strategy for Agri-Food Research and Technology Transfer)	Canadian Institutes of Health Research (CIHR)
Description of Program	The Course of Action, to be incorporated into Canada's National Forest Strategy, will meet the critical needs for sustainable development of the forest itself, the forest industry, and the communities that depend on the forest.	In 1992, the Canadian Agri-Food Research Council (CARC) developed a five year strategy for agri-food research and technology transfer in Canada, through consultation with the Canadian agri-food sector. The national strategy, which was presented to the Ministers of Agriculture has provided direction for program development in the agri-food sector for the last five years.	CIHR is Canada's major federal funding agency for health research. Its objective is to excel, according to internationally accepted standards of scientific excellence, in the creation of new knowledge and its translation into improved health for Canadians, more effective health services and products and a strengthened Canadian health care system.
Lessons from process and machinery	• Wide consultations increased buy in • The key to maintaining effective public participation is the development of better models for public input, with processes and mechanisms that are clearly defined, fair and open, with deadlines for decisions and with a review of results that will ensure the accountability of those responsible • Science commitments expressed in the strategy were not fully embraced partly because of a lack of mechanisms to bring the forest research communities together to further consider and pursue science needs. • The National Forest S&T Course of Action has incorporated the underlying principles that represent the values of the partners. • Of prime importance to the partners is that research undertaken in the Course of Action be client driven and that the effects be evaluated and communicated to all stakeholders. • Coordination among members and the development of partnerships and networks is important • A combination of public and private sector skills, funding, and management systems through partnerships may provide the most effective model for enhancing technology • Research must be coordinated	• Wide consultations were carried out to shape and direct the initiative. • A large committee structure involving industry, university and provincial and federal governments allows for a dialogue between the partners.	• The Canadian Institutes for Health Research got off to a strong start because it was an innovative policy solution that was built into a clear mandate. • Widespread consultation allowed for the sharing of ideas and building of support for the initiative.
Expected Outcomes	• Improved linkages between public, government and industry • Forestry priorities that reflect broader interests • Increased public knowledge of forestry issues • Improved communication among stakeholders • Increased public participation • Increased buy in	• Increased partnerships and networks among industry, governments and universities • Improved dialogue • Assist the agriculture and food industry to be: globally competitive, environmentally sustainable and socially responsible. • Broad consultations • Identification of issues and opportunities to be addressed through agri-food research and development. • Identification of major priority areas. • Rating of priorities according to impact, urgency and capability • Increased consensus on research prioritization in Canada.. • Leadership in coordination and networking of research and technology transfer	• Strong leadership from CIHR in Health Research • Improved Coordination of Health Research • Improved working relationship between CIHR and partners including provincial and territorial governments, voluntary health organizations, universities, hospitals, the private sector, and the international health research community. • Allows for input from stakeholders in health research priorities

National Forest Science and Technology Course of Action

We begin our examination of federal R&D agenda setting with the National Forest Science and Technology Course of Action. But this exercise must first be put in the context of the key role of forestry, and indeed of natural resource and environmental policy in general. Forestry is an important part of Canada's economy and was regulated by the federal government until 1930, when regulatory control was transferred to the provinces (Hessing and Howlett, 1997). The federal government maintained control over fisheries and Indian affairs, both of which may have major impacts on forest regulatory actions. It has also been active in forest policy, dealing with issues related to climate change, establishing an international system of model forests, as well as establishing criteria, indicators, and certification standards for sustainable forest management practices. Historically, the main role of government was to manage forests to ensure timber flows to support the pulp, paper and lumber industries. Recently, the rise of environmentalism and increased public interest and activism have led to changes in forestry policy. "Changing values are driving many new policy initiatives in Canada's forest sector. In addition to timber outputs, forests have come to symbolize the health of the planet, are recognized as a source of biodiversity and provide many environmental services, such as carbon sequestration, and water and air filtration. Accordingly, the public is increasingly concerned that forests are managed to provide a full range of services" (Luckert and Salkie, 1998, p.S7). Sustainable development has been largely adopted as a policy goal by provincial and federal forest departments and agencies. The concept involves providing equal consideration to economic, social, and environmental facets of development in decision making (Globerman, et.al., 1998). This has involved a move from focusing solely on timber values and maintaining flows to support fibre production to focusing on multiple values in the forest (Adamowicz and Veeman, 1998).

