S&T Excellence in Environment Canada: A Self-Assessment Tool based on the CSTA STEPS report

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S&T Excellence in Environment Canada:

A Self-Assessment Tool based on the CSTA *STEPS* report

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SELF-ASSESSMENT TOOL

to assess the fulfillment of the

Council of Science & Technology Advisors'

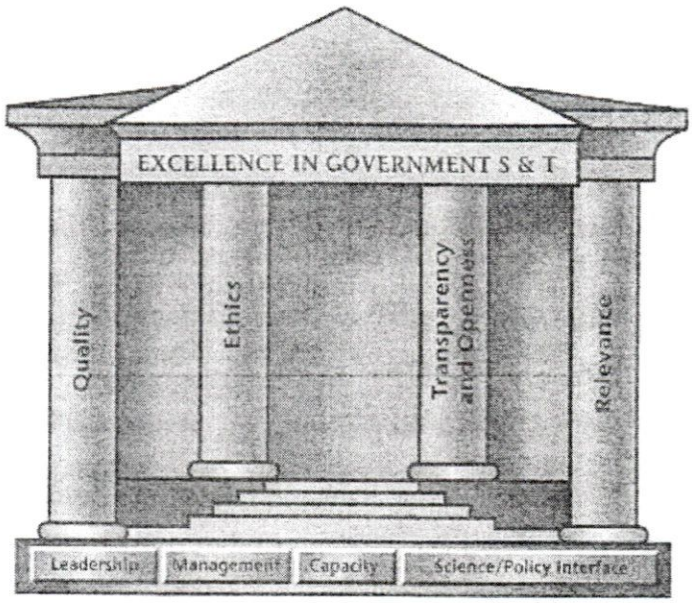
STEPS report.

S&T EXCELLENCE IN ENVIRONMENT CANADA

Background

In August 2001, the Council of Science and Technology Advisors (CSTA) issued a report entitled "*Science and Technology Excellence In The Public Service*", referred to as the *STEPS* report. *STEPS* portrays excellence as follows:

- The foundations of excellence are leadership, management, capacity, and science/policy interface
- The pillars of excellence are quality, relevance, transparency/openness, and ethics.



Objective

To provide S&T managers at all levels with a self-assessment tool for determining how well they, individually and/or collectively, are meeting the expectations of *STEPS*.

Assumption

Accountability for S&T excellence rests with managers at all levels with responsibilities for S&T.

The Context for S&T management at Environment Canada

Making sustainable development a reality in Canada is Environment Canada's mission. EC's mandate to help Canadians live and prosper in an environment that is respected, protected, and conserved was established by the Department of the Environment Act in 1970.

High-quality science and technology allow Environment Canada to address its mission and mandate by undertaking programs in three broad lines of business:

- controlling and preventing pollution in order to secure a *Clean Environment* for Canadians;
- conserving Canada's rich legacy of *Nature*; and
- providing *Weather and Environmental Predictions* that enable Canadians to adapt to changing weather and related environmental influences and impacts.

EC's fourth Business Line, Management, Administration and Policy, supports the delivery of its three principal Business Lines.

Business Lines are, by definition, groupings of departmental programs based on the results they are primarily intended to achieve. This approach focuses effort on the highest priorities and reports progress in terms of real public and client benefits.

Environment Canada's Business Lines are the fora for setting national direction, ensuring national coherence in program delivery, establishing clear accountabilities for results across organizations, and tracking and reporting on performance against Business Line and Departmental commitments. They also provide a shared strategic context for department-wide expenditure management. The S&T capacity of the department is geared to achieving the results articulated in the Business Line plans. These plans constitute contracts between senior managers for achievement of the established targets and commitments.

EC's organizational structure crosscuts Business Lines in a matrix management approach. Using a matrix approach ensures that results, the focus of departmental planning and reporting, are defined in a national context and delivered in an client-centered manner that respects regional differences. The organizational leads are accountable for the delivery of results as set out in the Business Line plans and for management of their organizations.

In defining the "clients" for a particular S&T activity, managers need to be mindful not only of the department's mandate but also of the needs of Canadians and of the broader scientific community. In areas related to the management of S&T, Environment Canada is accountable to:

- bodies establishing overall federal direction on S&T;
- the Auditor General, in the context of the Federal S&T Strategy; and
- Parliament, through the Minister.

