

# **Secondary Analysis of Public Opinion Research Regarding Genetically Modified Food and Related Biotechnology Issues**

## **Final Report**

Prepared for

The Canadian Biotechnology Advisory Committee Project  
Steering Committee on the Regulation of Genetically  
Modified Foods

Prepared by:  
Environics Research Group  
June 2001

This publication is also available electronically on the World Wide Web at the following address: [cbac-cccb.ca](http://cbac-cccb.ca)

This publication is also available in alternative formats on request. Contact the Canadian Biotechnology Advisory Committee (CBAC) at the numbers listed below.

For additional copies of this publication, please contact the:

Canadian Biotechnology Advisory Committee (CBAC)  
240 Sparks Street  
5<sup>th</sup> Floor - Room 570E  
Ottawa ON K1A 0H5

Tel: (613) 957-7715  
Toll free : 1 866 748-CBAC (2222)  
TTY : 1 866 835-5380  
Fax: (613) 946-2847  
Web: [cbac-cccb.ca](http://cbac-cccb.ca)  
E-mail: [info@cbac-cccb.ca](mailto:info@cbac-cccb.ca)

Opinions and statements in this publication do not necessarily reflect the CBAC views and positions.

© 2001, Environics Research Group, Secondary Analysis of Public Opinion Research Regarding Genetically Modified Food and Related Biotechnology Issues.

## TABLE OF CONTENTS

<b>1.0 EXECUTIVE SUMMARY .....</b>	<b>2</b>
<b>2.0 INTRODUCTION.....</b>	<b>6</b>
<b>3.0 AWARENESS, FAMILIARITY AND INTEREST.....</b>	<b>8</b>
<b>4.0 PERCEIVED SAFETY OF GENETICALLY MODIFIED FOODS .....</b>	<b>10</b>
<b>5.0 TRANSPARENCY .....</b>	<b>11</b>
<b>6.0 SEPARATION AND INDEPENDENCE OF REGULATORY FUNCTIONS.....</b>	<b>13</b>
<b>7.0 ENSURING SAFETY DURING RESEARCH &amp; DEVELOPMENT ACTIVITIES... </b>	<b>16</b>
<b>8.0 OPPORTUNITIES FOR PUBLIC INVOLVEMENT .....</b>	<b>17</b>
<b>9.0 POST-MARKET MONITORING FOR RISKS AND BENEFITS .....</b>	<b>19</b>
<b>10.0 CAPABILITY AND CAPACITY OF THE REGULATORY SYSTEM .....</b>	<b>20</b>
<b>11.0 INFORMATION PROVISION TO SUPPORT INFORMED CHOICE .....</b>	<b>23</b>
<b>12.0 LABELLING.....</b>	<b>26</b>
<b>13.0 ENVIRONMENTAL STEWARDSHIP .....</b>	<b>29</b>
<b>14.0 BROADER SOCIAL AND ETHICAL CONSIDERATIONS.....</b>	<b>31</b>
<b>REFERENCES.....</b>	<b>33</b>

## **1.0 EXECUTIVE SUMMARY**

This executive summary is based on a secondary analysis of available public opinion research on the subject of genetically modified food. From this secondary analysis, the following conclusions emerge:

### ***Awareness, Familiarity and Interest***

- Over the last few years, an increasing number of Canadians have heard, seen or read something about biotechnology and genetically modified foods. Consumer awareness of genetically modified foods on the grocers' shelves is low but growing.
- This increasing awareness has not been accompanied by large increases in familiarity and understanding about biotechnology and genetically modified foods. Presently, the general public appears to be casual observers of these issues.

### ***Perceived Safety of Genetically Modified Foods***

- Clear majorities of Canadians are confident in the safety of food products in this country. However, this same level of confidence is not present for genetically modified foods. Even though some studies have found that genetically modified foods are not a large top-of-mind concern for most Canadians, a number of public opinion studies have found that, when asked directly about the safety of genetically modified foods, majorities of Canadians express doubts.

### ***Transparency***

- Overall, there is a desire on behalf of the general public for the government to be more open and transparent in its dealings in the biotechnology arena. For the public, a clear sign of this transparency is the availability of information.
- There is not a clear consensus of what this information should be. However, it appears that information on the risks and benefits of biotechnology and information describing the regulatory process are the most important information needs.

### ***Separation and Independence of Regulatory Functions***

- Despite the belief that governments can and should perform both regulatory and support functions for the biotechnology industry, Canadians do not react overly positively when asked to assess the federal government's ability to keep its regulatory and support activities concerning the Canadian biotechnology industry separate.
- While there is a desire for the government to attend to these two functions fairly equally, in the end, it is the regulatory role that is a higher priority for Canadians.

### ***Ensuring Safety During Research and Development Activities***

- Of the various public opinion and focus group reports that we reviewed, none specifically discuss safety issues during the research and development phase. Therefore, this represents an area that may need to be explored in the future.

### ***Opportunities for Public Involvement***

- In general, there is great support for the opportunity for public involvement in biotechnology issues but in the end, few Canadians would likely become actively involved. Ultimately, Canadians feel that decisions in this area should be left to experts or based on sound science rather than the opinions of the Canadian public.

### ***Post-Market Monitoring for Risks and Benefits***

- Canadians have concerns about the possible impacts of biotechnology on human health and on the environment. As a result of these concerns, Canadians feel that further research into the long-term health and environmental impacts should be a federal government priority in the biotechnology field.