External pressures have also dictated changes, and we find the forest industry in a state of transition. As Luckert and Salkie stress, "As part of an increasingly global marketplace, Canada's domestic industry cannot be insulated from changes elsewhere. Some of these changes, such as increasing environmental activism, are also part of the Canadian landscape but others, such as changing patterns of trade, are exogenous influences on our domestic industry" (Luckert and Salkie, 1998, p.S7). This results in new challenges in public policy. External pressures require the industry to be more competitive and responsive, while internal influences call for more inclusive consultations in the setting of values and uses of the forest that often contradict those of the industry. "The challenge to policy makers in Canada is to remain flexible enough to respond to changes in public values while ensuring that the forest products sector remains competitive and able to respond to international pressure" (Luckert and Salkie, 1998, p.S7).

In response to these kinds of overall changes, the Government of Canada, in consultation with stakeholders, developed The National Forest S&T Course of Action (Canadian Forest Service, 1998). Under the sponsorship of the Canadian Council of Forest Ministers (CCFM), a federal-provincial ministerial-level body, forestry

researchers and stakeholders crafted in 1997-98 a National Forest Science and Technology Course of Action. This " R&D agenda" or "course of action", is being incorporated into the National Forest Strategy (NFS) , so as to meet the critical needs for sustainable development of the forest itself, the forest industry, and the communities that depend on the forest. It is also intended to help Canada meet its international commitments such as the implementation of criteria and indicators for sustainable forest management. At the same time, "it will ensure that the S&T community shares the vision and goals of Canadians as expressed in the NFS" (Canadian Forest Service, Website , 2001). A clearly articulated vision and stakeholder buy- in are deemed important to the success of the initiative.

The National Forest S&T Course of Action responded to the public policy challenges facing the forestry sector in four major ways. First, the course of action helps create, maintain and co-ordinate a network of researchers, forest companies, communities, public interest groups, and governments. Second, the course of action allows for public input into the agenda setting process. Third, a communication mechanism has been created under the course of action to facilitate information sharing between a wide range of stakeholders. Finally, the course of action assists with research.

The National Forest S&T Course of Action is a good example of what is known as the governance perspective. "The starting point for the governance perspective on partnerships is the belief that governments alone can no longer make public choices. For some, this is a matter of ideology and reflects a particular conception of the role of the state. For others, the belief is based more upon a practical assessment of the capacities of governments in a fundamentally different era. Regardless of the underlying rationale, the conclusion is the same: there is a need to shift from thinking about governments to thinking about governance and the notion of governance systems" (Environment Canada, 2000, p.4). Several developments lead to the increasing importance of the governance perspective. First, globalization and the information revolution have made information more easily accessible and stakeholders more connected. Second, as government is increasingly asked to do more with less, it has had to look at alternative service arrangements to deliver services. Third, the horizontality of many government initiatives has helped place a premium on partnerships between departments, governments, academia and industry. Finally, changes in citizen expectations, especially expecting transparency and participation in the process have contributed to the importance of the governance perspective (Environment Canada, 2000, p.4).

"In the governance perspective, the new world of policy – and decision-making creates key challenges. It puts a premium on integrating diverse policy fields in order to balance a range of needs and interests. It creates momentum to redesign of the machinery of government around citizens. It also creates pressure for the development of new approaches, tools and instruments for policy –and decision making, especially for "working together" through partnerships" (Environment Canada, 2000, p.5). We have seen examples of this type of partnership within the National Forest S&T Course

of Action, where the need for public input lead to a restructuring of the decision making process, and new partnerships and approaches were used to help set priorities and solve problems.

The National Forest S&T Course of Action has incorporated the underlying principles said to represent the values of the partners. Of prime importance to the partners is that research undertaken in the Course of Action be client driven (our emphasis) and that the effects be evaluated and communicated to all stakeholders. To facilitate this, a network has been created between researchers, forest companies, communities, public interest groups, and governments will identify and facilitate opportunities for linkages and networking at the regional and national levels, receiving community forestry and public input and capacity building (Canadian Forest Service Website, 2001). The plan provides for action to be taken to promote awareness of forestry issues, encouraging and supporting projects and programs for students, public forest and mill tours, networking among government officials, specialists and others, working with Aboriginals, the media and the public and other stakeholders. The plan also calls for steps to maximize the profile of National Forest Week and other national or provincial initiatives to sensitize the public to forestry issues. The network will keep the action plan on track and representative of the needs of the stakeholders.

The agenda statement emphasizes that the role of the government is broader than simply participating in the network and partnerships and that "... governments must ensure that the capacity and skills for the effective design, delivery and evaluation of public sector S&T policies and programs are in place. A combination of public and private sector skills, funding, and management systems through partnerships may provide the most effective model for enhancing technology" (Globerman, 1999, p.40). For the course of action to be a success, it must capitalize on these factors.