In addition, Environment Canada's S&T activities must reflect and respond to:

- Environment Canada's Business Plan;
- federal policies and the Federal S&T Strategy;
- the needs and interests of partners and other stakeholders; and
- other federal and Departmental strategies (e.g., the Environment Canada Sustainable Development Strategy, the Federal Policy on Intellectual Property, etc.).

Approach to developing the assessment tool

The approach recognizes that developing excellence is a process of continuous improvement in which each stage builds on previous stages. To implement the recommendations of the CSTA's *STEPS* report, Environment Canada will build on the department's 1998 S&T Management Framework (See Appendix 1) and the department's ongoing response to the CSTA's *Science Advice for Government Effectiveness* (*SAGE*) report.

The assessment tool is comprised of a group of questions that address each of the elements in the Framework for Excellence that is presented in the *STEPS* report, namely:

i. Leadership
ii. Management
iii. Capacity
iv. Science/policy interface
v. Quality
vi. Relevance
vii. Transparency and openness
viii. Ethics

In addition, there is a group of questions for each of the following elements that are not explicitly mentioned in the *STEPS* report: Knowledge management; Generating revenue; and Commercialization of research results.

In total, there are eleven groups of questions corresponding to the above eleven elements. For the first group (leadership), there are four sub-groups.

The questions are based on:

- The *STEPS* and *SAGE* reports
- The Auditor General's November 1999 Report to Parliament (Chapter 22, Attributes of Well-Managed Research Organizations, which became the basis for articles published in the University of Western Ontario's Ivy Business Journal (Nov-Dec 2000) and the Institute of Industrial Research's (Washington DC) Technology•Management Journal (Nov-Dec 2001)
- Bronson's recent report on best human resource practices in the federal government (prepared for the Council of Science & Technology Advisors)

- Leadership, management and coaching services delivered by Bronson and its Associates
- Articles in the Harvard Business Review's Special Issue on Breakthrough Leadership, December 2001
- BRONSON's work to identify best practices for the above mentioned Chapter 22 of the Auditor General's November 1999 Report as well as other clients, and its work as S&T consultant on numerous Auditor General teams to conduct special reviews of agencies and crown corporations with significant S&T activities (e.g., AECL, IDRC, Museums)

Possible approach to applying the tool

Possible options

1. Encourage each S&T manager, at all levels, to answer the questions as a self-assessment tool, with no obligation to report to anyone.
2. Provide each S&T manager with the option of having an independent / third party to provide them with an assessment report based on using the questions to obtain 360 degree feedback, with no obligation for the managers to disclose the report. [1]
3. Request a sample or all S&T managers to answer the questions and use the responses to prepare an organizational profile and identify cross-cutting or system-wide opportunities for improvement.

Possible instructions for answering the questions

- Suggest or require that each respondent define the scope of the self-assessment. Is the respondent assessing himself for his management of a particular program, or of a particular branch of employees, or for the entire scope of work under his purview?

- Suggest or require that each respondent indicate the relevant practices, programs, or activities that she feels address the particular question she is answering and that form the basis for her rating her response to that question as high, medium, or low.

- Suggest or require that each respondent rate at least 1/3 of the questions as "low" in order to identify the weakest areas. The appropriate follow-up action does not necessary require responding to all the "lows". The 1/3 third guideline helps create distinctions between areas of excellence and opportunities for improvement.

- Do not rate questions that are not considered to be applicable, but indicate

[1] This approach is applied in Environment Canada's National Water Research Institute in Burlington.

briefly why they do not apply. Similarly add questions that are considered to be relevant and important.

Possible approach to responding to the findings

The questions that received a "low" ratings indicate where it may be prudent to make improvements.

Priorities for improvement can be identified by subjecting the following to pre-set criteria:

- Each of the questions that were rated "low"; and / or
- Each of the eleven groups [2] , in which case the rating is based on the questions, within each group, that received a "low" rating

Examples of criteria that could be used are:

- Barrier to achieving desired results
- Significance of the barrier
- Cost-beneficial to apply remedial action

The following is a mock-up of a table that could be used for rating.

Criteria	Questions rated "low" or all eleven groups			

Scope of the self assessment

The first question that each respondent will need to consider is "What is the scope of this assessment?" Is the respondent assessing himself for his management of a particular program, or of a particular branch of employees, or for the entire scope of work under his purview?

