Research for Human Development
Evolution in the Canadian Research Sector

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<tr>
<td>AAAS</td>
<td>American Association for the Advancement of Science</td>
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<td>AUCC</td>
<td>Association of Universities and Colleges of Canada</td>
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<td>CFI</td>
<td>Canadian Foundation for Innovation</td>
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<td>CHSRF</td>
<td>Canadian Health Services Research Foundation</td>
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<td>CIDA</td>
<td>Canadian International Development Agency</td>
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<td>CIDA INC</td>
<td>Canadian International Development Agency Industrial Cooperation Program</td>
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<td>CIHR</td>
<td>Canadian Institutes of Health Research</td>
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<td>CRC</td>
<td>Canada Research Chairs</td>
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<td>DFAIT</td>
<td>Department of Foreign Affairs and International Trade (Canada)</td>
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<td>DFID</td>
<td>Department for International Development (United Kingdom)</td>
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<td>ERA</td>
<td>European Research Area</td>
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<td>EU</td>
<td>European Union</td>
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<td>FP6</td>
<td>Sixth Framework Programme 2002-2006 (European Union)</td>
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<tr>
<td>GDP</td>
<td>gross domestic product</td>
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<tr>
<td>GERD</td>
<td>gross expenditure on research and development</td>
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<td>HIV/AIDS</td>
<td>Human Immunodeficiency Virus /Acquired Immunodeficiency Syndrome</td>
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<td>IDRC</td>
<td>International Development Research Centre (Canada)</td>
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<td>INCO</td>
<td>International Scientific Cooperation Programme (European Union)</td>
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<td>MMRP</td>
<td>Multi-Annual, Multi-Disciplinary Research Program (The Netherlands)</td>
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<td>NCE</td>
<td>Networks of Centres of Excellence</td>
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<td>NGO</td>
<td>Nongovernmental organization</td>
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<td>NRC</td>
<td>National Research Council</td>
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<td>NSERC</td>
<td>Natural Science and Engineering Research Council of Canada</td>
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<td>NSF</td>
<td>National Science Foundation (USA)</td>
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<td>ODA</td>
<td>Official Development Assistance</td>
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<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
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<td>OSTP</td>
<td>Office of Science and Technology Policy</td>
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<tr>
<td>R&amp;D</td>
<td>research and development</td>
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<td>Sida</td>
<td>Swedish International Development Cooperation Agency</td>
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<td>SSHRC</td>
<td>Social Sciences and Humanities Research Council of Canada</td>
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<tr>
<td>UDCP</td>
<td>University Partnerships in Cooperation and Development Program</td>
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<td>UNDP</td>
<td>United Nations Development Programme</td>
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<td>Unesco</td>
<td>United Nations Educational, Scientific and Cultural Organization</td>
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<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<td>USAID</td>
<td>United States Agency for International Development</td>
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<td>WHO</td>
<td>World Health Organisation</td>
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Executive Summary

The International Development Research Centre (IDRC) is engaged in a wide-ranging review of the context in which it pursues its mandate to support international development research. The authors have surveyed the rapidly evolving environment in Canada for support of research by federal and provincial governments. Through key informant interviews, they have also examined the climate within Canadian academic institutions, including the level of commitment to internationalization and the perspective of administrators and researchers on international development research specifically. The emphasis throughout has been on research for development rather than on development research per se. In assessing the research funding environment, the authors have interviewed leaders of representative funding agencies and the Association of Universities and Colleges of Canada (AUCC). They have also consulted with individuals knowledgeable about the climate for internationalization of research in other developed countries, in the nongovernmental organization (NGO) sector, and in private industry within Canada.

Internationalization has been taken to refer to the extension of domestic research activities to international settings. It includes engagement at the project, program, and policy levels with both developing and industrialized countries, and embraces knowledge creation and translation (research), sharing (education), and transfer (capacity-building). Research on international issues and participation in research networks by Canadian scientists also fall within the term’s scope. Internationalization conveys some elements of globalization, particularly a commitment to a process of worldwide change and human development fueled by knowledge, information, and connectivity.

The research environment

Since 1998 federal government support for research and its associated infrastructure has risen dramatically through increased budget allocation to the federal granting councils and support for associated infrastructure programs, including Canada Research Chairs (CRCs) and the Canada Foundation for Innovation (CFI). Most augmented resources have been directed to basic and applied research within Canada; however, programs are sufficiently broad to incorporate international development research carried out by public institutions, NGOs, or private enterprise. The research sector is well prepared to capitalize on the fact that Canada’s international position is highly attractive to many potential partners and its range of research expertise and diversity of participating disciplines is particularly conducive to international research partnerships.

The overall growth from all sources in gross expenditure on R&D (GERD) in Canada between 1992 and 2002 was $8 billion annually,\(^1\) with a 36 percent increase in GERD as a proportion of Gross Domestic Product (GDP) over the decade. Canadian GERD in 2002 was approximately $18 billion, of which 54 percent was conducted in the private sector, 33 percent in academic institutions, and 10 percent in federal government laboratories and

\(^1\) Unless otherwise indicated, all amounts are in Canadian dollars.
agencies. Only 3 percent of research was carried out in other settings, including philanthropic and nongovernmental organizations. The latter category includes grass-roots support organizations estimated to number 50,000 internationally, many of them represented in Canada, although not usually heavily committed to innovative research.

Most internationally relevant research conducted in Canada, especially that directed to the support of human development, is likely to fall within the purview of academia or government or within public-private partnerships. Research beyond the assembly of population statistics for advocacy purposes does not appear, in most cases, to fall within the mission of Canadian-based NGOs.

Research leaders are almost unanimous in endorsing and seeking greater engagement with international partners. They do, however, feel impeded in this mission by the lack of a consistent policy framework in Canada governing international research relationships and support. An effective mechanism is needed to coordinate diverse government initiatives potentially directed to the support of international research. Such a mechanism might also provide incentives to the investment of industry R&D dollars in international research activities and further mobilize Canadian private sector scientific capacity.