While the ultimate responsibility for management of public forests rests with elected governments, all jurisdictions recognized the need for more direct public input. Public participation was seen as one of the keys to success of this initiative. There are three related roles for public input into the process. First, public input is required to help set the overall agenda priorities. Second, public input is needed to determine non-timber values and finally, public consultations can be used to help settle disputes. Hence, in this agenda-setting case study, it was recognized that the key to maintaining effective public participation is the development of better models for public input, with processes and mechanisms that are clearly defined, fair and open, with deadlines for decisions and with a review of results that will ensure the accountability of those responsible for the welfare of forests (Canadian Forest Service Website, 2001). Another challenge involves "Improving public involvement is particularly important in the case of Aboriginal communities whose traditional management strategies involve the use of the entire forest area for hunting, trapping cultural and spiritual activities, as well as timber harvest" (Adamowicz and Veeman, 1998, p.S57). The overarching goal of public involvement is to allow the forestry agenda to reflect values held by those outside the forestry industry and government.

Public input is also required to define non-timber values. Forest management needs to integrate timber and non-timber values to achieve the optimal mix of ecological and social service from a land base. This requires a different form of public involvement. Public participation would have to occur at various scales and would differ depending on the issue being addressed. At the local community level, involvement of public advisory committees would continue to service the needs of governments and the forestry industry for local planning guidance and for local support of the industry's activities. On a broader scale, public participation had to be the key element in understanding non-timber values. Values associated with such uses of forest lands as hiking, hunting, fishing, etc., would be derived from structured public input and data-gathering techniques such as surveys (Adamowicz and Veeman, 1998, p.S57). Public engagement was needed to ensure that the views of the public are considered in forest management planning and decision-making. This involves consulting with public and private agencies to review and, where appropriate, revise strategic forest policies to ensure they continue to meet the requirements of sustainable forest management.

Finally, public participation will be required to help settle disputes. The course of action will help "Develop and refine models of public consultation and conflict resolution that will allow for exchange of information and views that improve understanding among interested groups and lead to mutually acceptable solutions" (Canadian Forest Service, 1998, p.11).

A third broad goal of the strategy was to improve communications. The parties therefore agreed as a key part of the agenda to establish a Canadian Forest Sector S&T Network to ensure continuing dialogue and collaboration among interested parties on forest S&T in Canada. One priority of the network is to foster the coordination among members to develop the partnerships and networks and expertise needed to implement, evaluate, and revise the National Forest S&T Course of Action (Canadian Forest Service Website, 2001). More tangibly, "The establishment of this national strategy for forestry science and technology has resulted in FORCAST, a private, not-for-profit national coordination and communication mechanism that provides direction and infrastructure to ensure that forest science and technology is aligned with national priorities established in the National Forest S&T Course of Action" (Environment Canada, 1999, p.32). Improved communication will try to keep all interested parties up to date on the initiative.

The earlier Canadian National Forest Strategy (CNFS) had already been a reasonably good example of how partnerships and collaborative effort could produce national dialogue and action. However, the science commitments expressed in the strategy were not fully embraced partly because of a lack of mechanisms to bring the forest research communities together to further consider and pursue science needs. Science is a fundamental component in achieving the goal of sustainable forest management. Within Canada, many organizations and agencies are involved in forest S&T. The federal government assures research services in forest research, wildlife, hydrology, fisheries and remote sensing, among others. Several provincial governments carry out research programs related to operational forest management.

Academic research also plays an important role. There are forestry faculties in seven Canadian universities, and many other Canadian colleges and universities contribute to forest-related S&T. Canadian researchers are changing the way in which forest S&T is carried out by placing more reliance on partnerships and networks. Structuring research in this way enables experts from diverse disciplines to focus on complex problems and supports the development of more integrated techniques and approaches to resource management. Two national initiatives of note for their role in forest S&T are the Sustainable Forest Management Network of Centers of Excellence and the Canadian Model Forest Network. These networks are pioneering new approaches to partnerships among resource agencies, researchers, communities, the public and interest groups (Canadian Forest Service Website, 2001).

This agenda-setting exercise was premised also on a clear view that research aimed at meeting these diverse forestry challenges had to be coordinated. Fiscal constraints had hampered the ability of individual organizations to meet all their S&T needs, and the complexity of the issues added to their difficulties. To increase the effectiveness of each group's efforts, it was recognized through the process of discussion that Canada must adopt a national, coordinated approach to forest sector S&T, linking research on ecological processes, forest management, and new product and processing technology. Research capacity had to be aligned with identified priorities in these areas, and had to ensure an appropriate balance of funding. Success, in short, depended on embracing a philosophy of partnerships and teamwork.