1. What is the scope of this self assessment?

[2] The groups being **leadership, management,** etc. – see previous section entitled "Approach to developing the assessment tool".

Questions concerning the foundations of excellence

Leadership

Leadership is about "getting the ladder up the right wall". Authorities in leadership say that effective leaders focus on four roles: Pathfinding (visioning and strategizing), Aligning, Empowering, and Modeling.

Pathfinding

Create a vision that connects what clients are passionate about getting to what we are passionate about giving.

Possible questions: • Foundational element: leadership • First role of leadership: pathfinding	Relevant practices, programs, activities	Rating		
		H	M	L
2. Understands the "client" needs, interests, and priorities as articulated: • through the Department's mandate, • by Business Line Tables, • by other divisions of the department, • by policy and decision makers, • by the provinces, industry, and the public, • by entities to whom the Department provides services? • by other stakeholders whose concerns and interests are aligned with those of the Department? Key stakeholders would agree that their needs and expectations are understood?				
3. Ensures that team members understand clients' needs as articulated in department's vision and mandate and in the Business Line plans?				
4. Identifies the S&T expertise and / or S&T that needs to be accessed or performed to fulfill the results of the Business Line plans and the client needs, interests, and priorities?				
5. Looks for better ways to meet clients' needs? Provides strategic management of Business Line resources to ensure results are delivered as efficiently as possible?				
6. Involves team members in setting vision, direction and goals? Motivates employees to embrace the vision?				
7. Ensures that team members are clear on how to achieve the vision and goals? Translates vision into terms that employees can readily grasp? Links projects and programs to broader Business Line plans and results?				
8. Takes into account both short and longer-term needs and opportunities?				

Possible questions: • Foundational element: leadership • First role of leadership: pathfinding	Relevant practices, programs, activities	Rating H	 M	 L
9. Other (specify)				

Aligning

This is about ensuring that expenditures and the efforts of employees are in line (i.e., aligned) with objectives, needs, opportunities and priorities. It requires knowing the "parts" of the system, understanding how the whole system works and then aligning the parts to achieve the vision and goals.

Possible questions: • Foundational element: leadership • Second role of leadership: aligning	Relevant practices, programs, activities	Rating		
		H	M	L
10. Ensures that team members' commitments and activities are aligned with the organization's goals?				
11. Finds innovative ways to improve work processes?				
12. For all work being performed or supported, communicates, to staff and supervisor, how programs and projects relate to Department's business line(s) and client needs?				
13. Establishes criteria and then prioritizes, and then selects programs and projects that reflect Departmental priorities?				
14. When prioritizing and selecting projects, takes into account the need for a balance between mission-oriented and non-mission oriented (exploratory) research?				
15. Helps people develop skills they need to perform their jobs?				
16. Ensures people have the information they need to perform the work?				
17. Organizes work groups so that people work effectively, across business lines and services if needed?				
18. Matches the right people with the right jobs?				
19. Aligns rewards, including promotions, with the Department's vision, goals and priorities?				
20. Other (specify)				

Empowering

refers to releasing people's full talent, energy, and contributions.

Possible questions: • Foundational element: leadership • Third role of leadership: empowering	Relevant practices, programs, activities	Rating H	M	L
21. Explains expectations to people and seeks their commitment? Clarifies the desired results? Provides guidelines that specify the parameters and deadlines for accomplishing the desired results? Establishes boundaries within which people should operate?				
22. Encourages people without being controlling or manipulative?				
23. Gives people flexibility to determine best method for accomplishing work? Does not make decisions that others should make?				
24. Is open to ideas that others suggest? Ensures there are adequate channels for individual employees, stakeholders, and members of the public to aid in issue identification?				
25. Ensures people have the resources to complete their jobs?				
26. Allows people to be responsible for their work?				
27. Other (specify)				

Modeling

relates to building trust and "walking the talk".

Possible questions: • Foundational element: leadership • Fourth role of leadership: modeling	Relevant practices, programs, activities	Rating		
		H	M	L
28. Earns the trust of others?				
29. Communicates openly and honestly?				
30. Strives for excellence?				
31. Does not undermine others?				
32. Is loyal to the persons who are absent?				
33. Keeps promises?				
34. Other (specify)				

Management

Whereas leadership is about getting the ladder up the right wall, management is about "getting up the ladder as quickly and effectively as possible".