**Strategic directions**

Policymakers should continue their expanded support of domestic research and should be attentive to opportunities for support of Canadian-originated international research in both developed and developing countries. As a component of Official Development Assistance (ODA), federal policy should make an explicit, expanded commitment to support of capacity-building related to science and technology research, social sciences relevant to urbanization and human development, and knowledge translation, sharing, and transfer. The Innovation and Learning Strategy of the Government of Canada should be re-examined from a perspective of internationalization. Provincial governments should be encouraged to provide more explicitly the support needed by universities and colleges for international research roles and responsibilities.

The federal government should recognize the need for additional resources to support the internationalization of Canadian research activities. The need could be met, in part, by the provision of overhead and indirect cost support applied to international research grants and contracts. New programs to build international research should extend the successes of existing programs, such as the National Centres of Excellence (NCE) and the Canadian Foundation of Innovation (CFI), but must achieve greater flexibility to go beyond “big science” and allow investment of fiscal resources in partner countries. Canadian scientists should be supported in their efforts to pursue meaningful partnerships with developing country counterparts, emphasizing true sharing of ideas and power.

**An opportunity for IDRC**

IDRC should attempt, wherever appropriate, to align its research priorities more clearly with the existing strengths of the Canadian research sector. IDRC should not sacrifice its
problem-oriented approach or emphasis on social science, which are major strengths. Nonetheless, IDRC should be more proactive in partnering with Canadian scientists to identify research opportunities linked to positive action.

In the current supportive environment, the Canadian research community and IDRC share an extraordinary opportunity to move Canadian research capacity further into the realm of international development. The success of such a great venture would prove of immeasurable benefit to Canada, its scientists, students, and trainees, as well as to partners in development.
There is no escaping today the results and obligations that flow from the interdependence of nations.  
*Lester B. Pearson, 1948*

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The Canadian academic community has played an important role in the development of Canada’s position in the world, but it has not done enough to translate knowledge into practical tools for sustainable development or useful instruments for policy-makers at home and abroad.

Bringing Canadian universities into a meaningful partnership with other like-minded institutions will be an urgent challenge in the coming months and years.

*Maurice F. Strong, 1996*

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The link between science and technology and economic growth is innovation.

…Innovation is carried out by firms interacting with the other players in a country’s “innovation system” — institutions such as universities and research centres, government departments, educational and training institutions…

*René Simard, 2000*

*****

International academic and research cooperation are (also) advocated as means of deepening our understanding of the challenges Canada's foreign policy must address, and as means of forging ties around the world.

*A Dialogue on Foreign Policy: Report to Canadians. Final Report, June 2003*
Introduction

As illustrated in the preceding quotations, Canada has long declared itself in support of internationalization and Lester Pearson’s view of the interdependence of nations. There has been a parallel commitment to the support of institutions prepared to participate in human development through the management of change and the understanding that comes through research.

In this paper, “internationalization” refers to the extension of domestic research activities to international settings. It includes engagement at project, program, and policy levels with developing and industrialized countries and embraces knowledge creation and translation (research), sharing (education), and transfer (capacity-building). Research on international issues and participation in research networks by Canadian researchers also fall within the term’s scope. Internationalization conveys some elements of globalization, particularly a commitment to a process of worldwide change and human development fueled by knowledge, information, and connectivity.

Since 1948, the Canadian concept of development assistance has gradually evolved from a traditional donor-client view to one of partnership. The paradigm has, however, not yet evolved to the point of giving full recognition to the importance of research and knowledge creation as a part of international aid. Like a rower, we have a clearer vision of the point of departure than of the destination.

The ambiguity surrounding Canadian international development policies extends to the relationship between the federal government and the country’s research sector, especially universities and colleges. In spite of the views expressed by the Strong task force of 1996 or the 2000 Simard expert panel, a comprehensive national partnership has not been forged to support the inclusion of Canadian research and education capacity in the foreign affairs and international trade constellation. This uncertainty is reflected as recently as June 2003, in the final report of the Dialogue on Foreign Policy: Report to Canadians. While research and education are mentioned in passing, neither achieves deserved prominence as a key element in Canada’s future foreign relations.

Increasingly it has been recognized that science is an important foundation for development. The relevant science may come from a variety of sources, ranging from molecular to population-based, from physical to social sciences, from nanotechnology to epidemiology. Research and associated educational activities represent the key to unlocking the potential of developing countries to deal with the central challenges in technological innovation, urbanization, health, agriculture, environmental management, and in good governance and economic development.

It is clear that Canada, with its wide-ranging research expertise and a diverse array of participating disciplines, is well positioned to contribute to a better understanding of these challenges in development. Nowhere is this more true than in the education and research
sectors, where events of the past six years have contributed to a considerable strengthening of university interest in internationalization at the same time that policies of federal and provincial governments have enhanced the research capacity of academic institutions.

The overall growth from all sources in annual gross expenditure on R&D (GERD) in Canada between 1992 and 2002 was $8 billion, with a 36 percent increase in GERD as a proportion of gross domestic product GDP over the decade. Canadian GERD in 2002 was approximately $18 billion, of which 54 percent was conducted in the private sector, 33 percent in academic institutions, and 10 percent in federal government laboratories and agencies. Only 3 percent of research was carried out in other settings, including philanthropic and nongovernmental organizations (NGOs) (Appendix 2).

Unfortunately, while government policies, both federal and provincial, have contributed to a strengthening and revitalization of research, there has been a parallel weakening of Canadian commitment to Official Development Assistance (ODA). Although the tide may now be turning, in 2002 Canadian support of ODA was about 0.28 percent of GDP. A major proportion of Canadian ODA (approximately 40%) is directed to the support of international organizations and agencies and is not available for the support of bilateral activities (country-to-country or institution-to-institution) that are typically associated with research or education capacity-building.

In 2003, universities and colleges have almost unanimously adopted a positive position on increasing internationalization; however, many are stymied in their search for external financial support from Canadian and international sources.

For most of the past 20 years, the International Development Research Centre (IDRC) has stood almost alone as a Canadian agency committed to research in the context of development. IDRC has won a well-deserved reputation for innovation, problem-solving, and for relevance in its interactions with developing country institutions and governments.
Its areas of focus in domains such as agriculture, environmental science, social science, and information and communications technology, have been carefully chosen, and many successful partnership projects have emerged. IDRC has not, however, developed a comprehensively strong relationship with the Canadian research sector. In part, this is attributable to the Centre’s usually explicit exclusion of Canadian institutions as financial beneficiaries from research involvement in its programs. For most of its history IDRC has given no particular attention to areas of traditional strength in Canadian universities. Instead, the Centre has been guided, correctly many would argue, by priorities identified in consultation with partner countries and institutions. While the impact was unintended, this approach has resulted, nonetheless, in some feeling of exclusion by Canadian academic institutions.