### ***Capability and Capacity of the Regulatory System***

- There has been a weakening of the public's assessment of the federal government's performance in regulating biotechnology. At the same time, however, there is virtually no understanding of the government's biotechnology policy or regulations. Focus group reports suggest that these declining assessments are largely functions of both growing uncertainty about biotechnology itself and a general disenchantment with the perceived current capability of government. Canadians want to see the regulatory system well supported with the proper resources.
- Canadians overwhelmingly agree that government should increase its regulation of biotechnology, that the government should regulate the biotechnology sector more than others because of its unique nature, and that standards for genetically modified foods should be higher than for other foods in Canada.
- It is worth noting that confidence in the regulatory system increased when people were told about Canada's legislation governing regulation and their comfort level increases dramatically when the actual process is described.

### ***Information Provision to Support Informed Choice***

- There is overwhelming support that the government should inform people about biotechnology and let them decide for themselves whether they want to use biotechnology products.

- Even though Canadians want information to be available to them, most Canadians will only access such information when they feel it is necessary.
- Canadians are concerned about the inherent biases in the information they receive about biotechnology and genetically modified foods and, not surprisingly, they want this information to be neutral and accessible.
- There is little consensus on the primary source of balanced information and, in fact, consumers will obtain information from a number of sources. Also, it appears that confidence in the government as a source of objective information is waning.

### **Labelling**

- Canadians overwhelmingly want some form of labelling to provide informed choice regarding genetically modified foods. They want labels that are clear, accurate and simple. Canadian consumers definitely know when label wording is unappealing, unclear, and misleading but are not at all definite on the wording that they would see as clear or desirable.
- However, few of the studies we examined have explored people's preferences for mandatory versus voluntary labelling standards. Some research appears to suggest a preference for mandatory labelling, although the questions have not addressed this issue comprehensively. One focus group study suggests that many would accept voluntary labelling as a reasonable step. Further study of the preferences of Canadians in this regard may be needed.
- There is a contingent of both Canadians and Americans who want information on foods produced through biotechnology available to them in other means than labels, such as toll-free numbers, brochures, and web sites.

### **Environmental Stewardship**

- Although Canadians rate themselves as not very familiar with biotechnology, there is a concern that there is a potential impact of this technology on the environment and the need for this potential impact to be assessed. The environment is an area where a significant minority feel that the risks of biotechnology outweigh the benefits.
- Although agreement with this view has decreased since 1998, Canadians still feel that governments, rather than the private or not-for-profit sectors, should be primarily responsible for assessing the environmental impact of biotechnology.

### **Broader Social and Ethical Considerations**

- There is a general public perception that the ethical and moral dimensions of biotechnology are important, but the level at which ethics are considered to be important varies depending on the specific ethical questions considered. While

certain studies found that Canadians want morals and ethics to be an integrated part of biotechnology research, it appears that science should be the final arbiter over ethics and morals when biotechnology decisions are made.

- There were mixed perceptions of the government's role as the primary body responsible for making ethical decisions on behalf of the country. While certain Canadians felt that the government should have the primary responsibility for ensuring that ethical considerations are taken into account in biotechnology research, others felt that the government should resist making moral and ethical decisions on behalf of society.

## 2.0 INTRODUCTION

Biotechnology and genetically modified foods, in particular, are issues that have assumed greater prominence over the last few years. The debate over the risks and benefits of genetically modified foods and other biotechnology applications has intensified and both sides are often passionate in defence of their positions. With the increased prominence and intensifying debate, the public has increasingly been asked for their opinions and attitudes in a number of areas and subjects related to biotechnology, in general, and more specifically, regarding genetically modified foods.

As part of the analysis of the current environment, the Environics Research Group was asked by the Canadian Biotechnology Advisory Committee (CBAC) to undertake an analysis of existing public opinion research and other research reports regarding genetically modified foods and related biotechnology issues. While this is not an exhaustive report on every aspect of this area, this report provides a solid overview of recent public opinion in this area. The focus of this report is public opinion research that has been conducted in Canada, especially those projects conducted within the last three years.

The source data for this secondary analysis includes proprietary data from Environics' syndicated studies, as well as from other publicly available public opinion research Environics has conducted regarding genetically modified foods and related biotechnology issues. In addition, we reviewed other relevant data (custom and omnibus research obtained from other firms) that was obtained through CBAC's offices and other publicly available sources.

CBAC has identified 10 key issues related to the regulation of GM foods. These have been grouped under three broad themes

<b>Themes</b>	<b>Issues</b>
➤ Good governance	<ol style="list-style-type: none"><li>1. Transparency</li><li>2. Separation and independence of regulatory functions</li><li>3. Ensuring safety during research and development activities</li><li>4. Opportunities for public involvement</li><li>5. Post-market monitoring for risks and benefits</li><li>6. Capability and capacity in the regulatory system</li></ol>
➤ Information and choice	<ol style="list-style-type: none"><li>7. Information provision to support informed choice</li><li>8. Labelling</li></ol>



- Social and ethical considerations
- 9. Environmental stewardship
- 10. Broader social and ethical considerations

In this report, we have organized the findings of our secondary analysis along these ten issue areas, where possible. In addition, we have provided summaries of findings in other areas of interest such as awareness, familiarity, interest, and safety concerns about biotechnology and genetically modified foods.

### 3.0 AWARENESS, FAMILIARITY AND INTEREST

A number of public opinion research studies have shown that, over the last few years, increasing numbers of Canadians have heard, seen or read something about biotechnology and genetically modified foods (Pollara and Earncliffe, 2000c; Pollara, 1999a; Angus Reid 1999a; Angus Reid 2000; Environics International, 2000b). In addition, while consumer awareness of genetically modified foods on the grocers' shelves is low (approximately one-third to just under one-half), it also appears to be growing (Pollara and Earncliffe, 2000c; Angus Reid, 2000). This increased awareness of biotechnology and genetically modified foods is likely due to the increased media coverage these issues have been receiving since the mid 1990's. For example, in their report *Meeting the Public's Need for Information on Biotechnology (2000)*, Edna Einsiedel, Karen Findlay and Jennifer Arko noted that the number of biotechnology-related stories in the *Globe and Mail* went from about 200 in 1995 to over 500 in 1999.

