Bridging Troubled Waters:
Canada's Role Connecting Biotechnology to Global Human Needs

Third Forum Session of the Biotechnology and Governance Program

SUMMARY OF THE DELIBERATIONS
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Contents:

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The following is a summary of the deliberations that took place during the third of four forum sessions held on governance and biotechnology, on June 3, 2003. The deliberations involved over 60 invited participants, including senior managers from 12 different federal government departments, as well as representatives from academe, industry and civil society.

The summary is organized in two parts. The first section outlines the scope and purpose of the Forum events, and provides an overview of this particular event, as well as a summary of the outcomes. The second section outlines points raised during the presentations and plenary discussions of the third Forum event. Annex A provides the framework for the small roundtable discussions. Annex B summarizes these discussions. A list of participants is found in Annex C. In Annex D, the Institute gratefully acknowledges the support of the program's sponsors, without which the Forum series and the broader Biotechnology and Governance Program would not be possible.

It should be noted that the discussions operated under a modified version of the Chatham House rule. They are as follows:

- Direct attributions of quotes to specific participants shall not be made without explicit consent.
- Acknowledgement that information was received at a Forum event, however, is allowed. (This second clause allows for written summaries of the event - without attribution - to be produced and circulated to interested parties.)

Special thanks are due to the four participant reviewers who commented on drafts of this summary in order to ensure it was a fair reflection of the evening's proceedings.

Executive Summary

"Bridging Troubled Waters: Canada's Role in Connecting Biotechnology to Global Needs" brought together over 60 senior decision-makers, from both inside and outside government, to examine biotechnology's relevance to Canada's foreign and international development policy.

The evening was broken down into three main sections. The first was a keynote address and a panel discussion, with time reserved for questions from the audience.

The presenter and panelists addressed the ethical and practical considerations of sharing the benefits of technology in a globally equitable manner. Advances in genomics have opened the way for the development of vast new technological potential. But it is not clear who will benefit from these new technologies. Will biotechnology and genomics benefit the already highly privileged North or do they have larger relevance to improve global health and equity? The consistent rise of life expectancy in the North is a stark contrast to the trend in Sub-Saharan Africa, where health crises have pushed life expectancy to below 40. The inequity between rich and poor nations might be considered one of our greatest ethical challenges. Biotechnology's applicability to this challenge is no longer an abstract idea. The Canadian Program on Genomics and Global Health has identified the top ten biotechnologies holding the greatest potential for improving health in the developing world. What is Canada's role in seeing the benefits of biotechnology used to remedy global inequity?

During the second portion of the evening, participants broke into small roundtable groups and discussed these questions. In the final portion, the roundtables reported back to plenary and debate continued on key points.

Among Forum participants there was a general consensus on the importance of the issue, but an acknowledgement that it was currently not being addressed in any concerted way within government. Canada's innovation agenda is not deeply connected to our foreign and development policy. It was noted that CIDA and DFAIT, the departments with the most obvious roles in connecting these strains of policy, had no representatives at the event.

Participants also agreed that rising to the challenge of equitably sharing the benefits of biotechnology will require will and leadership. Next steps involve building relationships to engage in a productive dialogue to determine the appropriateness of technological responses to Third World challenges. Once goals are clarified, it will be necessary to concentrate on building capacity and creating an institutional framework to pursue them.

The Third Forum was the first time in Ottawa such a wide range of people had been brought together to engage in a free exchange of ideas on this topic. The event facilitated the building of links within government and between sectors, and allowed a common understanding of an important issue to be developed.

Scope and Purpose of the Forum Event

"Bridging Troubled Waters: Canada's Role Connecting Biotechnology to Global Human Needs" marked the third of four evening roundtables (being run over a period of 10 months, ending in the fall of 2003) that engage participants around governance issues posed by biotechnology. Designed to benefit senior decision-makers, this series draws participants from both inside and outside government, and seeks to elicit candid discussion of these complex issues. The general thread joining these events is the following question: *Assuming that biotechnology is "transformative" in its impact on society, governments and industry – what are the governance implications that need to be considered?* Forum sessions are thus intended to bring participants to a higher appreciation of the complex public policy issues associated with biotechnology, and to make them more aware of the diversity of views from both inside and outside the federal government with respect to these issues.