Certainly, individual Canadian academics have been frequently involved, to mutual advantage, in IDRC projects and this has led in many cases to substantial connectivity with developing country scientists, institutions, and governments. It has not, however, led to a feeling on the part of Canadian research institutions that they are actively engaged in conjoint planning of an integrated international research enterprise attuned to national priorities.

As part of strategic planning for 2005-2010, IDRC is engaged in a wide-ranging consultation to review the environment in which it pursues its mandate to support international development research. The writers of this report were asked to survey the rapidly evolving environment in Canada for support of research by federal and provincial governments. They were also asked to examine the climate within Canadian academic institutions, including the level of commitment to internationalization and the perspective of administrators and researchers on international development research specifically.

The emphasis throughout has been on research for development rather than on development research per se. The overall assessment of the research funding environment was completed through interviews with leaders of representative funding agencies, the Association of Universities and Colleges of Canada (AUCC), and through consultation with individuals knowledgeable about the climate for internationalization of research in other developed countries, in the NGO sector, and in private industry within Canada.

**Context for International Development Research**

Canada has research capacity and output well in excess of its share of the world’s population or economic productivity. Canada’s science output has been estimated at 4.2 percent of the world’s total and embraces most of the domains relevant to international development. This capacity represents an important, so far mostly unrealized, opportunity.

There is widespread recognition of the importance of science and technology to Canada’s world view. Many of the most important arguments supporting greater Canadian involvement in international research were put forward in 1996 by the task force headed by Maurice Strong. A panel that included many of Canada’s leading international thinkers stated at that time
Canada has an excellent record of engagement with the developing economies of the world, but our knowledge-based activities have been modest. Canadian educational institutions have become increasingly seized of international issues, but often, from an academic rather than from a proactive, policy-oriented perspective. And beyond academia, compared with American and European intellectual investments in international relations, Canada is not a significant player.

The Canadian academic community has played an important role in the development of Canada’s position in the world, but it has not done enough to translate knowledge into practical tools for sustainable development or useful instruments for policy makers at home and abroad. Canadian universities are important players in this field and, regardless of Canada’s future abroad, will remain a permanent feature of the landscape. Bringing Canadian universities into meaningful partnership with other likeminded institutions will be an urgent challenge in the coming months and years (Strong 1996).

Perhaps most importantly, task force advocacy included the following:

A stabilized, innovative, and dynamic community of internationally relevant institutions and the financial support they will need will require the political permission that can only come from public support. Public understanding and support were identified among the most urgent priorities for the very survival of the Canadian capacity to play a constructive international role.

Correctly, in the view of the authors of this report, the task force recognized the threats implicit in 1996 to the institutions destined to serve as the bedrock of tomorrow’s societal needs (technology institutes, research centres, colleges, and universities). In 1996 they were worried that these essential institutions might be reduced to ineffectiveness or lost completely as Canada’s base for contributing to and benefiting from the intersection of knowledge with the new information and communication technologies. To some degree, the task force’s concern with threats to Canada’s research and education infrastructure has now been met by government actions, as described below. It remains true, however, that Canada cannot hope to meet its full obligations for participation in international development without a strong and effective research infrastructure based in government, in the private sector, and in academic institutions. This should include the full and explicit extension of educational and research mandates as required for contribution to international development.

The Canadian advantages for participation in international development activities remain as

- wide recognition of our support for democracy, respect for human rights, and the rule of law, peace, order, and good government
• wide recognition of our national support for ideals of sustainable development, including resource management, environmental protection and conservation, and prudent use of energy

• commitment to a long history of international engagement and goodwill that builds on a confluence of skills, institutions, and industries that combine knowledge sharing, communication, and information technologies.

To these should be added another signature element in the Canadian identity, our collective commitment to better health for all Canadian citizens. This includes a national commitment to maintenance of an outstanding health-care system and to support of the research and educational initiatives required to sustain the health system. It further includes a long-standing commitment to agriculture and food science as required to secure access to reliable and consistent nutrition and food of the highest quality, a key contributor to national health.

It is notable that all of these Canadian advantages for participation in international development are particularly embodied in the mandate of IDRC as it has evolved over the past two decades.

Federal and provincial governments have now responded to the demand for increased support of research infrastructure as described below. They have not, however, responded with corresponding vitality to the demands for greater engagement with international research agendas.

The call for expanded internationalization on the part of Canadian institutions was clear in the publication, A New World of Knowledge: Canadian Universities and Globalization (Bond and Lemasson 1999). While it is clear that university thinking on international engagement has evolved, most of the drive to date has originated at an individual and departmental level. At an institutional level, the focus has been heavily weighted to the development of educational outreach, international student access, exchange programs, and the like.

There has been little in the way of proactive institutional commitment other than the pursuit, in some cases, of partnership related to major science projects. The result has been a somewhat confusing array of international relationships, often tied to pro forma institutional agreements of relatively limited substance. Exchanges of students occur bilaterally without being tied to any underlying sense of strong institutional commitment to programmatic development. In many cases, “sandwich” degree programs have been created, either allowing Canadian students to pursue thesis work in international settings or permitting international students to carry out theoretical work in a Canadian university while completing their research in home-country settings. While these programs are commendable and build an important foundation, they do not lead directly to expanded international research.
In the course of this review, it has been apparent that responsibility for international activities is divided across many fronts at an institutional level. The vice president for research is often responsible for international research agreements, but there are also numerous arrangements managed at the faculty dean level, and there is often an office of international affairs with responsibility for educational exchanges. In a few of the major research universities, there is a strong commitment to internationalization at the presidential level and it is in these institutions that the opportunities for international research engagement are being most actively seized and attracting support from a diverse array of funding sources.