In sum, the forestry policy agenda and its linked R&D agenda process attempted to be driven through a process of open participation in order to allow public and stakeholder input to increase buy in. Networks created will hopefully improve communication and links between the public, government, industry and researchers to help keep the action plan on track and representative of its stakeholders needs.

The National Strategy for Agri-Food Research and Technology Transfer

The Canadian agri-food sector currently contributes 11% of the national GDP and 15% to total employment. Increasing pressures, both domestically and internationally, are demanding that the sector transform its methods of doing business. The future success of the Canadian agri-food sector depends on its ability to be responsive, innovative, entrepreneurial and competitive and understand its markets better and focus more on meeting its clients' needs (Canadian Agri-Food Council Website, 2001). Due to the international nature of the industry, countries will soon have to niche market their products to compete. "One of the realities of the increasing costs of research is that each country will have to be more selective about the science it conducts. Canada, like other countries, cannot afford to continue to try to be the best in all areas of research...foreign partners are moving towards research specialization and are utilizing access agreements to acquire needed technologies developed in other

countries" (Environment Canada, 1999, p.31). Thus, coordination becomes crucially important to ensure the continued success of the sector.

In order to address these concerns, the Canadian Agri-Food Research Council (CARC) was established in 1974 to advise on the state and needs of national programs for agricultural research and development. To lay the groundwork for the future, through consultation with the Canadian agri-food sector in 1992, CARC developed a five year strategy for agri-food research and technology transfer in Canada. The national strategy, which was presented to the Ministers of Agriculture has provided direction for program development in the agri-food sector for the last five years. In 1994, CARC's mandate was augmented to be directly responsible for the coordination of research and development.

"The CARC report tries to balance short-term, industry-driven R&D with broad science knowledge (basic research) necessary to ensure the long-term health of the sector. The strategy has two main themes. First, because funding shortages are making it difficult for any one organization to deliver major research programs alone, the sector must develop more effective and synergistic partnerships. The second theme is improving communication among the various agri-food players and the public." (Environment Canada, 1999, p.31). To address the partnership issue, CARC provides leadership in coordination and networking of research and technology transfer and is a catalyst for building consensus on research prioritization in Canada. CARC fosters the building of partnerships and networks among industry, governments and universities to address issues of mutual concern and to develop collective solutions. In this regard, research and technology transfer is directed to assist the agriculture and food industry to be globally competitive, environmentally sustainable and socially responsible.

In order to set the agenda for the strategy a Council consisting of 37 members, (50% industry and 50% university and governments) was created. To ensure a broad range of input, CARC also has an extensive committee system consisting of provincial, national, standing and sub committees. CARC's national and provincial committee structure has more than 800 participants from across the country who identify issues and opportunities to be addressed through agri-food research and development. On an annual basis, CARC's Priority Setting Committee, with the assistance of the committee system, identifies major priority areas. Priorities are rated according to criteria such as impact, urgency and capability. As part of its objectives, CARC, on a five year basis, updates the National Strategy for Agri-Food Research and Technology Transfer. It also assists industry with the development of sectorial strategies (e.g., dairy, etc.).

In the background consultations for the national strategy "the setting of national priorities was rated low on the impact scale but as the fourth action item overall. The key message of this section was that Canadian research will need to act in a multi-disciplinary fashion with respect to priority setting and to initiate long term strategic planning for research. While many respondents noted that priorities are part of every organization's plans, it was deemed to be important to develop some coordinated and national priorities which will foster increased partnerships in order to mitigate the

impacts of the budget cuts. It was made clear that it will be essential to ensure that the priorities are based on input from all members of the agri-food research community (especially industry), are targeted towards improving Canada's competitive position and are effectively implemented" (Canadian Agri-Food Council Website, 2001). Thus, input from members was key to the strategy's success.

Those consulted commented that duplication could be avoided through national coordination. "Many felt that without a clear coordinated technology transfer system, the technologies will not reach the private sector and that Canada needs to integrate (its) marketing efforts. As Canada places increased emphasis on the importance of technology transfer, it will be inevitable that growing pains will be experienced and that issues such as duplication, lack of national coordination and the lack of clear role definitions will continue to produce some frustration until a standardized system is put in place to handle the commercialization of public sector technologies" (Canadian Agri-Food Council Website, 2001).