It is interesting to note that, on an international scale, Canadians' level of awareness of genetically modified foods (i.e. heard or read "some" or "a lot" about GM foods) is quite high. Residents of Germany, Japan and Great Britain have higher levels of exposure to stories or information about genetically modified foods than Canadians, but Canadians have higher levels of exposure than residents of Australia, the United States, Mexico, China, Brazil, and India (Environics International, 2000b).

It also appears that biotechnology is becoming a more frequent topic of discussion among Canadians. Both Hoban's survey (2000) and Pollara and Earncliffe (2000c) report that a majority of Canadians say that they have spoken to someone about biotechnology at least once and, according to the Pollara findings, these numbers are up significantly from 1999. Not only has the likelihood that Canadians have discussed biotechnology increased but it also seems that the frequency of these discussions has increased as well. Three in four Canadians (73%, up a significant 24 points from July, 1999) discussed biotechnology or genetically modified organisms during the three months prior to an Environics International survey in February 2000. One in ten of these people (12%, up five points) discussed it often during this period and one in four (25%, up 11 points) discussed it several times. One in three Canadians (36%, up eight points) talked about biotechnology once or twice. Only three in ten people (28%, down 23 points) did not discuss biotechnology at all in the previous three months before the Environics International survey (Environics International, 2000a).

<b>Discussed Biotechnology (%) (Environics International, 2000a)</b>		
	February 2000	July 1999
Often	12	7
Several times	25	14
Once or twice	36	28
Never	28	51
<i>Over the past 3 months, have you talked with others about the topic of biotechnology or genetically engineered organisms?</i>		

This increasing awareness has not been accompanied by large increases in familiarity and understanding about biotechnology and genetically modified foods (Environics, 2000; Pollara and Earncliffe, 2000c; Angus Reid, 2000). Presently, the general public as a whole does not appear to be completely engaged with biotechnology issues. In follow-up focus group research, many group participants classified themselves as casual observers, rather than active followers or disinterested (Pollara and Earncliffe, 2000c). Edna Einsiedel described this situation very succinctly when she stated that “Canadians are increasingly aware of the applications provided by biotechnology but their image of what this technology is remains nebulous” (Einsiedel, 1997). This lack of understanding of biotechnology was also apparent in a series of focus group discussion conducted by the Consumers’ Association of Canada (2000b).

<b>Familiarity with Biotechnology (%)</b>					
	Environics April 1998	Pollara and Earncliffe October 1999	Pollara and Earncliffe February 2000	Environics March 2000	Pollara and Earncliffe September 2000
Very Familiar	6	5	6	5	7
Somewhat Familiar	39	48	50	38	49
Not very Familiar	33	33	29	35	30
Not at all familiar	22	14	15	27	14
<p><i>Environics question wording: Biotechnology is the application of science in the use of living organisms or their products to develop new products and processes. Would you say you are very familiar, somewhat familiar, not very familiar, or not at all familiar with biotechnology? Note: the only difference between the 2000 and 1998 wording was that the 2000 question had the phrase "or their products" in it.</i></p> <p><i>Pollara/Earncliffe question wording: Would you say you are very familiar, somewhat familiar, not very familiar, or not at all familiar with biotechnology?</i></p>					

With respect to genetically modified foods, the Angus Reid Group found that half of Canadians who are aware of genetically modified foods (50%) still only understand “a little” about genetically modified foods (Angus Reid, 2000). However, when all consumers are taken into consideration (those aware and unaware of genetically modified foods), Canadian consumers do have a better understanding of genetically modified foods than in 1998 (Angus Reid, 2000). It should be noted that this observed increase in understanding is only among those who profess to know “some” about genetically modified foods rather than those who profess to understand “a lot”.

#### **4.0 PERCEIVED SAFETY OF GENETICALLY MODIFIED FOODS**

Of the various public opinion and focus groups reported that we reviewed, there was plenty of discussion relating to such areas as perceived responsibility for ensuring safety of products produced through biotechnology (Environics, 2000; Environics, 1998a), concerns over food safety and confidence about the safety of Canadian food products (Environics International, 1999; Angus Reid, 2000), and the perceived safety of genetically modified foods (Environics International, 2000b, Council of Canadians, 2000; Pollara and Earncliffe, 2000c; Angus Reid 1999b, Angus Reid, 2000; Pollara 1999a; Pollara 1999b; Canadian Health Food Association, 2000, Rampton, 2001).

It is clear that Canadians feel that governments rather than industry or non-profit associations should be responsible for ensuring the safety of products produced through biotechnology (Environics, 2000; Environics 1998a).

Overall, clear majorities of Canadians are confident in the safety of food products in this country. Environics International (1999), the Angus Reid Group (2000), and Pollara and Earncliffe (200c) found between seven and eight out of ten Canadians are at least somewhat confident that the foods available for consumption are safe to eat.