A major contextual development of recent years relates to the recognition that science and technology is a key component of internationalization. The Simard report of 2000 clearly identified the link between science and technology and economic growth both for Canada and for international partners. While the focus of the Simard report is on the concerns of Canada and its developed country partners, it is nonetheless evident that the approaches recommended by the expert panel could readily be extended to international development partnerships and that the Canadian research sector should be expected to play a key role in such outreach activities. Without doubt, research initiatives are central to our ability to capitalize on science and technology as an engine for international economic development.

The Canadian private sector is spending more than $9 billion annually on R&D (Appendix 2) and a portion of this is assuredly directed to international research, especially in engineering, telecommunications, agriculture, and health. While there are some public-private partnerships involving R&D, this approach has not yet featured highly in Canadian initiatives. There appears to be enormous potential for the application of private sector capacity in science and technology to innovation for sustainable development.

Perhaps most important is the recognition that increased investment in health is likely to be a central element in short term economic development. This idea was first advanced in the World Bank 1993 World Development Report and was picked up with enthusiasm by the Commission on Macroeconomics and Health chaired by Jeffrey Sachs. The commission’s 2001 report strongly argues that there is no better investment to be made today than that which would be applied to fighting disease in Africa and other developing countries. HIV/AIDS, malaria, and tuberculosis are devastating the developing world and undermining social and political stability. The developed countries of the world must commit to ongoing proactive research seeking short-term improvements in health and productivity as well as to the practical application of existing treatment interventions and preventive measures essential to longer-term maintenance of public health in these countries. This is the compelling argument put forward by Dr Sachs and his commissioners.

A related theme was taken up in October 2002 by Daar et al. who argued for direction of our collective research energies to the successful application of biotechnology in global health. The authors enumerated 10 biotechnologies that would dramatically improve health in developing countries (Table 1) and it is notable that Canada is already possessed of
exceptional expertise, university, private sector, and government-based, in most of these areas.

**Table 1. The top 10 biotechnologies (rank order based on expert panel scores).**

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<tr>
<th>Rank</th>
<th>Biotechnology</th>
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<tbody>
<tr>
<td>1</td>
<td>Modified molecular technologies for affordable, simple diagnosis of infectious disease</td>
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<tr>
<td>2</td>
<td>Recombinant technologies to develop vaccines against infectious diseases</td>
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<tr>
<td>3</td>
<td>Technologies for more efficient drug and vaccine delivery systems</td>
</tr>
<tr>
<td>4</td>
<td>Technologies for environmental improvement (sanitation, clean water, bioremediation)</td>
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<tr>
<td>5</td>
<td>Sequencing pathogen genomes to understand their biology and to identify new antimicrobials</td>
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<tr>
<td>6</td>
<td>Female-controlled protection against sexually transmitted diseases, both with and without contraceptive effect</td>
</tr>
<tr>
<td>7</td>
<td>Bioinformatics to identify drug targets and to examine pathogen-host interactions</td>
</tr>
<tr>
<td>8</td>
<td>Genetically modified crops with increased nutrients to counter specific deficiencies</td>
</tr>
<tr>
<td>9</td>
<td>Recombinant technology to make therapeutic products (e.g., insulin, interferons) more affordable</td>
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<tr>
<td>10</td>
<td>Combinatorial chemistry for drug discovery</td>
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**Changing Research Paradigm**

There has been significant evolution in the research paradigm guiding all forms of research relevant to development. This is shown schematically in Figure 2. Canadian universities and their international counterparts recognize the need to move with agility from basic and theoretical research to applied research often conducted on a broader basis. Relevant research skills in the latter domain would include sociobehavioural, epidemiology, population health, geography, and environmental impact research.

![Figure 2. The International Research Paradigm.](image-url)
A key feature of the past decade has been the increasing focus of colleges and universities on integrative science that facilitates bridging from basic theoretical research to application. The federal granting councils have explicitly endorsed translational research and knowledge transfer as a principal integrative activity and this is reflected in their research funding decisions of recent years.

If Canadian research is to be transposed to an international platform, it is clear that major emphasis on knowledge translation, sharing, and transfer will be required. Such an emphasis should work to the mutual benefit of Canadian and partner institutions in developing countries.

Present and Future Trends

Research funding

Research funding has expanded exponentially in Canada in recent years, although the total available still falls far short of what is available in most G8 countries. The federal government has announced a target of bringing the Canadian funding level to fifth place in the developed world. Movement in this direction has been achieved through investment in a number of proactive programs for research support, including:

- Networks of Centres of Excellence (NCE)
- Canada Research Chairs (CRC)
- Canada Foundation for Innovation (CFI)
- expanded resources for the federal granting councils, NSERC, CIHR, SSHRC
- Genome Canada
- Western Economic Diversification Canada
- Atlantic Innovation Fund
- Canadian Foundation for Climate and Atmospheric Sciences
- Defence Canada: Chemical, Biological, Radiological and Nuclear Research and Technology Initiative
- tax incentivization to scientific research and experimental development

These programs have already contributed substantially to an improved environment for research in Canada. The CRC program has allowed the recruitment and, in some cases, the repatriation of Canadian scientists. The CFI has supported the acquisition of much needed new institutional equipment and facilities. Nonetheless, the backlog of demands is considerable and most universities are facing challenges related to aging buildings and equipment. The drive for increasing engagement with international research must compete with the pressing and immediate demands of the on-campus research environment.

In the course of this survey very few specific research initiatives relevant to international development were identified that could be attributed directly to increased research council funding or to specific programs such as CFI, CRC, or NCE. Institutions are very much aware of the potential for further development in international research but they are constrained by priorities closer to home. While there is universal praise for the research
development policies of recent years, there is a clear sense that the impact is not yet adequate to push Canada forward on the international stage as a major research player, either in the biggest science and technology undertakings or in usually less costly research relevant to development. There is also growing concern that operating funds have not grown at a pace to match the increased support for personnel, equipment, and facilities.