Possible questions: • Foundational element: management	Relevant practices, programs, activities	Rating H	 M	 L
35. Establishes performance targets prior to launching programs and commencing work on projects? e.g., • Evaluation framework • Project milestones				
36. Maintains clear focus on priorities?				
37. Seeks people's support for the organization's goals?				
38. Holds people accountable for agreed results?				
39. Makes sure that team is aware of changes that affect their work? Is patient but persistent during times of change?				
40. Acknowledges and learns from his/her own "breakdowns" / mistakes?				
41. Helps others learn from mistakes? Allows people to declare breakdowns and admit mistakes? Decouples project and personal failure?				
42. Demonstrates an understanding of the risky nature of S&T activities (i.e., the need to take risks, to maintain a balance of less risky and more risky projects, and to expect failure)? Can assess risks and weigh risks against possible benefits and costs? Communicates that assessment effectively with staff?				
43. Takes time to teach people?				
44. Resolves issues and makes on-time decisions?				
45. Provides regular feedback and seeks input? Remains at the center of the action?				
46. Considers impacts on other parts of the system and long-term implications when making decisions?				
47. Builds effective relationships within and outside the organization?				
48. Gives recognition for positive performance?				

Possible questions: • Foundational element: management	Relevant practices, programs, activities	Rating H	M	L
49. When improvement is necessary, addresses and resolves issues in a constructive way?				
50. Ensures that there are clear milestones for projects, and that the milestones become more stringent as the project progresses? Incorporates risk assessment and defines cut offs in advance?				
51. Applies specific measures to ensure a supply of, and to attract, persons with the required skills?				
52. Applies specific measures to retain high performers and deal with non-performers?				
53. Establishes policies, procedures, rewards and environment that result in the effective delivery of results that require contribution from two or more different organizations (often referred to as horizontal projects, issues or files)?				
54. Ensures that staff are provided the training necessary to perform their jobs and to increase their contribution and value to the organization?				
55. Evaluates progress and performance through various means? e.g., • Monthly or quarterly in-person reviews? • Self-assessment exercises • Independent evaluations • Surveys				
56. Other (specify)				

Capacity

In order to address current and emerging needs, you need to have the right people, proper facilities and sufficient funds.

Possible questions: • Foundational element: capacity	Relevant practices, programs, activities	Rating H	 M	 L
57. Anticipates and identifies clients' needs and expectations in conjunction with requirements based on Business Line plans, through such means as gathering intelligence, consulting with users and analyzing trends affecting clients' (and their stakeholders') and as well as scientific / technological development and trends?				
58. Determines the S&T activities that need to be undertaken and the expertise needed to perform those activities, in order to address the clients' needs and expectations?				
59. Determines the core in-house expertise needed and seeks external expertise to complement in-house capacity as needed?				
60. Ensures in-house expertise exists to identify, assess, and communicate science from external sources?				
61. Develops a business case for required resources and is effective in marketing the business case to decision-makers and influencers?				
62. Identifies and pursues innovative methods to acquire the necessary resources and to leverage resources through collaboration and partnerships?				
63. Attracts / retains people based on explicit criteria such as: (a) need for expertise in an area of importance to user / stakeholder needs; (b) need to have in-house expert to provide objective, confidential and timely advice; (c) most cost-effective option (compared with relying on universities or industry)?				
64. Where necessary, is proactive in developing a supply of, and attracting, people in critical areas? e.g., collaborates with universities (e.g., supervise graduate students), hires students (all levels), collaborate with granting councils (e.g., top-up scholarships), networks at conferences.				
65. Uses available resources to leverage external resources to enlarge the organization's utility and impacts?				
66. Develops people at all levels including technicians, scientists and S&T managers? (also, see questions under leadership and management)				

Possible questions: • Foundational element: capacity	Relevant practices, programs, activities	Rating H	M	L
67. Ensures that critical expertise is not lost? e.g., finds the funds needed to hire young scientists and work with the older scientists before they retire.				
68. Identifies and plans for emerging issues?				
69. Other (specify)				

Science-policy interface

The federal government requires good science for decision-making, minimizing controversies, and capitalizing on opportunities. Given that scientists and policy analysts / decision-makers operate in different paradigms, this requires that there be an effective interface between them.

Managers are advised to consult the document "*Implementing the Principles and Guidelines of the Framework for Science and Technology Advice: A Guide for Science and Policy Managers*". That document provides a self-assessment guide focused on the science advice process. The questions below address the major points from that guide that pertain specifically to S&T managers.