In November 1995, federal and provincial Deputy Ministers of agriculture and food departments, met to update the R&D resource data contained in the National Strategy for Agri-Food Research and Technology Transfer. They found that the collective professional resources deployed by federal, provincial, university and private sector organizations to address the technology needs of Canada's agriculture and food industry was estimated at $560 million for research and $190 million for technology transfer (Canadian Agri-Food Council Website, 2001).

In the intervening five years "...much of the national R&D structure has been subjected to acute fiscal pressures. Rationalization of programs and downsizing of resources have become the watch-words and some stock-taking does appear desirable in order to assess the extent of change which has occurred, as well as to evaluate the impact on Canada's research and technology transfer capacity" (Canadian Agri-Food Council Website, 2001). It was found that "The strategic emphasis in both research and technology transfer is even more firmly dedicated to enhancing sector competitiveness. The stewardship of agricultural resources continues to be emphasized, particularly by the provinces. On the other hand, technology transfer to the food industry receives only nominal support. And this is not surprising, given industry's independent initiatives in processed product development and the effective role of the internationally-based machinery manufacturers in transferring new food processing technologies" (Canadian Agr-Food Council Website, 2001).

In sum, the Canadian Agri-Food Research Council is directly responsible for coordinating R&D and technology transfer. Through the national strategy for Agri-Food research and technology transfer, CARC provides leadership in coordinating research and networks. Wide consultations were carried out to shape and direct the initiative. A large committee structure involving industry, university and provincial and federal governments allows for a dialogue between the partners.

The Canadian Institutes of Health Research (CIHR) Process

The process that led to the establishment of the Canadian Institutes of Health Research (CIHR) idea began formally in March 1998. "A Task Force, under the aegis of the MRC, representing the full spectrum of the health research community, proposed to the federal government, a new, unique made-in-Canada model – a family of virtual Institutes – for organizing and funding Canadian health research" (Canada, 2000, p.9). The recommendations flowed from acknowledged shortcomings of the existing Medical Research Council (MRC). As MRC President, Henry Friesen, stated: "The council recognized that it was "substantially at a disadvantage at an international level in terms of support for health and medical research," said Friesen, "and unless the MRC developed a strategy that was more inclusive, it would be left further behind." This led to the idea of replacing the council with a series of a "thematically focused institutes" linked through technology" (Canadian Medical Association Journal, 2000, p.1029).

The federal government took the recommendations seriously and in the 1999 budget, created the CIHR. "Subsequently, an Interim Governing Council (IGC) comprised of 34 distinguished scientists, leading academics, educators, health practitioners, social scientists and representatives of both the voluntary and private sector, was created to provide advice on legislation and on the governance of CIHR." (Canadian Institutes of Health Website, 2001). A broad ranging consultation ensued to create the CIHR. "The IGC launched a Canada-wide request for input as to the initial slates of Institutes for CIHR. This consultation involved a range of input from dozens of universities and other centres of research. The quality of the input and the substantial consensus in some key areas contributed significantly to the IGC's proposed initial slate of Institutes" (Canada, 2000, p.10). By listening and responding to the needs of clients and stakeholders, the project started off on solid ground.

These consultations proved fruitful and encouraged considerable support for the CIHR. As Friesen put it, "Meeting this challenge brought together the largest coalition of interests in the history of our community to shape the vision. Canada's health researchers, beginning with the members of the Medical Research Council of Canada (MRC) and including, among many others, clinical investigators across the country, have shown tremendous commitment and made a compelling case for setting a new path for health research. Of that, we can be proud" (Friesen, 2000, p.19). Widespread consultation coupled with an innovative approach appear to have created a unique solution to a public policy problem.

Part of the CIHR's success is that it has advanced an innovative policy agenda. The mission given to the CIHR through the consultations and approved by Parliament "...is to excel, according to internationally accepted standards of scientific excellence, in the creation of new knowledge and its translation into improved health for Canadians, more effective health services and products and a strengthened Canadian health care system." (Canadian Institutes of Health Research Website, 2001). The CIHR concept is an innovative one - a multi-disciplinary approach organized through a framework of "virtual" institutes, each dedicated to a specific area of focus, linking and supporting

researchers pursuing common goals. Institutes created under the CIHR are not centralized "bricks and mortar" facilities. Instead, these "virtual" organizations will support and link researchers located in universities, hospitals and other research centres across Canada.

In order to learn from past experience, "[t]he CIHR will have a much broader mandate than the MRC. Through a network of research institutions, it will support a wide spectrum of health research, from basic science to clinical research to health services and population health. It will also have a much larger budget — by its second year of operation, the annual budget of the CIHR will be close to $500 million, nearly double that of the MRC..." (Canadian Medical Association Journal, p.1029). The larger budget is important not only to allow for operating and granting funds, but also to show that this initiative is important to the government.