**Innovation**

There have been urgent calls for expansion of Canadian activity in science and technology as a bridge to economic development. This was most clear in the 2000 report of the expert panel on Canada’s role in international science and technology. This panel recommended the creation of a minimum $150 million fund to be used in support of international opportunities in science and technology. After convoluted discussion, this resulted eventually in an outcome less than what had been envisaged, a CFI international projects competition. Funds were made available to some Canadian institutions; however, constraints on the use of CFI funds limited expenditure outside Canada and most resulting projects were related to cost-sharing of major infrastructure costs on specific projects undertaken with international partners, mostly in developed countries. In the view of some observers, this initiative as originally envisaged was blunted because of uncertainty of the mandate at the Natural Science and Engineering Research Council of Canada (NSERC) and because of internal competition among NSERC, the National Research Council (NRC), and CFI.

Industry Canada and several provincial governments are actively pursuing innovation agendas and are supported in their plans by granting programs such as those of CFI, Genome Canada, Western Economic Diversification, Atlantic Innovation, and NCE. The innovation agendas will ultimately depend for success on adequate underpinning in science and technology, and this will determine potential for international research extension.

There is unanimous recognition among researchers of a pressing need to achieve better integration of these complementary missions and to facilitate conjoint fiscal planning. In the absence of such integration, Canada’s innovation efforts are likely to remain isolated and sporadic and are unlikely to achieve the desired international impact in either developed or developing countries.

**Principal Research Funding Mechanisms**

It is beyond the scope of this review to analyze the funding mechanisms available directly or indirectly for the support of Canadian research. As noted above, the overall funding environment has changed radically in recent years, reflecting the increased commitment of both federal and provincial governments to research and technology support and the growing investment in R&D by private companies. In most respects, the augmented resources have been directed to the support of basic and applied research within Canada; however, grant programs are in many cases sufficiently broad to incorporate, at least partially, international development research. Relevant programs include:
a) Those with particular impact on the academic sector

- Networks of Centres of Excellence
- Canada Research Chairs
- Canada Foundation for Innovation
- Natural Science and Engineering Research Council
- Canadian Institutes of Health Research
- Social Sciences and Humanities Research Council
- Canadian Health Services Research Foundation (CHSRF)
- Genome Canada
- University Partnerships in Cooperation and Development Program (AUCC/CIDA)

b) Those with general, sometimes indirect, impact on the research sector

- CIDA INC
- CIDA Bilateral
- International Development Research Centre
- NGO programs
- Canadian foundations and philanthropies
- International foundations, e.g., Rockefeller, Carnegie, Wellcome, Kellogg
- International agencies, e.g., UNDP, UNICEF, WHO, Unesco
- World Bank
- International development banks, e.g., African, Asian
- scientific tax credits and other research incentives targeting the private sector

The availability of funds to support international research appears better than it has ever been, but universities frequently cite the lack of clear policy directives, the absence of integrating forces, and an inadequacy of internal fiscal resources as major impediments to enhanced university engagement in international research.

**Academic Perceptions of Granting Council Environment**

Interviews with a cross section of Canadian informants (Appendix 1) revealed a high level of awareness in the academic sector of granting council policies relevant to international research in developed and developing countries. There was, in addition, commendation for the commitment made by the federal government to enhanced budgetary support for the federal granting councils. There was wide, although not general, recognition that the granting councils had actively considered their evolving role relative to international research. Most health science universities understand that the Canadian Institutes of Health Research (CIHR) has made a specific allocation to the support of global health initiatives, and joined a partnership in 2002 with Health Canada, IDRC, and CIDA to support a call for health research proposals featuring international partnerships in development.
It is also widely known that the Social Sciences and Humanities Research Council (SSHRC) has undergone a significant transformation, with new emphasis being placed on networking and integrative research that overcomes geography. As part of this process, international engagement has been encouraged, particularly in relationship to two programs, the Major Collaborative Research Initiatives and Initiatives on the New Economy. The Council has also clearly defined support for cultural fluidity in graduate training and is attempting to provide active incentives to international involvement. As part of this transformation, explicit steps have been taken to assure the permissibility of using Canadian research funds in developing-country settings. This includes making resources available for the direct support of faculty members at non-Canadian institutions.

Alone among the federal granting councils, NSERC has not yet taken explicit steps to encourage international engagement by grant holders. There appear to be no direct impediments to international projects; however, NSERC has not yet undertaken the kind of comprehensive strategic and structural review that led to transformations at CIHR and SSHRC.

Other federal government funding research mechanisms, including NCE, CRC, and CFI appear to have a permissive approach to international research, while lacking explicit processes that allow transfer of funds to international partner institutions. Most informants felt that it would be possible for a Canada Research Chair holder to spend considerable time in international settings. The CFI policy support for investments in infrastructure in developing country settings is in flux, although the already endorsed support of the University of Manitoba/University of Nairobi HIV/AIDS research centre may be a prototype.

**International Funding Environment**

This section provides a brief overview of trends in international research collaboration with the developing world to provide an orientation as to how such issues are being addressed in different contexts and policy frameworks.

**United States**

The United States’ approach to science and technology issues internationally is quite distinct from Canada’s; it is more directly considered to be a key element of foreign policy. The Secretary of State, for example, has a science adviser who has been active in representing American science and technology diplomatic interests. USAID (US Agency for International Development) has developed a strategy for science and technology cooperation in relation to the US$5 billion commitment of President George W. Bush for development assistance.

Despite an increased level of activities that are highly focused on specific problems and issues of national security, international science and technology collaboration, particularly with the developing world, nevertheless remains much less funded than the more
traditional foreign trade and aid activities. International science and technology collaboration with developing countries remains ad hoc and poorly coordinated, with the bulk of activities involving developed countries, followed by the newly industrialized economies (Korea, Mexico, Israel, China, Brazil, and Russia), and lastly the low-income countries. Considerable frustration has been expressed by US universities concerning USAID programs, particularly in agricultural development, which have not generally encouraged effective North-South partnerships.

The American Association for the Advancement of Science (AAAS), the National Science Foundation (NSF), and the Office of Science and Technology Policy (OSTP), are all revisiting their approach to international science and technology. The NSF, for example, is suggesting that research excellence must be viewed from a slightly different perspective when reviewing work with the developing world. For this reason, the NSF has explicitly adopted two standards for review: merit and broader impact of the research. US private foundations add a very significant and distinct dimension to the development funding environment for institutions and researchers. The emergence of the Bill and Melinda Gates Foundation has encouraged innovative approaches to development research and has provided a major new impetus for global health research.