Possible questions: • Foundational element: science-policy interface	Relevant practices, programs, activities	Rating		
		H	M	L
70. Establishes mechanisms / processes to ensure the effective use of science and science advice by decision makers? (Do these mechanisms adhere to the requirements in the Framework for S&T Advice?)				
71. Establishes effective relationships with policy analysts and decision-makers? Fosters interaction and team spirit between scientists and policy analysts, decision-makers and stakeholders?				
72. Identifies and communicates issues in a timely matter? Works with policy and decision makers to identify issues and to scope out questions that need to be addressed?				
73. Provides value to decision makers and policy makers through such means as anticipating and clarifying issues, providing advice and input in terms that the client can understand, stating assumptions, and explaining uncertainties and risks?				
74. Is inclusive in the development of science advice such that scientific input provided is based on a multi-disciplinary perspective and addresses the weight of evidence and schools of thought? Involves internal, external, and international experts as needed as well as persons who can provide views on scientific findings based on their experience and observations? e.g., Aboriginals, Fishermen, Hunting Guides? As well, involves persons who are adept at working on the interface between science and policy? Assesses input for conflicts of interest and biases?				
75. Nurtures scientists' commitments by keeping them involved and informed about the use of science in decision making? Deals constructively with differences of opinion?				

Possible questions: • Foundational element: science-policy interface	Relevant practices, programs, activities	Rating H	M	L
76. Reviews key decisions to determine whether new science knowledge affects the science advice that was provided? Alerts policy and decision makers to new findings? Helps monitor and evaluate the effectiveness of policy decisions?				
77. Other (specify)				

Possible questions concerning the pillars of excellence

Quality

deals with content of the research output and science input to policy development and decision-making. The quality of the service is addressed in the previous section concerning science-policy interface.

Possible questions: • First pillar of excellence: Quality	Relevant practices, programs, activities	Rating		
		H	M	L
78. Ensures all science and science advice is subject to due diligence procedures (i.e., rigorous internal and external review; assessment of all findings, analyses, and recommendations of science advisors)?				
79. Applies appropriate measures by which to assess the quality of the work?, e.g., • Publishing in world-class refereed journals • References by external scientists to papers presented at conferences and published in journals by scientists within his/her organization • Survey of stakeholders, clients and partners • Number of patents secured • Number and significance of technology transfer agreements • Invitations to participate on international committees				
80. Conducts independent assessments of impact of the research and of the effectiveness of the organization?				
81. Seeks input from clients and stakeholders on the quality of the input and advice being provided as well as the clients' criteria for quality? (e.g., Clients may be more concerned about timeliness than perfection)				
82. Applies external peer review to reports prior to the reports being released and made available to the public?				
83. Reviews the appropriateness of the S&T being performed to meet the clients' needs through such methods as: • "Walk-through" reviews by independent scientific authorities and feedback from independent technical advisory panels? • Benchmarking against comparable organizations as well as others?				
84. Other (specify)				

Relevance

requires that the S&T performed is aligned with departmental and government mandates, missions and priorities. Relevance also requires that there be a user (outside the S&T community) who can or should be able to confirm that the S&T is relevant.

Possible questions: • Second pillar of excellence: Relevance	Relevant practices, programs, activities	Rating		
		H	M	L
85. Spends time explaining, to employees, the Department's vision, goals and priorities, as well as the developments and trends that influence the Department's needs and priorities? Articulates how projects and programs fit in?				
86. Anticipates and identifies clients' needs and expectations, through such means as gathering intelligence, consulting with users and analyzing trends affecting clients' (and their stakeholders') and as well as scientific / technological development and trends?				
87. Expects proponents of research projects to consult with clients and scientific authorities?				
88. Applies processes to review portfolio of planned and ongoing S&T projects to focus on the needs that are relevant to the department and government? Do these processes involve clients, stakeholders and external scientific experts?				
89. Conducts periodic reviews (e.g., quarterly) with direct reports to assess progress and revisit priorities?				
90. Other (specify)				

Transparency and openness

concern how the S&T organization communicates with its employees and stakeholders. They also relate to the integrity of such communication, i.e., communication that generates trust and respect.