However, this same level of confidence is not present for genetically modified foods. Even though some studies have found that genetically modified foods are not a large top-of-mind concern for most Canadians (Angus Reid, 1999b, Rampton, 2001), a number of public opinion studies have found that, when asked directly about the safety of genetically modified foods, majorities of Canadians express doubts. A few examples may help to illustrate this point. In a survey conducted for the Council of Canadians (1999), Environics found that 75 percent of Canadians familiar with genetically engineered foods worry about the safety of genetically modified foods. Similarly, a Canadian Health Food Association survey found that close to 60 percent of Canadians believe that genetically modified organisms pose a risk to the Canadian food supply (CHFA, 2000). On a global scale, Canada had the third highest proportion (out of ten countries), that suggested that they are very or somewhat concerned (75%) about genetically modified foods (Environics International 2000b). Pollara survey results also show that majorities of the Canadian population are either concerned or uncomfortable about foods derived through biotechnology and genetic engineering (Pollara, 1999a, Pollara 1999b; Pollara and Earncliffe, 2000c).

However, it should be noted that Canadians do not always seem to have negative opinions about the safety of genetically modified foods. In their recent work, Pollara and Earncliffe Research and Communications (2000) found that approximately three-fifths of Canadians agreed with the statements “since I haven’t heard about anyone getting sick from GM foods, I think GM foods are probably safe to eat” (59%) and “after all the public debate about GM foods, on balance I think genetically modified foods are generally safe to eat” (63%).

## 5.0 TRANSPARENCY

The issue of openness and transparency has been discussed in various focus group sessions (Pollara and Earncliffe, 2000c, Environics 1998b) conducted among the general public. Overall, there is a desire on behalf of the general public for the government to be more open and transparent in its dealings in the biotechnology arena. For the public, a clear sign of this transparency is the availability of information. While most Canadians will not seek out or read all the available information, their comfort level increases by knowing that the information is accessible for those who wish to review it. The fact that information is freely available seems to be sufficient to convince most that there is no hidden agenda; transparency seems to indicate that government is properly motivated and committed to informing citizens (Pollara and Earncliffe, 2000c).

According to additional focus group research conducted by Pollara and Earncliffe Research and Communications (2000c), the main contributing factor to consumer confidence in the process is transparency about the safety and regulatory approval process. As we have seen with many other processes, Canadians have become increasingly uncomfortable with the idea that important decisions that might impact their lives are being made behind closed doors. With respect to biotechnology issues, Canadians feel that deliberation and decision making should be transparent and inclusive of expertise from all sides of the debate (Pollara and Earncliffe, 2000a).

The need for openness and transparency was also seen as a key factor that would provide legitimacy to any advisory body, such as CBAC (Environics, 1998b).

In their 2001 consultation document *Regulation of Genetically Modified Food*, CBAC suggests that a challenge related to transparency is that there seems to be a lack of clear information available to Canadians on features of the regulatory system. If such information is available, it does not appear to be reaching the general public. Approximately one-quarter of Canadians report that they are somewhat or very familiar with the ways in which the federal government regulates biotechnology, while one-third are not at all familiar with the ways in which the federal government regulates biotechnology (Pollara and Earncliffe, 2000c). Furthermore, Canadians are unclear as to whether the federal government plays a major or minor role in regulating biotechnology (Environics, 2000). Focus group research findings reiterate that most Canadians have little idea about the federal government roles and responsibilities or the composition of the regulatory system, although most assumed that some sort of regulatory system was in place (Pollara and Earncliffe, 2000c; Consumers' Association of Canada, 2000b).

<b>Familiarity with Federal Government Regulation of Biotechnology (%) (Pollara and Earncliffe Research and Communications 2000c)</b>			
	September 2000	February 2000	October 1999
Very familiar	3	2	2
Somewhat familiar	20	24	23
Not very familiar	43	40	40
Not at all familiar	33	33	31
<i>How familiar would you say you are with the ways in which the federal government regulates biotechnology?</i>			

In addition, Canadians have similar low levels of familiarity with the ways in which research into the safety of food biotechnology is conducted in Canada. One-third of Canadians (33%) are either somewhat (30%) or very familiar (3%) with the ways in which research into the safety of food biotechnology is conducted in this country; two-thirds (65%) are not very familiar or not at all familiar (25%) with this system (Pollara and Earncliffe, 2000c).

While it is clear that Canadians feel that the availability of information is a sign that the government is being open and transparent, there is not a clear consensus of what this information should be. However, a number of suggestions have been put forward in the studies we reviewed and a few concrete ideas did emerge. It appears that information on the risks and benefits of biotechnology products, such as genetically modified foods, is important (Pollara and Earncliffe, 2000c, Filière agroalimentaire du Québec, avril 2000, Environics, 1998b). Information describing the regulatory process or the measures taken to ensure the safety of food biotechnology (National Institute of Nutrition, 1999a, 1999b, Pollara and Earncliffe, 2000c, Consumers' Association of Canada, 2000a) also received some prominence in the literature. Other information demands ranged from basic information, such as an overview of the field, the issues involved and some of the basic roles and responsibilities of the federal government (Pollara and Earncliffe, 2000c), to specific requests, such as how genetically modified foods were modified, what kind of genetic materials were used, and for what purposes this modification was done (National Institute of Nutrition, 1999b). In the end, the key is that, for any information that is provided, Canadians want it to be accurate and balanced.

## 6.0 SEPARATION AND INDEPENDENCE OF REGULATORY FUNCTIONS

In a report commissioned by the federal government, the Royal Society of Canada (2001) argued

*“if the same government agency that is charged with the responsibility to protect the public health and environmental safety from risks posed by technologies also is charged with the promotion of that same technology, and if its safety assessments are, by official policy, balanced against the economic interests of the industries that develop them, this represents, from the point of view of both the public and the industrial stakeholder, a significant conflict of interest”.*

This report suggests that, through official statements and documents, the Canadian Food Inspection Agency and Agriculture and Agri-Food Canada are in such a conflict of interest position. In addition, the Auditor General has also criticized the government’s general policy of giving regulatory agencies the task of promoting as well as regulating Canadian industries.