The Forum events are part of the Institute's Biotechnology and Governance Program. The objectives of this Program are as follows:

1) Educate and raise awareness of current policy issues: Promote a wider awareness and shared understanding of some of the big biotech-related policy issues that are currently on society's 'radar screen'.
2) Explore governance implications: In light of the issues raised by biotechnology and the principles of good governance, to consider how existing processes, structures, conventions, or modes of decision-making and consultation may need to be adapted.
3) Anticipate: Look ahead. Examine how this technology may evolve over the longer term, and what may be done to derive the greatest net benefit for society as the technology develops.[1]

"Bridging Troubled Waters: Canada's Role Connecting Biotechnology to Global Human Needs" examined biotechnology's relevance beyond Canada's domestic innovation policy, to our foreign and international development policy.[2] The ethical and practical considerations of sharing the benefits of technology in a globally equitable manner were the focus of discussion. The Institute invited Abdallah Daar (Professor of Public Health Sciences & Director, Program in Applied Ethics and Biotechnology, University of Toronto Joint Centre for Bioethics) to speak on this topic. A panel, consisting of Jay Drydyk (Chair, Dept. of Philosophy, Carleton University), Paul Dufour (Senior Program Specialist, International Development Research Centre) and Peter Hackett (Vice President, National Research Council of Canada) addressed a series of related questions and provided commentary.

The audience engaged the presenter and panelists during a short question period. Participants then continued the debate in small roundtable groups where discussion was focussed by a set of key questions. These groups reported back to the plenary on their debate around these questions.

The topic and questions generated very lively discussion and debate. Among the outcomes of this third session, was a general consensus on the importance of the issue but an acknowledgement

[1] Please refer to the Institute's web site at www.iog.ca for further information on the Biotechnology and Governance Program.
[2] Please refer to Annex C for the full list of participants.

that it was currently not being addressed in any concerted way within government. Participants debated the key issues that needed to be considered and compiled a list of practical steps that would move the issue forward.

Participants agreed on a series of steps as a follow-up to the Forum. The first was to create a summary of the event to be peer-reviewed by a working group of participants. This document would be made available to departments not represented at the event, especially DFAIT and CIDA. Another follow-up step would be to feed the evenings results into thinking about the next Forum event, most likely an examination of the Canadian Biotech Strategy.

What follows in the next section is a summary of the comments made during the evening's presentation, panel and the discussions that followed. All of the statements presented below reflect the views and opinions of individuals who participated in the discussions, and in no way represent the views of the Institute.

Plenary

Keynote on the Canadian Program on Genomics and Global Health

The Human Genome Project has opened the way for the development of vast new technological potential. Francis Collins describes the future of genomics as a house. The foundation of this house is the Human Genome Project. Following this metaphor, on this foundation the big challenges emerging in genomic research stack up on each other like floors of a house. The first floor represents genomics' challenge to biology and advancing our scientific knowledge. The second is genomics' challenge to health and translating our knowledge into health benefits. The third is genomics' challenge to society as we find the balance between maximizing benefits and minimizing harms. These three thematic areas have cross-cutting elements: training, education, technology development, legal, ethical and social considerations, and availability of resources.

This work in progress is already an incredible accomplishment. But who lives in this house? Is it a house built for the already incredibly privileged North or does it have larger relevance to improve global health and equity? Should we bring ethics to bear on the medium of biotechnology and genomics?

It is this issue which is the focus of the Canadian Program on Genomics and Global Health being run by the University of Toronto Joint Centre on Bioethics. Funded by Genome Canada, the program aims to examine how genomics can be harnessed to improve global health equity. The inequity between rich and poor nations is one of our greatest ethical challenges. Historically, Canada has been at the forefront of thinking about other people's needs. The program moves toward defining a role for Canada in addressing global health inequities through the powerful new technological promise of genomics.

Is there inequality? The health crisis in sub-Saharan Africa is most dramatic when we look at life-expectancy. AIDS-HIV has caused life expectancy to plunge to 40 years and below. This trend will continue its descent if nothing is done.

It is important to put a human face to these statistics. [Picture of a group of Dalit children in India] These children are underprivileged in many ways, but smiling. They have low per capita income but high social capital. They have a desire to improve their lives and the lives of their families. What they lack is access to knowledge.

At the Kananaskis meeting of the G8, the richest countries of the North acknowledged a duty to address global inequities. Genomics are already having an impact on global health. This political focus must be used to harness these technologies and spread their benefits.