The creation and maintenance of networks is also important to the success of the CIHR. "CIHR will be a modern health research organization that brings together all fields of health research - across disciplines and research themes - into powerful networks of expertise in areas of importance to Canadians. These networks of expertise will be the Institutes of CIHR" (Canada, 2000, p.8). Coordination of the networks will be a challenge for the organization. Its success depends on it. However, whether this will work out completely to the satisfaction of all involved remains to be seen. At present, CIHR programming is still in an early state of development.

The CIHR may be a good example of what is known as the "network of networks" model. "In the network of networks model, each operating business under the overall umbrella would be a research network (which would include federal scientists, research programs and national laboratories) that focused on one or more specific research theme (e.g. wildlife, toxic substances, etc.) Other 'investors' such as other federal government departments, universities, industry and NGOs, could also contribute equity to the individual networks" (Environment Canada, 1999, p.21). Where the CIHR differs from other "network of networks" models is that it does not set national priorities. "CIHR is not a full fledged national research coordination initiative, in that federal labs, industry and others are not full partners in setting policies and programs. There is no attempt on the part of CIHR to determine national health research priorities, and the bulk of its research will still be investigator driven" (Environment Canada, 1999, p.44).

This does not detract from the overall functioning of the model. " The Network of Networks model can work well enough without a system for establishing national priorities; it simply takes as given available funding, research structures and (implicit) research priorities" (Environment Canada, 1999, p.25). One of the reasons for its success may be that the CIHR does not try to set detailed national priorities.

In sum, the Canadian Institutes for Health Research got off to a strong start because it was an innovative policy and agenda-setting process that was built into a clear mandate. Widespread consultation allowed for the sharing of ideas and building

of support for the initiative. The CIHR will continue to co-ordinate and lead health research in Canada for years to come.

* * * *

Each of the above three case studies have been profiled with perilous brevity. Each is different as to point of origin, the contexts of their own separate (but overlapping) fields in the forestry, agri-food, and health sectors, and with regard to whether they were one-off agenda-setting exercises or seemingly continuous arenas for agenda-setting. We have largely relied on the three agency's own accounts of what the process involved and what they have said about it. We leave to our conclusions a further ex-post commentary on these cases through the lens of the five agenda-setting issues.

CONCLUSIONS: THE ISSUES AND THE CASE STUDIES

The purpose of this brief commentary paper has been to explore key issues regarding a national environmental R&D agenda-setting process. It is has been intended as a background paper to assist those involved in Environment Canada and its policy community to appreciate further the nature of key issues in agenda-setting, by which we mean issues that are central to the nature of agenda-setting as a political-institutional activity or phase of policy making and resource allocation.

By way of conclusion and overall final commentary, we now bring together the conceptual issues from the first section of the paper with the three agenda-setting case studies in the second section of the paper. Our brief sampling of the agenda-setting models by authors such as Kingdon, Downs and Howlett alerts us clearly to the central point that agenda-setting in political-institutional settings is far from being a simple rational process. Also, as stressed from the outset, the case studies were only surveyed in a brief secondary manner and with a focus on how the departmental or agency sponsors described them. Hence the main analytical points we make about them can only be regarded as illustrative rather than empirically definitive. Nonetheless, some useful insights can be inferred for further discussion. Our final conclusions and commentary are structured mainly around the issues of agenda-setting. Then further concluding comments about options and constraints, are also offered with a view to understanding further some of the practicalities of agenda-setting.

Issues

We have cautioned from the outset that there are definitional problems in even agreeing on what agenda-setting is. This is not just a narrow semantic issue in that stakeholders and the public may themselves have different concepts in mind. Does

agenda-setting actually involve a process of ranking and then acting on stated priorities? Or is it more loosely viewed as just another exercise in undifferentiated policy consultation? Thus, a useful sense of caution is important even with the descriptions of the exercises revealed by the case studies. A key question is whether these are in fact exercises in agenda-setting in any of the senses discussed earlier. For example, the forestry exercise is called a "course of action" which sounds agenda-like and even quite specific. On the other hand, the agri-food example speaks of developing a "national strategy"....something which sounds much looser and more like a policy development exercise.

With respect to levels of agenda-setting and hence multiple "agendas within agendas" the federal case studies only supply glimpses of this difficulty of multi-layeredness. For example, we do not know enough from our brief case study surveys of exactly how much of the processes launched reflect prior Cabinet-wide, departmental and then perhaps sectoral agendas from within the government. The multi-level nature of agendas and the extent to which they involve "top-down" and "bottom-up" pressures are evident in the case studies. So also is there evidence of the need to take advantage of windows of political and policy opportunity.