However, for the Canadian public, this apparent “conflict of interest” is not as cut and dry as one might think. Overall, Canadians believe that the federal government can and should act as both regulators and supporters of industry. According to a September 2000 Pollara and Earnscliffe Research and Communications survey, an overwhelming majority of Canadians (72%) believe that the federal government can and should be involved in regulating industry and supporting industry at the same time, as long as the two functions are separated (between departments); Less than one-quarter (23%) felt it was impossible to do both. Following from the findings of this survey, focus group research conducted by Pollara and Earnscliffe indicated that, as long as the functions are clearly separate, most participants believe that these functions can co-exist within the government. Many believe they can even co-exist within departments, given appropriate separation (Pollara and Earnscliffe, 2000c). On the other hand, other focus group participants suggested that it is critical that the government be seen as free of conflict of interest and the regulation of biotechnology must rest with different departments than those responsible for the promotion of the technology (Consumers’ Association of Canada, 2000a).

Furthermore, three-fifths of Canadians (61%) feel that, because biotechnology affects society in a variety of ways, authority over the development and management of biotechnology products should be coordinated among a group of federal departments rather than having control rest with one federal department (Environics, 2000).

Despite the belief that governments can and should perform both regulatory and support functions for the biotechnology industry, Canadians do not react overly positively when asked to assess the federal government’s ability to keep its regulatory and support activities concerning the Canadian biotechnology industry separate. Only slightly more than one-quarter of Canadians (27%) suggest that the federal government is doing an excellent (2%) or good (25%) job at separating these two functions. A

plurality (40%) feel the government is doing a fair job in this area, while another one in ten Canadians (12%) believe they are doing a poor job (Pollara and Earnscliffe, 2000c).

In focus group research conducted as part of the Renewal of the Canadian Biotechnology Strategy project, the Environics Research Group found that Canadians have some reservations about the ability of the federal government to truly communicate with Canadians on the substance of the issues surrounding biotechnology; they think that companies involved with biotechnology would most persuasively lobby for decisions that would benefit their interests to the detriment of the general public (Environics, 1998b). Likewise, Pollara and Earnscliffe Research and Communications also found in their focus group research work that some Canadians raised concerns that the government's industry support function would take precedence over the government's regulatory role. For some individuals in these focus group sessions, the lack of labelling of genetically modified food suggests that corporate interests are forcing agencies like the Canadian Food Inspection Agency to neglect its public interest role in food safety (Pollara and Earnscliffe, 2000c).

Even though Canadians do not attach a high priority to the government assisting biotechnology companies compared to other responsibilities in the realm of biotechnology, they nonetheless assign the government relatively high marks for their performance of this task. Canadians ranked "helping biotech companies be more innovative and competitive" last of 11 federal government priorities. However, at the same time, Canadians felt this was an area of strength (2<sup>nd</sup> out of 11) with respect to the government's actual performance (Pollara and Earnscliffe, 2000c).

It appears that Canadians realize, appreciate, and support the fact that the federal government must deal with the dual functions of regulation and support for industry. In September 2000, a plurality of Canadians (46%) felt that the federal government was putting equal emphasis on its regulatory and support roles in the field of biotechnology; one in five (22%) suggested a greater emphasis was being put on the support role, while one in six (16%) argued that a greater emphasis was being put on the regulatory role. However, in the same survey, Canadians suggested that, in the future, they would like to see a more equal emphasis on these two roles (60%) or an increased emphasis on the regulatory function (27%), while fewer Canadians (10%) argued for more emphasis on the support role for the biotechnology industry (Pollara and Earnscliffe, 2000c). While there is a desire for the government to attend to these two functions fairly equally, in the end, it is the regulatory role that is a higher priority for Canadians.

The priority of the regulatory role for governments is even more dominant when Canadians assess government priorities in the biotechnology area. Canadians continually place a greater emphasis on the government performing a regulatory or oversight role rather than one promoting the industry. For example, when Canadians were asked to identify who should have primary responsibility for six different roles and activities in the biotechnology area, they were much more likely to view governments as being responsible for making and enforcing regulations concerning the safe use of biotechnology (63%) or determining the human health safety of products produced



through biotechnology (50%) than developing markets for biotechnology products in other countries (38%) (Environics, 2000). Similarly, other research shows that while Canadians want the government to ensure economic benefits for Canada or help biotechnology companies be more innovative and competitive they are more likely to suggest that the priorities of the federal government in the field of biotechnology should be health and environmental stewardship roles (Pollara and Earncliffe, 2000c). The importance of these oversight roles can be further seen in Canadians' strong level of agreement (88%) that the primary function of the federal government in the field of biotechnology is to understand and manage the risks while working to gain the benefits (Pollara and Earncliffe, 2000c).

<b>Primary Responsibility – Biotechnology-Related Activities (%) (Environics, 2000)</b>						
	Gov'ts	Private Industry	Non-Profit Associations	Individual Citizens	All/Combination	DK/NA
Making and enforcing regulations concerning the safe use of biotechnology	63	6	15	9	6	1
Determining the human health safety of biotechnology products	50	8	21	11	8	2
Assessing new biotechnology products to ensure that they do not harm the environment	45	11	26	7	8	2
Developing markets for Canadian biotechnology products in other countries	38	36	12	4	6	3
Conducting research on biotechnology products	32	33	21	3	8	2
Manufacture and distribution of biotechnology products	29	43	16	6	5	2
<i>Who should have primary responsibility for undertaking the following specific roles or activities - governments, private industry, non-profit associations, such as consumer or environmental groups, or individual citizens?</i>						

## **7.0 ENSURING SAFETY DURING RESEARCH AND DEVELOPMENT ACTIVITIES**

Of the various public opinion and focus group reports that we reviewed, none specifically discuss safety issues during the research and development phase. Therefore, this represents an area that may need to be explored in the future.