**European Union (EU)**

Within Europe, a major institutional reorientation has occurred emphasizing a more integrated approach to research to develop scientific excellence through the creation of the European Research Area (ERA).

The Sixth Framework Programme (FP6) 2002-2006 is the EU’s main instrument for funding research focused on seven key areas: genomics and biotechnology for health, information technologies, nanotechnologies and nanosciences, aeronautics and space, food safety, sustainable development, and economics and social sciences.

The proactive approach is reflected in the four ERA priorities:

- making the ERA more attractive to the best scientists and making it a world-class reference centre;
- enabling European researchers and industrialists to access the knowledge and technology produced outside Europe and also the experimental fields needed for European research;
- integrating science and technology into the implementation of EU foreign policy and development aid; and
- enlisting the scientific and technological resources of the EU and of third countries in initiatives linked to significant world problems or health and major diseases connected with poverty.

The main avenue for research cooperation with developing countries has been the International Scientific Cooperation Programme (INCO), the successor to a number of research for development programs first established in 1983. Under FP6, funding for INCO
partner countries has been partly mainstreamed into thematic priorities, such as New and Emerging Science Technology, with horizontal programing explicitly encouraging the international role of community research, the promotion of innovation, encouragement of participation of small and medium-sized enterprises, and the improvement of human research potential and the socioeconomic knowledge base.

A budget envelope of 285 million Euros is dedicated to fund countries that wish to participate under these priorities. In continuation of the original INCO under FP6, another 315 million Euros are allocated for specific measures in support of international cooperation targeting activities not covered by the designated priorities, but linked to the specific needs of the target countries. In addition, all of FP6 is open to third countries who wish to participate, provided they pay their own way. The budget envelope of 315 million Euros will be divided among the four INCO target regions: Developing Countries, Mediterranean Partner Countries, Western Balkan Countries, and Russia and the other New Independent States. In order to account for their specific needs, annual calls for proposals are managed on a region-specific basis or according to the priority areas established by Council Decision, and refined through bi-regional dialogue and European commitments in international forums.

For the 285 million Euros that can only be used to fund third countries to participate in the thematic priorities, countries with a reasonably functioning research infrastructure will find it easier to be included in consortia on research themes of a more global scope (such as food safety and poverty-related diseases). New instruments such as the Networks of Excellence and Integrated Projects may restrict the participation of most developing countries, given the focus on large and expensive projects that will tend to be dominated by European research teams. Some thematic priorities take a markedly more proactive attitude than others by creating explicit openings for international cooperation, for example, projects focused on water and the environment.

The mid-term review in 2004 will show the extent to which opening of the ERA internationally has had an impact. The EU has also launched the first phase of the European-Developing Countries Clinical Trials Programme, a new program to accelerate the clinical development of drugs and vaccines against poverty-related diseases. The Commission has committed 200 million Euros to this initiative under FP6.

With regard to research as foreign aid, several European development agencies look at research cooperation as an appropriate target for ODA funding. For example, the Swedish international development agency, Sida, through its Agency for Research Cooperation with Developing Countries, plans and implements its research focus along with its action programs and sector policies. In the view of SIDA, positive and sustainable development requires the development and use of new knowledge.

The United Kingdom’s Department for International Development (DFID) has revised its research for development policy to allow institutions located outside the UK to bid on research projects. This policy shift is recent and has not yet led to any major changes in the range of institutions undertaking DFID research, but it will be important to monitor the
impact of this new approach on UK North-South collaboration. DFID has also centralized a large part of its research activities in an effort to optimize its research effort. Programs have been restructured a number of times over recent years.

Dutch development policy was revamped in the early 1990s and one priority became development research. The thinking behind this policy shift was that much development assistance in the South was dominated by donors and the Northern research community, and little of the research funded in the South had relevance for local people. The most illustrative example of the new thinking on research and development policy is the Multi-Annual, Multi-Disciplinary Research Program (MMRP), a program funded by the Ministry of Foreign Affairs. The first such program was established in 1993. The goal of the MMRP is to have Southern partners formulate their own research project proposals, use participatory research methodologies, organize, administer, and manage projects, and disseminate research results. The highest priority is given to capacity-building in the South and to South-South networking.

In the Netherlands the commitment to development research has been translated into action through joint funding by Ministries such as Education and Science, Agriculture, and Health and Environment working with the Directorate for International Cooperation of the Ministry of Foreign Affairs. A practice of having Sector Councils for Research and Development brings together representatives from government, academia, and users of research to provide medium and long-term outlooks on scientific and social trends, and give advice on meshing scientific research with societal needs. The Netherlands Development Assistance Research Council has played a particularly important role in maintaining university-government dialogue. This structure has played a prominent role in spearheading effective targeted bilateral partnerships, for example, on health in Ghana and biodiversity in the Philippines. The effectiveness of this structure in providing a forum for national researchers to promote translation of research to policy makes it worthy of closer examination.

**Overall Environment for Human Development Research**

The following is a summary of viewpoints expressed by key informants listed in Appendix 1. Those interviewed were asked to address the overall environment for research in Canadian institutions and to comment specifically on how recent changes might impact their ability to engage in research with partners from developed or developing countries. The primary focus in these interviews related to the ability or willingness of Canadian universities to capitalize on international development research opportunities.
**Strengths**

- Research funding overall has increased substantially since 1998.
- Granting councils, especially CIHR and SSHRC, are more flexible in facilitating international partnership.
- Canada Research Chairs have allowed appointment of some investigators with career commitment to international research.
- Private sector expenditure on R&D has almost doubled since 1992.
- International research institutions are extremely receptive to the potential for meaningful North-South partnerships.
- South-South partnerships are increasingly successful and amplify the strength of partner institutions.
- Canada’s international profile is attractive to many partners.
- Canadian expertise in information and communications technology, including distance learning, provides a solid foundation for international research.
- Diverse Canadian strengths correspond to many areas of need in international development research.
- Levels of faculty interest are high in most universities.
- Pressure from students is positive for international engagement in undergraduate and graduate programs.