For example, the CIHR case shows that agendas were multi-level in that aspects of the process dealt with the state and organization of health policy and research overall, and that key players at the MRC and in Health Canada had already decided in the mid-1990s that reform was needed. Research priorities were also eventually examined (and even ranked) through the consultation process to produce the new CIHR institutes.

The issue of time frames and thematic versus resource allocation agendas reveal interesting examples in the case studies. The available public documentation suggests that the three case study exercises involved more thematic agenda-setting rather than directly allocative agenda-setting. Broad themes such as the need for stakeholder involvement and networked partnership approaches are emphasized, as are ideas about the need for interdisciplinary research and development activity and sustainable development (see more below). But some aspects of agenda-setting in the case studies do seem more allocative in nature and are linked in interesting ways with the question of time frames. The agri-food case study does seem to reveal a direct link to budgetary or allocative decisions, perhaps in part because the agenda-setting process has evolved into what appears to be a regular annual process. The CIHR process was more of a one-off process (to date at least) but it also can be said to have allocative implications in that the clear intent was that resources would soon flow to the new areas of research identified in the determination of the new virtual health institutes.

The case study surveys are more problematical with regard to the issue of expert versus public participation in science and technology agenda-setting. There is certainly good evidence for arguing that the three exercises involved a good range of consultation and involvement by key stakeholder groups and research network partners. Hence expert scientists and R&D managers interacted with key interests. It

is less clear to what extent the public was involved. Each process occurred at different times across the last decade and lasted for various periods of time. During this expanse of time, there were emerging debates about the nature and extent of the public understanding of science in Canada, with more focussed attention in the late 1990s than in the earlier part of the decade when recessions and budget cuts were dominant in public discourse. The public consultation processes used clearly reveal a broadened involvement by stakeholders in part because partnership and network approaches were increasingly in vogue in overall public policy and in science policy as well. A wide variety of approaches were used including normal written briefs, conferences and public meetings. Some Internet-based processes were also used but they do not appear to be the dominant or central processes relied on.

Finally, we come to the issue of environmental and environmental R&D agenda-setting. We initially asked whether environmental agenda-setting is the same as in other policy fields or raises separate issues. We first answered that environmental agenda setting does indeed share the core characteristics of overall agenda-setting present in many other particular policy fields. But we then argued that environmental agenda-setting as a whole may indeed part company with other policy fields. This was so, we argued when one characterized environmental policy as being synonymous with sustainable development policy. When defined as sustainable development, environmental agenda-setting may be more difficult than in other policy fields because it is then more quintessentially horizontal and multi-departmental in nature, preventative in its approach to problems, and also inter-generational in its time frame and scope of concern.

The three cases studies are not, in the first instance, about environmental policy. They are about forestry, agri-food and health policy respectively. But in fact, even our brief survey of these cases must cause us to question whether, in the final analysis, environmental agenda-setting is all that much different than agenda-setting in these other fields. The differences narrow in part because all of these fields have also moved towards, and become a part of, sustainable development policy. Key features of sustainable development were a part of all three exercises, albeit expressed in different ways, and hence they increasingly dealt with concerns about horizontality, preventative approaches, and difficult inter-generational time frames.

The forestry case study certainly was caught up in these aspects of policy and agenda-setting. The agri-food case was somewhat less obviously so, but there are certainly references to sustainable agriculture and of course the larger food debate was becoming involved in issues regarding the role of the precautionary principle.

A similar narrowing of the differences occurs when we relate the three cases to the question of whether environmental R&D is different from other kinds of R&D. The gap narrows for similar reasons to our policy field level comparison above. All R&D in each of the three fields shows that R&D which is policy or socially relevant in anticipating the need for new government rules, guidelines or incentives is increasingly needed. Even the notion that environmental R&D is likely to be more interdisciplinary in

nature than in other R&D realms does not seem to be as true as one might think. The CIHR process case study showed that the whole agenda-setting effort was premised on the need to show that health research and health policy problems could not be dealt with through the intellectual frameworks of traditional scientific disciplines. The forestry case also showed similar concerns and needs.

Options and Constraints

The options and constraints facing the designers of any future national environmental R&D agenda-setting process flow directly from the issues analysed above, depending upon how the issues are ranked and combined and in how one visualizes democratic governance.