## **8.0 OPPORTUNITIES FOR PUBLIC INVOLVEMENT**

Canadians have clear views with respect to public involvement in biotechnology issues. In general, there is great support for public involvement but, in the end, few Canadians would likely become actively involved. Ultimately, Canadians feel that decisions in this area should be left to experts or based on sound science rather than the opinions of the Canadian public.

It is clear that, when asked, the general public overwhelmingly supports opportunities for public involvement in discussions about important biotechnology issues. In a survey conducted for Health Canada, the Environics Research Group found that 91 percent of Canadians strongly (64%) or somewhat support (27%) the government consulting the public on issues pertaining to biotechnology (Environics, 2000). Similarly, Pollara and Earncliffe Research and Communications found that a clear majority of Canadians (88%) either strongly (52%) or somewhat agree (36%) that the government should conduct public hearings or consultations about safety, regulation, and support to biotechnology (Pollara and Earncliffe, 2000a). Canadians tend to reject the notion that biotechnology is so complex that public consultation is a waste of time (Pollara and Earncliffe, 2000a).

Further support for public consultation on biotechnology matters was found by Dr. Edna Einsiedel in her review of public attitudes toward biotechnology (1997) and in the 1999 citizen's jury research process entitled "*Citizens' Conference on Food Biotechnology, Designer Genes at the Dinner Table*" (National Institute of Nutrition, 1999a). In the citizen's jury, the participants called for the public to be solicited for opinions and to be educated about biotechnology; they referred to a provision in the 1998 Canadian Biotechnology Strategy which recognized the urgency of public participation in addressing biotechnology (NIN, 1999a). In addition, the jury recommended that public participation be ongoing in many different formats.

Despite this clear call for public involvement, most participants in focus group research have indicated that they would not personally participate in town halls or consultation sessions regarding biotechnology (Pollara and Earncliffe, 2000c). However, even though they may not personally participate in such public consultations, the Canadian public still wants these consultations to take place, especially for those who may be interested in participating. It appears that the demand for opportunities for public involvement is driven by a sense that consultation implies government openness (Pollara and Earncliffe, 2000c). Therefore, public consultations may serve to alleviate some Canadians' concerns about secrecy or lack of concern for the public interest on behalf of governments.

When asked about possible methods of participating in the public debate on biotechnology and genetic engineering, Canadians prefer to take a more passive approach and very few want to become actively involved in the process. According to a 1999 Pollara survey, Canadians most prefer to learn about biotechnology through the mass media (26%). Furthermore, the second and third most popular approaches were

to leave it to experts to debate the issue (24%) or leave it to the various non-government organizations to speak on their behalf (18%). In contrast, only one in six Canadians (16%) indicate that they would take part in public discussion forums organized in their community, while one in ten (9%) would call in to debates held on television or radio, and another three percent would participate in letter writing campaigns (Pollara, 1999b).

However, even though they want to have the opportunity to be consulted on biotechnology issues, the public places greater importance on decision-making related to biotechnology that is based on expert decisions and sound science rather than the views of the public. For example, when it comes to making decisions about the management and control of biotechnology products, three-fifths of Canadians (59%) suggested scientific evidence should be given more weight, while three out of ten (30%) felt that people's concerns and perceptions should be the priority (Environics, 2000). As the table below suggests, Pollara and Earncliffe Research and Communications also found similar results when they asked Canadians to choose between decisions about biotechnology based on expert advice or the views of the public (Pollara and Earncliffe, 2000c).

<b>Biotechnology Decision-Making: Expert Advice vs. Views of the Public (%) (Pollara and Earncliffe Research and Communications 2000)</b>		
	September 2000	February 2000
Expert Advice	61	59
Views of Public	31	34

*Which of the following views is closest to your own: Decisions about biotechnology should be based mainly on the views and advice of experts about the risks and benefits. OR. Decisions about biotechnology should be based primarily on the average Canadian's views of risks and benefits.*

## **9.0 POST-MARKET MONITORING FOR RISKS AND BENEFITS**

Overall, a number of studies have highlighted Canadians' concerns about the possible impacts of biotechnology on human health and possible long-term impact on the environment (Environics International, 2000a; Environics, 2000, Pollara and Earncliffe, 2000c; Pollara 1999a; Consumers' Association of Canada, 2000b). For example, three-fifths of Canadians who are uncomfortable with what they have heard about foods derived through biotechnology and genetic engineering (58%) suggest that their primary concern about such foods is the long-term human health effects, while another 10 percent suggest that their primary concern is the long-term environmental effects (Pollara, 1999a).

During focus group discussions conducted by the Consumer's Association of Canada, participants expressed their concerns about an apparent lack of long-term tests of the effects of biotechnology. Furthermore, focus group participants suggested that results of any long-term tests that had been conducted should be available to enable Canadians to more clearly identify tangible consumer benefits and risks (Consumers' Association of Canada, 2000a).