**Weaknesses**

- Provincial funding base of Canadian universities does not encourage internationalization in most cases.
- The position of the federal government on encouragement of international research is inconsistent and mechanisms for support are both inadequate and lacking an integrated policy framework.
- The incentives for tenure and promotion in Canadian universities may work against attracting young faculty members to human development research.
- Criteria for assessment of academic productivity do not favour activities common to development research, including collaborative multi-author reports, commissioned evaluations, and publication in the gray literature or low-impact journals.
- Canadian universities are not explicitly accountable for international research involvement.
- Provincial government funders are unlikely to introduce such an accountability, other than as a component of economic development and innovation initiatives.
- Politically driven innovation agendas do not adequately recognize the opportunities in international science and technology research, either theoretical or applied.
- Synergies have rarely developed among academic, government, and private sector scientists with common interests in international research.
- The federal Department of Foreign Affairs and International Trade (DFAIT) does not provide adequate expert support to the academic agenda or to science and technology activities in developing country settings (or in most developed countries).
• The current support system required for international development research is labour-intensive and not conducive to involvement of smaller institutions.

Opportunities

• The capacity for Canadian engagement in international research is large and exceeds Canada’s share of world population or economic productivity.
• Canada’s international profile is highly acceptable to many potential partner countries, institutions, and researchers.
• Canada’s expertise in fields such as environmental studies, urbanization, health sciences, law, social sciences, information and communication technology, fresh water and oceans, and agriculture is particularly conducive to international research partnerships.
• Policymakers appreciate that greater Canadian involvement in international research would enhance the competitiveness of Canadian institutions and industries on the world stage.
• A greater degree of engagement in international research and education would augment the complement of highly qualified personnel in Canada prepared for international roles and contribute to an enhancement of Canadian connectivity.
• The attractiveness of Canadian advanced education programs for students and trainees would be correspondingly enhanced by greater involvement of the academic sector in international research.

Challenges

• The processes for support of international research by granting councils, CIDA, IDRC, and other government agencies need streamlining wherever possible.
• The three federal granting councils are not all at the same point in evolution of their strategies. CIHR and SSHRC are in transition; however, NSERC has not yet completed a strategic review or developed a formal position on international research funding.
• An international research strategy for Canada will require a balance between investment in developed and developing countries, theoretical and applied research, and humanitarian vs. commercially driven enquiry.
• All stakeholders in Canada’s research sector seek a greater sense of involvement in discussions of international affairs and of international research prioritization.
• A more effective working relationship is required among CIDA, AUCC, and the universities, colleges, and research institutes of Canada.
• Private sector research, mostly intramural, accounts for 54 percent of Canada’s R&D and more attention should be focused on potential public-private partnerships in human development research.
• Universities and relevant government institutions must work closely together to raise public awareness concerning the importance of international research and the Canadian contribution to research capacity in developing countries. Future world security depends on the effective application of knowledge creation, translation, and sharing in support of sustainable economic development. Canada’s roles and responsibilities must be reinforced with the public.
Partnership Opportunities

There is a strong view in the Canadian academic community that success in international development research will relate in large measure to an ability to form meaningful and lasting partnerships.

Within an appropriate funding framework, universities, colleges, and research institutes are prepared to play a catalytic role in fostering North-North, South-South, and North-South partnerships that will provide a receptive environment for research initiatives. The ability of Canadian institutions to undertake significant responsibilities in North-South or South-South partnerships will require continuing realignment of Canadian research funding processes parallel to reforms already undertaken by CIHR and SSHRC.

Significant partnerships and improvements in research infrastructure such as those that have developed in Canada under the NCE and CFI programs provide an outstanding foundation from which further research development could take place. Some senior leaders of major Canadian research universities would welcome an extension of the NCE or CFI programs leading to increased participation of Canadian institutions in international research initiatives in OECD (Organisation of Economic Co-operation Development) and countries. Policy evolution is also needed to support development of Canadian research institutes based in developing countries and staffed by faculty members from both Canadian universities and partnering institutions in the South.

There is a strong feeling that the development of international research will only occur if a dedicated global research initiative fund is created within Canada, perhaps with blended contributions from several sources (at least NSERC, NRC, CIHR, SSHRC, CFI, NCE, CRC, Genome Canada, CIDA, IDRC). Such outreach partnerships would need unequivocal national support from DFAIT, Health Canada, Industry Canada, Agriculture and Agri-Food Canada, and other appropriate arms of government.

If such a commitment to international research development was clarified on the part of government and universities, it is anticipated that support of international foundations, international funding agencies, and NGOs would be forthcoming.

Clearly on a project-by-project basis, it will be important to identify opportunities for private sector engagement and sharing of risks and opportunities. There is a strong belief in the Canadian academic community that private sector partners are willing to enter into such partnerships; however, in the context of international development research it will be necessary for CIDA to reform its rules of engagement if universities are to partner with private sector enterprises on an equal footing.

Figure 3 illustrates schematically the multiple interactions required by universities, colleges, and research centres as a foundation to their expanded interaction with international institutional partners for education and research.
Federal Supporting Mechanisms

CIDA

Research does not fall into the central mandate of the Canadian International Development Agency (CIDA); however, many CIDA programs contribute to research success through capacity-building and applied investigations to support best practices. Increasingly, there have been calls to downplay the dichotomy between action-driven initiatives and research which might support or amplify the impact sought. Indirectly, CIDA is a major contributor to national research through its support of international agencies that contribute to overall capacity in developing countries. From the perspective of university leaders, CIDA has not been sufficiently interested in academic relationships. The CIDA-funded program with AUCC, the University Partnerships in Cooperation and Development Program (UDCP) is seen by many as being too limited in scope. From the point of view of larger universities the numerical limitations on competing applications are an impediment rather than an incentive to expanded university interest in international projects. Several larger universities and research organizations prefer to work with CIDA directly on bilateral projects.

Several universities expressed ambivalence about CIDA INC. Although there are clearly opportunities for universities to participate in CIDA INC programs with private sector
partners, the overall program is nonetheless seen as being preoccupied with the empowerment of commercial interests. CIDA generally is not perceived as contributing to the effective deployment of Canadian research capabilities internationally.

**IDRC**

The awareness of IDRC activities is uneven among academic institutions. Several institutions have worked closely with IDRC on a project basis and they are generally laudatory in their assessments of IDRC. There is, however, a widespread feeling that the Centre suffered badly from the budgetary cuts of 15 years ago, and that it has not yet fully recovered.