Possible questions: • Third pillar of excellence: Transparency and openness	Relevant practices, programs, activities	Rating		
		H	M	L
91. Consults with employees, clients, and stakeholders on planned changes that affect them?				
92. Involves employees, clients and stakeholders in key decision-making processes and involves them in a manner that is useful, timely, and meaningful to all concerned?				
93. Communicates plans, progress, and results to employees, clients and stakeholders? Communicates results in a manner that demonstrates their quality (e.g., include peer review panel members)?				
94. Demonstrates to employees and staff how science was taken into account in decision-making?				
95. Demonstrates effective leadership in dealing with transparency and openness? e.g., addresses challenges associated with transparency and openness.				
96. Applies various and effective means of disseminating results? e.g., workshops, academic journals, trade magazines, web site, advertising				
97. Requires projects to include dissemination / communication of results as an integral part of the project?				
98. Supports staff training in S&T communication?				
99. Assesses the effectiveness of communications and improves them as necessary?				
100. Other (specify)				

Ethics

are the values and principles embraced by the people in a community. S&T should be guided by ethical considerations that are sensitive to: (a) scientific community (i.e. professional) values; (b) public service values; and (c) community values.

Possible questions: • Fourth pillar of excellence: Ethics	Relevant practices, programs, activities	Rating		
		H	M	L
101.Are the values of the scientific community, the government and the public known? Have they been confirmed in an open and transparent manner?				
102.Is the S&T that is undertaken within the scope of the values of the scientific community, the government, and the public?				
103.Is the S&T performed in a manner that is within the scope of the values of the scientific community, the government, and the public?				
104.Is the S&T evaluated from an ethics perspective? Are the ethics evaluators qualified, independent, and free of conflicts of interest?				
105.Are the ethics-related consequences articulated for decision-makers? Are risks assessed and adequately communicated?				
106.Other (specify)				

Other dimensions not explicitly addressed in *STEPS*

Other parameters (if and where applicable): • Knowledge management • Generating revenue • Commercialization of research results	Relevant practices, programs, activities	Rating		
		H	M	L
KNOWLEDGE MANAGEMENT				
107.Ensures that organizational knowledge is systemically captured, transferred to persons / organizations that need it and recorded for further search and use?				
108.Ensures that the organization is widely known and respected?				
109.Ensures that the relationship between S&T performers and clients is dynamic and ongoing, and is both formal and informal?				
110.Other (specify)				
GENERATING REVENUE				
109.Establishes clear rationale for generating revenue, with knowledge of the impacts and consequences?				
110.Establishes clear goals and strategies for generating revenue?				
111.Other (specify)				
COMMERCIALIZING RESEARCH RESULTS				
112.Establishes clear rationale for commercializing research results, with knowledge of the impacts and consequences?				
113.Establishes clear goals and strategies for commercializing research results?				
114.Other (specify)				

Appendix 1: Environment Canada's S&T Management Framework

The goals of S&T management within Environment Canada are:

- to promote excellence in the performance of environmental S&T in the Department;
- to ensure that S&T activities are clearly linked to broader Departmental planning and priorities;
- to ensure that S&T is effective and that opportunities for integration of S&T conducted throughout the Department exist;
- to ensure that S&T within the Department is conducted in a manner that promotes the public good;
- to give S&T employees opportunities to grow, develop skills and be challenged;
- to ensure accountability for the delivery of S&T throughout the Department;
- to listen and respond to stakeholders, clients, and partners;
- to monitor the effectiveness of the management of S&T resources at Environment Canada; and,
- to promote continuous improvement in the management of S&T at Environment Canada.

Environment Canada's S&T Management Framework consists of eight key elements. These elements define the initiatives, concepts, and activities which are part of S&T management and which are part of the Management, Administration, and Policy business line. In addition, these elements are the basis of the Department's efforts to improve the management of S&T for better support of the other business lines—Clean Environment, Weather and Environmental Predictions, and Nature.

The following matrix relates the elements of the S&T Management Framework to those of the *STEPS* report.

***STEPS* elements**	**S&T Management Framework elements**							
	S&T Management System	Strategic Planning, Coordination, and Integration	Accountability	Partnerships and Alternative Service Delivery	S&T Operating Practices	Management of S&T Laboratories	Managing S&T HR	Communi-cating S&T
Leadership		X						
Management	X				X	X		
Capacity		X		X			X	
Science/ policy interface		X						
Quality			X					
Ethics			X					
Transparency & openness			X					X
Relevance		X	X	X				

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