One initial set of options and constraints turns on who will conduct and sponsor the R&D agenda-setting process. This option usually turns immediately on how independent or arms-length the process will be. The case studies reveal choices here that range from advisory council sponsorship, to the use of a task force, to the role of a council of ministers (and therefore defacto federal and provincial in scope and nature). All of the cases suggest that it is difficult to structure such a process in terms of political legitimacy if it is operated too close to the federal government parent department or ministry. And yet the lead federal department and ministry may want to control some outcomes regarding any final agenda, especially if it implies an allocative agenda-setting effort.

A second set of options and constraints turns ultimately on the issue of levels and hence "agendas within agendas" and also whether the planned agenda-setting process will ultimately be centred on themes or actual resource allocation, including possibly ranking actual R&D projects. Often this will turn on what to call the process. Is it really about environmental policy and R&D (and the links between the two) or will it really focus on environmental R&D per se. Will the agenda-setting process be anchored around some specific notion of environmental R&D or will concepts of R&D for sustainable development enter the picture? They undoubtedly would, in our view. Specific words may matter a great deal in setting up expectations and because, as we have seen conceptually, all forms of agenda-setting involve the tactical behaviour of policy and science entrepreneurs and stakeholders both within government and outside it. For example, the agri-food case study involved a process where "technology transfer" was a part of the title and hence skews debate and scope in a certain direction and potentially away from the concerns of other stakeholders.

A related option and constraint is the choice of whether the intended agenda-setting process is seen as a one-off process or something that will become continuous and permanent. There are always choices about how one brings such an exercise or set of exercises to an end and also about what constitutes closure and agreement (or disagreement). Is one looking for some formal signatory agreement or sign-off from key stakeholders? If the exercise is about real allocative agenda-setting, is the home

ministry or department effectively and openly willing and prepared to say that it will be bound by these priority rankings or does it wish to preserve its own discretion (and power) on such matters? Must it report back in an accountable fashion showing that funds have been allocated to the agreed R&D priorities?

As has been evident throughout the discussion, options and constraints arise crucially over choices about how extensive the stakeholder versus public versus expert scientist involvement is going to be in the planned R&D agenda-setting process. The wider the level and scope of public involvement (or direct democracy) the less likely it is that the sponsoring department or agency is able to literally confine the agenda process to that of "environmental R&D" in any strict sense. The process is likely, almost by definition, to be very wide-ranging and deal with multiple levels of policy and R&D agenda-setting.

A still further set of choices and constraints (all ultimately linked, but each requiring separate tactical and managerial thinking) include choices regarding: the use of Internet-based tools and fora for participation and exchange; the development of discussion papers (by the department, sponsoring agency and/or by independent experts) that will frame and lay out what agenda-setting scenarios might become the object of discussion in the planned process; and features such as the use or not of intermediaries and facilitators and other choices regarding how arms-length or independent the process might be and might be perceived to be.

Each of these kinds of choices and constraints involve questions of budgetary and staffing resources both for the sponsoring body and equally for the stakeholders which become engaged. In today's political climate there are certainly strong expectations by many stakeholder groups and citizens that Internet-based processes will be used for involvement, feedback, and formal accountability. In some respects, as our earlier analysis suggested, Internet-based processes are seen as a cost-effective way of enhancing participation but such processes also involve other forms of energy and involvement by the sponsoring body which, while valuable, are quite costly in terms of time and the need for dedicated staff.

Inevitably, there are tactical choices also for the sponsoring body regarding its communications strategies and competencies. If the agenda-setting process is indeed being structured as an independent process, and if R&D and science is crucially involved, then very specific thought needs to be given to how the legitimacy and independence of the process is going to be demonstrably shown and defended. Increasingly, for science and R&D agendas and policies, these processes also involve public concerns about the ethics of research.

All of the above issues in agenda-setting and their various combinations of induced choices and constraints yield the overall conclusion that agenda-setting is far more an art than a science. Agenda-setting is a complex multi-level political-institutional activity. Agenda-setting processes are risky to devise and implement because quintessentially they are political in their ultimate content, whether they are

thematic in nature, allocative in nature, or whether a sponsoring agency wants a broad democratic process or a process, the outcomes of which it can control.

Environment Canada should develop its approach to R&D agenda-setting knowing that it is a risky but worthwhile and needed enterprise. It should think through its strategy first by being quite explicit about what the general political-institutional issues of agenda-setting are. And it should then locate environmental R&D within this larger ambit of realities and opportunities. The general trend seems to us to be that, however special or unique environmental policy or environmental R&D might have been, it is increasingly caught up in processes and debates which look more and more similar across policy fields.

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