Despite endorsement by university informants of the IDRC mandate and research agenda, it is felt by most that communications with the academic sector should improve and that universities should be more actively engaged in discussion about research priority-setting or identification of ways in which Canadian research strengths may be brought to bear on international development problems.

Universities whose research strengths align most closely with the interests of IDRC are, not surprisingly, the most enthusiastic about IDRC activities. Nonetheless, they have been impeded in their interactions with IDRC because of the Centre’s approach, closely followed until recently, of strictly limiting academic expenditure of Centre funds within Canada. This, coupled with the lack of a policy providing overhead or indirect costs of research for Canadian universities so engaged, has provided a disincentive to extensive university involvement in either IDRC or CIDA projects. With the recent increases in IDRC budget there has been some relaxing of the rules concerning institutional expenditure within Canada, but it is too soon to see impact of this shift. For the most part, the reluctance of Canadian universities to engage with IDRC’s research agenda could be rapidly overcome if funds equivalent to the 25 percent commitment made recently by the federal government to support indirect research costs linked to tri-council funding were to be introduced.

Of perhaps greater concern is the disconnect between the IDRC research agenda and the identifiable strengths of Canadian universities. Some major Canadian strengths, such as health sciences, biotechnology, engineering, law, and physical sciences have been relatively neglected by IDRC. If IDRC is to strengthen its relationship with the academic community it would be profitable to achieve improved congruence between IDRC research interests and the capabilities of Canadian partner institutions. Provided that an adequate funding basis is available to support international development research, it is probable that appropriate developing country partner institutions can be found in almost any research domain. It is not suggested by academic leaders that IDRC should become unfocused in its research activities, or that the successful problem-solving approach be abandoned. Indeed, under present financial limitations, it may be difficult to take on any new research directions. Nonetheless, a better alignment of Canadian research strengths with IDRC interests would have a multiplier effect on research funding success within Canada and externally. Many opportunities are currently going unrecognized for the development of
partnerships between institutions and NGOs, or private companies with shared human development interests.

There is a strong feeling from the Canadian university community that IDRC is engaged in extremely important work that is of overriding interest to many academics and to their students. There would unquestionably be a quick and enthusiastic response from the academic community if the funding base available to IDRC were to increase and if added flexibility were introduced into the process of research prioritization. From the university view, the emphasis must be placed squarely on research to support development, not on studies of development itself.

Summary

The interviews conducted for this study produced an almost unanimous sense of support for an expanded Canadian role in international research in both developed and developing countries. It was made abundantly clear by almost all informants that enhanced Canadian success will stem from a clarification of collective national goals and identification of research as an essential underpinning of international relations and a major part of Canada’s potential contribution to international development.

Many underscored the need for a new integrative policy-making body to bring together the diverse elements in an international research agenda. If such decisions are taken unambiguously by the federal government, including the commitment to a consistently managed and adequate funding structure, Canadian companies and institutions are likely to respond with enthusiasm. In the absence of explicit decisions taken by the federal government and its agencies, the likely outcome is a continuation of the status quo with substantial interest in international research activities within the academic sector not necessarily matched by actions. The international research activities that prosper will be those that are championed by individuals or by smaller units such as departments and research centres within the university. They will succeed where external funding can be identified, occasionally from federal granting councils, or more commonly from international agencies and foundations.

The investment of private sector companies in international research will continue to be driven by market forces and is unlikely to embrace the challenges of sustainable development in the least developed economies. Nor are private public partnerships likely to emerge in numbers unless explicitly encouraged by national policies.

If the status quo persists, the net result is likely to be a continuation of Canada’s somewhat erratic performance in international development research. In the view of the authors of this report, that would represent a tragic waste of substantial Canadian research capacity that is well positioned to contribute greatly to sustainable international development in many fields.

IDRC should attempt, wherever appropriate, to align its research priorities more clearly with the existing strengths of the Canadian research sector. IDRC should not sacrifice its
problem-oriented approach or emphasis on social science, which are major strengths. Nonetheless, IDRC should be more proactive in partnering with Canadian scientists.

The Canadian research community and IDRC share an extraordinary opportunity to move Canadian research capacity further into the realm of international development. The success of such a great venture would prove of immeasurable benefit to Canada, its scientists, students, and trainees, as well as to our partners in development.
## Appendix 1 Informants

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<tr>
<th>Organization</th>
<th>Contacts</th>
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<td>Atlantic Veterinary College at the University of PEI</td>
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<td>Queen’s University</td>
<td>Kerry Rowe, Vice Principal, Research</td>
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<tr>
<td>Salama Shield Foundation</td>
<td>Dennis Willms, Founding Director</td>
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## Appendix 1 Informants continued

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<tr>
<th>Organisation</th>
<th>Contact Person</th>
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<tbody>
<tr>
<td>Social Sciences and Humanities Research Council of Canada</td>
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<td>United States Agency for International Development</td>
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<td>University of British Columbia</td>
<td>Martha Piper, President</td>
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<td>University of Calgary</td>
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<td>University of Ottawa</td>
<td>• Karen Grant, Vice Provost</td>
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<td>University of Saskatchewan</td>
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<td>University of Toronto</td>
<td>• Robert Birgeneau, President</td>
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<td>• John Challis, Vice President, Research</td>
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<td>University of Victoria</td>
<td>• Martin Taylor, Vice President, Research</td>
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<td>• Sabine Schuerholt-Lehr, Assistant Director, Office of International Affairs</td>
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<tr>
<td>University of Waterloo</td>
<td>Paul Guild, Vice President, University Research</td>
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<td>University of Western Ontario</td>
<td>Nils Petersen, Vice President, Research</td>
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<tr>
<td>World Health Organisation</td>
<td>Tikki Pang (Pangestu), Director, Research Policy &amp; Cooperation (RPC/EIP)</td>
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Appendix 2

Research expenditure by site of performance in Canada
(2002 total $18 billion - 1.81% of GERD)

Industry: 54%
University: 33%
Federal government: 10%
Other: 3%

Source: Statscan
http://innovation.gc.ca/s-tinfo
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