There is nothing to lose. On ethical grounds it could be argued that these advances in science and technology are global public goods. DNA is shared throughout humanity, it is a common resource, people give DNA samples freely, the knowledge is public, and much of the research was funded by public money. Everyone has a stake in the use of this technology. As well, the use of this knowledge and technology is not diminished by the use of any one person.

Technology has historically played a large role in development and is therefore critically important to developing countries. The relevance of genomics to development challenges has been identified by the UNDP and the WHO. As the issue slowly unfolds, the next critical steps are to develop a research agenda that reflects developing country needs and channel the appropriate resources towards it. The Canadian Program on Genomics and Global Health has moved a research agenda from the abstract to the specific by identifying the top ten biotechnologies holding the greatest potential for improving health in the developing world. They are:

1. **Molecular diagnostics** – affordable, simple diagnostics for infectious diseases
2. **Recombinant vaccines** – new vaccines to fight diseases such as malaria and hepatitis B
3. **Drug and vaccine delivery systems** – simple to administer and cost-effective alternatives to traditional delivery systems which require multiple injections and refrigeration of vaccines
4. **Bioremediation** – using microbes to clean soil and water of pollutants
5. **Sequencing pathogen genomes** - generating the data for understanding the mechanisms of disease and methods for effective treatment and prevention
6. **Female-controlled STD protection** – means of protection from STDs that do not rely on a partner's consent
7. **Bioinformatics** – computer-based tools to process genetic data into valuable information for the prevention and treatment of disease
8. **Enriched GM crops** – enhancing the nutritional value of crops to combat malnutrition and nutrient-deficiency
9. **Recombinant drugs** – affordable sources of therapeutic proteins for treating chronic diseases
10. **Combinatorial chemistry** – faster, cheaper drug development

The purpose of the top-ten exercise was to ground the discourse on how genomics might improve global health by looking at specific technology platforms. The top 10 are very diverse, but concentrate on technology platforms with real relevance. The list will hopefully serve to focus ideas and shift the research agenda to meet the needs of developing countries. This scientific agenda must be pursued in tandem with advances in other areas that will make biotechnology affordable and sustainable, such as intellectual property protection and governance frameworks.

This issue is advancing around the world. The UN system is engaging in the topic, with its UN millennium development goals and its associate committees on health, education, and reducing mortality. Policy-leaders are beginning to think about specific agendas.

We must look at what Canada's role should be. Historically, Canada has been a leader in developing innovative approaches in international relations. Prime Minister Lester B. Pearson, one of our most prominent international statesmen, said,

> There can be no peace, no security, when a few rich countries with a small minority of the world's people alone have access to the brave, and frightening, new world of technology and science, while the large majority live in deprivation and want, shut off from opportunities of full economic development; but with expectations and aspirations aroused beyond the hope of realising them.

Seeing the benefits of biotechnology equitably distributed is a large challenge. However, it also presents an opportunity to have a huge impact on global human health and regain Canada's historic role as a foreign policy leader.

The Canadian Program on Genomics and Global Health presents a vision of innovation for development. Its purpose is to mobilize Canadian science and technology to address global challenges faced by developing countries. Canada must move toward harmonizing its innovation agenda with its foreign and development policy. This is not a selfless act. There will be positive benefits for Canada as well, especially in the areas of trade and security.

In closing, a quote from Martin Luther King:

> It really boils down to this: that all life is interrelated. We are all caught in an inescapable network of mutuality, tied to a single garment of destiny. Whatever affects one directly, affects all indirectly.

Key Points raised by the Panel and in Plenary

<u>Generating a productive dialogue between Canada and developing countries</u>

- A productive dialogue between Canada and the developing world must be ethically credible. It can not be self-serving and has to identify risks, as well as benefits. At present, genomics as a global public good is only an idea, not a reality. Science should be available to all as a human right. The knowledge and benefit of science should be equitably shared.

- A key issue is how to make the dialogue productive. What and where is demand coming from and how do we respond to that demand in a meaningful way? We must be willing to listen. IDRC and CIDA have regional offices around the world which are a valuable resource to tap into the debate in the developing world on the issues surrounding biotechnology. Domestic Canadian policy is already structured to address demand. But Canada has developed a two-track mode of operating which separates foreign and trade policy from innovation policy with no ability to converge the two.