When Canadians assessed possible federal government priorities in the biotechnology field there was a definite emphasis on health and environmental protection and research on the long-term health and environmental impacts of biotechnology. Of the 11 priority areas tested in a 2000 study, long-term health research and long-term environmental research ranked 1<sup>st</sup> and 4<sup>th</sup>, respectively (Pollara and Earncliffe, 2000c). While these two research areas are priorities for the Canadian public, they are less convinced that the federal government is doing an effective job in these areas. In fact, long-term environmental research ranked in a tie for sixth (out of 11 areas) and long-term health research finished in a tie for 8<sup>th</sup> when Canadians assessed the government's performance in these perceived priority areas (Pollara and Earncliffe, 2000c).

Canadians' concerns about the long-term health and environmental impacts of biotechnology are further seen in their overwhelming agreement that the federal government should conduct further research into the long-term health impacts (86% agreement) and long-term environmental impacts (84% agreement) of biotechnology before allowing any further use of biotechnology (Pollara and Earncliffe, 2000c).

## 10.0 CAPABILITY AND CAPACITY OF THE REGULATORY SYSTEM

As was noted previously, Canadians have very little familiarity with the ways in which the federal government regulates biotechnology. Furthermore, assessments of the capability and capacity of the regulatory system tend to be at a top level only.

A number of public opinion studies have explored the Canadian public's overall view of the government's performance and effectiveness in the area of regulating biotechnology (Pollara and Earncliffe, 2000b; Pollara and Earncliffe, 2000c, Angus Reid 2000; Environics, 1998a, Environics, 2000, Council of Canadians, 1999, Environics International, 2000a). In general, these studies have shown that there has been a weakening of the public's assessment of the federal government's performance in regulating biotechnology. At the same time, however, there is virtually no understanding of the government's biotechnology policy or regulations. Environics International has been tracking public opinion on this question for a number of years and they have noticed that between 1995 and 2000, the number of Canadians that strongly disagreed with the statement "that biotechnology is being properly regulated" doubled from 13 to 26 percent, at the expense of the proportion of those having no opinion or expressing tentative agreement that this area is properly regulated. Correspondingly, the proportion of people believing that biotechnology is properly regulated has dropped nine points from 48 to 39 percent since 1995 (Environics International, 2000a).

<b>Biotechnology Being Properly Regulated 1995-2000 (%) (Environics International, 2000a)</b>				
	2000	1999	1997	1995
Strongly agree	6	8	8	8
Somewhat agree	33	34	42	40
Somewhat disagree	28	21	27	19
Strongly disagree	26	20	17	13
DK/NA	10	16	6	21

*Biotechnology refers to scientists creating new human-made strains of plants and organisms in the laboratory for the benefit of society. Do you strongly agree, somewhat agree, somewhat disagree, or strongly disagree that biotechnology is being properly regulated today?*

Negative opinions of the regulation of biotechnology are even stronger when the federal government is included in the equation. As we identified in Section 6 (*Separation and Independence of Regulatory Functions*), Canadians primarily see governments, rather than other sectors such as private industry or non-profit groups, as being responsible for the regulation of biotechnology (Environics, 2000; Environics, 1998a) and, in general, Canadians offer only tepid approval of their performance (Environics, 2000; Environics, 1998a; Pollara and Earncliffe, 2000c). Furthermore, negative assessments of the government's performance in this area have increased in recent years. Follow-up focus group research on the question of the federal government's ability to effectively regulate the biotechnology industry suggests that declining assessments are largely functions of both growing uncertainty about biotechnology itself and a general disenchantment with the perceived current capability of government. Focus group participants expressed

concerns that government cutbacks have eroded the effectiveness of the regulatory system and the priority was to ensure that this system is well supported with human and financial resources (Pollara and Earnscliffe, 2000c). The Citizen’s Jury research project also suggested that, while participants had faith in Canada’s regulatory agencies, they cautioned that these agencies need proper funding to do their work (National Institute of Nutrition, 1999a). It seems clear that Canadians are concerned about the regulation of biotechnology and they have some fears that the proper resources may not be currently dedicated to effectively manage this task.

<b>Perceived Federal Government Performance Regulating Biotechnology (Environics, 1998 &amp; 2000; Pollara and Earnscliffe, 2000)</b>			
	Environics April 1998 %	Environics March 2000 %	Pollara/Earnscliffe September 2000 %
Very good/Excellent job	4	2	1
Good job	24	22	11
Fair job	43	42	36
Poor job	12	29	26
DK/NA	16	6	26
<i>Environics question wording: Overall, do you think the federal government is doing a very good job, a good job, a fair job, or a poor job of regulating the development of biotechnology?</i> <i>Pollara/Earnscliffe question wording: Would you say the federal government is doing an excellent, good, fair, or poor job of regulating biotechnology?</i>			

It appears that, because of these concerns about the regulation of biotechnology and concerns about the government’s performance in this area, Canadians would like to see some changes to the system. Einsiedel (1997) argues that concerns about how biotechnology is being managed are evident in views that current regulations are not sufficient. Canadians overwhelmingly agree that government should increase its regulation of biotechnology, that the government should regulate the biotechnology sector more than others because of its unique nature, and that standards for genetically modified foods should be higher than for other foods in Canada (Pollara and Earnscliffe, 2000b; Pollara and Earnscliffe, 2000c).

In their most recent study of public attitudes toward biotechnology issues, Pollara and Earnscliffe Research and Communications found that a majority of Canadians are confident that, once a product developed using biotechnology has been evaluated and approved by the federal government, the product is safe. It is worth noting that this confidence increased when people were told about Canada’s legislation governing regulation and their comfort level increases dramatically when the actual process is described (Pollara and Earnscliffe, 2000c). Therefore, to increase consumer confidence in the regulatory system, it may be of benefit for the government to better inform Canadians about the regulatory process. However, such an information campaign will not be without its own challenges as many Canadians are cynical about the biotechnology area, especially genetically modified foods. For example, the Angus Reid Group found that, even though consumers largely say they are very or somewhat confident in the government providing safe products, only 50% of Canadians trust the

government to act in the best interest of the consumer when it comes to genetically modified food; in addition, only 32 percent are confident that genetically modified foods that reach the marketplace are safe for consumers (Angus Reid, 2000).



