

## **Backgrounder**

### **BioPromise? Biotechnology, Sustainable Development and Canada's Future Economy**

As part of its ongoing investigations into the role of biotechnology in society, the Canadian Biotechnology Advisory Committee (CBAC) commissioned a study entitled *BioPromise? Biotechnology, Sustainable Development and Canada's Future Economy*.

*BioPromise?* provides an analysis of biotechnology's potential to contribute to sustainable development. An expert working party, chaired by Dr. Hanson, produced two complementary reports ("executive" and "technical") that, between them, cover a broad range of aspects of the relationship between biotechnology and sustainable development. CBAC's formal release of the executive and technical reports is planned for Wednesday, October 18, 2006.

CBAC is inviting comments on the report including via its website, and will use a web-based discussion forum to generate further conversation on ideas stimulated by the study.

#### **Why Study Biotechnology and Sustainable Development?**

First and foremost, there is a need for better progress in Canada on sustainable development.

Second, biotechnology has been proposed as a means to enable many sustainable development solutions such as:

- clean air through new industrial processes and replacement of petrochemicals with biofuels;
- clean water through better sewage treatment and improved pollution remediation technology;
- clean land and healthy soils through the use of new agricultural techniques that use fewer or lower-impact pesticides, advanced bioremediation, and better toxin detection;
- increased biodiversity through the provision of new conservation management tools such as genomic methods; and
- new economic opportunities through the generation of higher-value products from biological materials.

There are, however, also potential concerns associated with widespread application of biotechnology. These include:

- environmental concerns such as new kinds of pollution from bioreactors, potential problems with novel organisms, and environmental damage from greater cultivation of crops for bioproducts;
- ethical issues including questions of ownership of genetic material and living beings and the "right" relationship of humanity with other life forms;

- international development considerations about biotechnology's usefulness and appropriateness as a tool to help the poor in developing countries, and the effective engagement of countries with low scientific capacity; and
- scientific questions about whether our knowledge is advanced enough to deliver the results that are being promised.

## **Key Themes**

The need to implement sustainable development is urgent. The expert working party concludes that biotechnology represents a major opportunity to make progress in sustainable development. The reports present a vision for the next 15 years and state recommendations for policy action that is needed now.

The relationship between biotechnology and sustainable development is complex and can be considered from many different angles. In *BioPromise?*, this relationship is considered from six different perspectives.

### **1. Values and Ethical Considerations**

It is important to recognize that both the implementation of sustainable development and the adoption of new technologies involve value judgements. A set of goals and process principles are proposed to guide the vision and recommendations for using biotechnology to advance sustainable development.

### **2. Emerging Technology Scan for Canada**

The two reports provide an overview of major biotechnology prospects relevant to sustainable development for Canada. Topics include biofuels, marine biotechnology, industrial applications of biotechnology such as "biorefineries," and others.

### **3. Assessing and Addressing Community Health, Economic and Ecological Needs**

Biotechnology provides opportunities to increase the health of rural communities, but could also pose some threats to the health of rural ecosystems. These topics should be central in the consideration of the deployment of new biotechnologies.

The report acknowledges there is a good possibility that without significant, coordinated common action, the rewards of new biotechnologies are unlikely to be captured by rural people. Challenges include difficulties with financing, developing new business relations along the value chain and overcoming institutional barriers.

In order to link biotechnology innovation with sustainable development, a sustainable development assessment framework is crucial. Without a framework, conflicts can degenerate into "wars of words."

### **4. Fostering Public Dialogue**

The kinds of change examined in *BioPromise?* require an adaptive management approach. This implies enhanced, deliberative dialogue among all stakeholders with the objective of mutual learning. To have real transformative potential, the dialogue must be linked to decision-making processes.

### **5. Providing an International Perspective**

International cooperation and knowledge networks will be crucial to enhance Canada's productivity and international competitiveness. Biotechnology should play an important

role in global sustainable development, including the production of vaccines, opportunities for rural development and improved environmental protection.

## **6. Governance for a Flourishing Biotechnology-Sustainable Development Relationship**

There is a need for strong federal leadership through improved horizontal coordination and a strengthened Canadian biotechnology strategy.

All sectors of society must be engaged in implementation of the technology; this implies working through both governmental channels and a broader group of stakeholders.

Decision-making would be improved by the provision of yearly public reports about Canadian performance in research, regulatory regimes, commercialization and competitiveness, policy agendas, and public attitudes (one report per year for a five-year cycle).

## **Recommendations**

Through its work on the six themes listed above, the study's expert working party identified nine areas for priority action to advance the biotechnology-sustainable development relationship. These priority areas identify practical steps that can be taken now to help build a sustainable future where innovation allows Canada to stay prosperous and maintain and enhance ecosystem function and health. The list of nine key findings and recommendations presented below is a summary of those that can be found in the Executive Report.

### **1. Develop and implement a strategic policy framework for biotechnology and sustainable development.**

An overarching structure is needed to provide guidance and indicators for progress.

### **2. Support advanced biotechnologies.**

Advanced biotechnologies such as biorefineries are key to adding value to Canada's biomass and introducing industrial processes that have reduced environmental impact.

### **3. Get the market signals right.**

Take a strategic approach linking innovation investment with desired sustainability outcomes, and move toward an integrated environment-economy assessment of opportunity and avoid market distortions.

### **4. Undertake environmental monitoring.**

The monitoring strategy should enable transparent, timely and scientifically credible development of regulations, as well as testing of important ecological hypotheses concerning innovative technologies.

### **5. Develop an integrated assessment framework for biotechnology and sustainable development.**

By extending the use of existing tools and assessment processes, develop a sustainable development assessment framework to guide policy, screen new applications and assess products at all stages of their development and life cycle.

**6. Support public dialogue.**

Long-term, deliberative dialogue will promote better understanding of technology's potential and risks, and yield feedback to guide R&D efforts.

**7. Initiate knowledge networks for biotechnology and sustainable development.**

Such networks will facilitate knowledge exchange by scholars and practitioners world-wide, leveraging international experience and expertise.

**8. Develop biotechnology and sustainable development capacity in Canadian international development agencies.**

Ensure that efforts are led by developing nations themselves so that the technology responds appropriately to their needs.

**9. Increase federal leadership, engage all stakeholders and promote informed decision-making.**

Better governance allows better choices to be made.

The overarching message of *BioPromise?* is that biotechnology could help Canada and the world attain sustainable development goals while enhancing Canada's overall economy. Developed in line with the recommendations above, a strong sustainable-development-oriented biotechnology sector could reduce Canada's ecological footprint, reduce toxic substances, support clean air and water goals, and perhaps play a role in relation to climate change, while positioning Canada and its people to take full advantage of new knowledge and skills available in coming years.

CBAC is a body of external experts in the fields of science, business, nutrition, law, the environment, philosophy, ethics and public advocacy. CBAC was established by the Government of Canada to provide public policy advice on a range of biotechnology issues, and reports to the federal ministers of Health, Agriculture and Agri-Food, Environment, Natural Resources, Fisheries and Oceans, Industry, and International Trade.

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