Past transfers of technology

- The green revolution provides an interesting example of the broader effects of technology. It greatly improved yields but also led to a large displacement of population. To maximize the benefits of the technology, large tracks of land were required. Land owners pushed small holders off the land and into overcrowded cities and unemployment. The green revolution example poses important questions about how technological change should be implemented. How will the benefits of technology will be distributed? It calls for the development of more democratic approach to the utilization of technology.

- The merit of the green revolution is a long-standing debate but raises important questions. How do you make technological development work for human development? How do you manage technology and make the most of the convergence of this incredible emerging set of technologies (cognitive sciences, IT, biotechnology). Nations are struggling to deal with both the science and the social science (ethics, governance) part of the equation. This includes developing capabilities to deal with technology in practical ways, like infrastructure and the business environment.

- Technological approaches must be appropriate. The green revolution in India caused dislocation, but today Indians do not have to face famine.

- If biotechnology allows development under people's control it will be more effective. Good dialogue is vitally important. Who will benefit from innovation and how, under whose control will it be implemented, who is developing whom? Democractic paths to development like micro-finance offer a way forward.

Generating Innovation: What and How

- Applications of genomics and biotechnology extend beyond the human health dimension. Industrial applications and processes like bioremediation will allow for cleaner, more sustainable production and prevent degradation of productive land and the environment. Innovation in biotechnology and genomics can be a tool for sustainable economic development.

- The distinction between agriculture, health, environment-based biotechnologies is blurred. Currently, there is a great level of convergence among different domains: IT, biotechnology, cognitive sciences. It is at the intersections and edges of these domains that real innovation happens.

- Technology can provide for real increases in productivity. We have focussed primarily on using productivity to obtain sustainable production. We should also think about sustainable consumption.

- A truly global innovation system is only in its initial stages. The concept of global private goods will inevitably be a primary consideration in shaping it. The private sector of course has a huge

role to play. Government does not manufacture vaccines anymore. Industry does because they can do so with greater efficiency.

The ethical dimension and the will to move forward

- The vision put forward by the Canadian Program on Genomics and Global is not an easy one to realize. It requires money and resources. There are huge political and economic barriers to be overcome if this vision is to become a reality. Effective communication of these ideas is essential in overcoming these obstacles.

- The resources required to realize this vision are not all financial. We need to develop a global outlook. What is required is the humility to learn from other people, the willingness listen and pay attention to solutions from the developing world. This is an easier task for Canada to take on than other countries. Canadians believe that other people matter; that the environment matters. Our celebration of our multicultural society is our connection to the world.

- We already have the tools to improve global health, what rests is to pull everything together. Diverse elements must focus globally, not just internally. By taking on this role there will be indirect benefits for Canada. More importantly, this is a role worthy of Canadian attention and is consistent with our view of ourselves as moral players in the international arena.

- The inequitable distribution of the benefits of science and technology is the grand moral question of our age. Technology offers solutions to some of humanity's most pressing problems. Despite scientific advances like the green revolution, hunger still exists. It requires more than an acceptance of the mutuality Martin Luther King spoke of. It requires an intentionality to move the issue forward. We have past examples of how strong intentions have been successful in achieving great goals: the rebuilding of Europe and Japan after the Second World War, the resources and energy put into American defense. More than any other limitation, it is a matter of prioritizing. Good intentions are not good enough. Canada needs the vision to decide where it stands and make the first step.

- Realizing the potential of biotechnology for human health is a great moral challenge, but also a historic opportunity. The first step is signalling our intention to take a leadership role, a return to a Pearsonian role in defining our place in global affairs. The rest will follow as technicalities. We must put this issue on the national agenda. Two questions: how do we do we signal out intention to take the lead on this issue, what are the technical mechanisms that we will require to move things forward? Once we have signalled our intention to take the lead on this issue, we must focus on the core issues to enable it: governance, incentives, mechanisms, leadership, strategic focus.

Annex A: Framework for the Small Roundtable Discussions

Key Questions

Small roundtable discussions of 8 to 10 participants were focussed around the following questions:

1) What are the most important issues that need to be addressed concerning the application of biotechnology in developing countries?

2) What practical steps can be taken now (by government, the private sector, civil society or other groups)?

Report back to the Plenary

Chairpersons reported back to the plenary on the small roundtable discussions. The feedback was structured to compile two lists:

1) Key issues

2) Practical steps

Annex B: Key Issues and Practical Steps (Summary of the Small Roundtable Discussions)

Key Issues

The key issues that emerged out of the small roundtable discussions are ordered according to theme:

Relationship between North and South

- How do you build trust relationships between developed and lesser developed countries?
- Who decides what path to development and what technologies should be pursued to enable it, the producer or the recipient?
- Developing countries should define their own needs and a true partnership should evolve (e.g., via world trade systems)
- Lack of formal incentives to form partnerships between Canada and developing countries
- Ability to listen

Appropriateness of technology

- Cultural and environmental appropriateness is important (technology designed for developed world needs is not necessarily useful for local needs and circumstances in the developing world)
- Lack of consensus over the relevancy of biotech to development. Is biotechnology the most appropriate solution to developing country needs? There is a need to share lessons on the relevancy of biotech to development
- How can you enable developing countries to leapfrog less-desirable technologies that have played a role in the technological evolution of the developed world?
- Setting priorities (e.g., cell phones vs. water)

Building Capacity

- How can Canada help to establish developing countries as pioneers in biotechnology, especially taking into account the varying levels of current capacity in the developing world?
- Influencing developing countries to develop their own capacities and R&D appropriate to their needs and place in world economy
- Capacity building is required, not just in the area of adoption of biotechnology but in a more general sense
- Sustainability – there is a need for investment into education, systems and governance structures

Who will take the lead?

- A long-term and committed leadership is required – how does one inspire leadership at various levels?
- Where is DFAIT?

Where is Canada on these issues?

- Need to look at home – aboriginal communities have needs and could provide us with experience
- The state of biotechnology in Canada: the Canadian biotech sector is relatively weak and investment lags behind U.S. We must manage our expectations of what we can do internationally because we are not truly in command or in a position of strength even at home.

Basic Concepts

- The conceptual problems of defining both biotechnology and development?
- Tension between the concept of global public goods and the reality of the current system which stimulates innovation through intellectual property rights

Practical Steps

The practical steps that emerged out of the small roundtable discussions are ordered according to theme:

Leadership

- Get issue on the transition agenda. Include lead deputies
- Create a credible, trustworthy set of messages and messengers (set of champions)
- Persistent, dedicated and articulated leadership is required (not shifting with the polls) – perhaps create an institute that is part of global network?

Institutional

- Develop R&D models which work internationally
- Require grants and other funding mechanisms to acknowledge benefit of knowledge transfer to lesser developed countries – reward international partnerships and knowledge transfer
- Set up new governance mechanisms to assist networking between Canada and developing countries on use of technology (funding, priority setting, etc). Pilot on bilateral basis (ex. Swiss-India collaboration)
- Accept, measure, evaluate and manage risk – through an institute. Develop indicators of success
- Realistic expectations – dedicate 4% of innovative capacity to issues of global human development

- Trade concessions – ie. transfer ownership of intellectual property

Relationship-building

- Build trust by choosing issues of high relevance (ie. AIDS, water quality) – start small, scale fast. Canadian aid has an important role in building trust
- Outcomes that show mutual benefit on both sides – accountability measures on both sides
- Partnerships with developing countries where they can articulate their own needs
- Build partnerships/networks from scientific departments with counterparts abroad – transfer knowledge
- Work together to build on existing knowledge – do not assume that we have all the knowledge and expertise

Canadian approaches and lessons

- Have a biotech strategy – include an international component
- Link foreign policy to trade, science and human resource policy
- Engage DFAIT and CIDA
- Strengthen the sector in Canada and then reach out to rest of the world from a position of strength. Better governance of sector in Canada
- Train and return foreign expertise – to fight the current trend toward brain drain
- Assist countries that do not have the expertise to participate internationally
- Look at home – issues with aboriginal communities: any lessons for international development?

What kind of development?

- Avoid mega-projects – that address a specific issue but create other problems
- Do not pretend there is one solution: work with locally based solutions – engage developing countries (i.e. micro-credit, sharing research)
- Acknowledge complexity of capacity building

Investment

- Private-public partnerships – with accountability for partnership outcomes
- Policy mechanisms to ensure philanthropic efforts by private sector; refocus foreign aid
- Encourage private sector investment

Education

- Raise profile of biotechnology and development at home – the frailty of knowledge of the Canadian public

Annex C: Participants, Speakers and Organizers

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