## **11.0 INFORMATION PROVISION TO SUPPORT INFORMED CHOICE**

One of the issues being addressed by the Canadian Biotechnology Advisory Committee is the provision of information on the production, regulation, nutritional value, risks and benefits of various foods available on the Canadian market. Providing this information promotes autonomy and the ability for Canadian consumers to make an informed choice (Canadian Biotechnology Advisory Committee, 2001). It is of interest, therefore, to determine the perceptions of Canadian consumers regarding the information that is currently being provided, the system of delivery, and the sources for that information.

As noted earlier, Canadians have a lack of familiarity and understanding of biotechnology and related issues. This lack of familiarity may account for the desire of Canadian consumers to be informed about biotechnology and related issues. The desire for information can be clearly seen in a recent survey by Pollara and Earncliffe, 2000c). Ninety-three percent of Canadians agreed (65% strongly) that the government should inform people about biotechnology and let them decide for themselves whether they want to use biotechnology products (Pollara and Earncliffe, 2000c). Furthermore, the Angus Reid Group (2000) found that two-thirds (68%) of Canadians expressed a willingness to learn more about genetically modified foods.

Focus group reports also indicated a desire to have more information about important biotechnology issues. Focus group participants who felt that they should always be informed said that, since the government is already making the public aware of air and water quality, it follows that people would want to know about genetically modified foods (National Institute of Nutrition, 1999b). Focus group participants in Canada as well as China, Germany, Great Britain, Japan and the United States felt that there was the possibility of a backlash if consumers felt that they were being intentionally misinformed by the government and industry about biotechnology and related issues (Environics International, 1999).

A significant minority of Canadians (34%) said that if more information on biotechnology were available, they would immediately take the time to seek out this information and learn more about the issue (Pollara and Earncliffe, 2000c). However, 65 percent would only get the information at a time when they felt it was necessary to know more about biotechnology. Further, 72 percent would want the information made available to them only when they wanted it (Pollara and Earncliffe, 2000c). Therefore, in general, Canadians tend to be rather passive in their pursuit and review of biotechnology information.

Canadians are concerned about the inherent biases in the information they receive about biotechnology and genetically modified foods (Angus Reid Group, 2000; Environics, 1998b). Not surprisingly, Canadians want the information on biotechnology that they receive to be neutral and accessible (Pollara and Earncliffe, 2000c). However, research indicates that the provision of information perceived as unbiased will be very challenging. For example, in one study reviewed, most focus group participants indicated that they initially became aware of biotechnology through the

media, and all participants in this study expressed distrust or scepticism about the information due to editorial and media biases (Consumers' Association of Canada, 2000b).

There is little consensus on the primary source of balanced information and, in fact, consumers will obtain information from a number of sources. Although, in previous years, Canadians believed that the government should be the primary source of balanced information on biotechnology (Einsiedel, Findlay & Arko, 2000), opinion is now divided and confidence in the government as a source of objective information appears to be waning. One-third of Canadians (36%) think that the responsibility for providing information about genetically modified foods should lie with the government; This proportion has decreased since 1998 (Angus Reid Group, 2000). This may be due, in part, to reduced trust in the government as well as general uncertainty as to who should be responsible for the provision of this information (Angus Reid Group, 2000). It may also be because, as indicated by focus group participants in sessions conducted by the Consumers' Association of Canada, there is belief that government decision-making is generally influenced by industry and pressure groups (Consumers' Association of Canada, 2000b).

A number of other preferred sources of biotechnology information have been identified in other public opinion studies. When asked who should be responsible for providing this information, some Quebecers preferred that scientists provide the information, and as a second choice, looked to the government for this information (Filière agroalimentaire du Québec, avril 2000), while other Canadians saw environmental groups as most reliable information providers (23%) followed by consumer organizations (17%) (Hoban, 2000). However, a clear distrust of information provided by environmental groups such as Greenpeace, has also been indicated by focus group participants in another study (Consumers' Association of Canada, 2000a).

Canadians do not feel that, as consumers, they have enough information to make an informed choice about the potential uses of biotechnology in food products (Environics, 1998b). Ninety-five percent of Canadians believed that they should have the right to choose whether or not they buy foods containing genetically modified ingredients (Canadian Health Food Association Health Study, 2000). In keeping with this issue, focus group participants recognized that making consumer choices is the most powerful tool they have at their disposal to influence the direction of biotechnology in this country (Environics, 1998b).

Canadian consumers make choices that show their mixed opinions on genetically modified foods. One study (Pollara and Earncliffe, 2000c) found that when they discovered that a previously purchased food contained genetically modified ingredients, 27 percent would continue to purchase the food, 30 percent would buy it but find out more about it, 29 percent would not buy it until they had found out more and only 11 percent would never buy it again. However, another study (Canadian Health Food Association Health Study, 2000) reported that over one-quarter of Canadians were more likely to shop at a health food store as compared to two years ago, and 38 percent

were more likely to purchase certified organic foods than they were two years ago because these foods do not contain genetically modified ingredients.

The issue of informed choice in order to make better consumer decisions leads to the issue of how the public can be informed about genetically modified foods. One avenue already being examined is the issue of labelling.

## 12.0 LABELLING

Under Canadian law, requirements that currently exist for the labelling of genetically modified foods address aspects of food safety such as nutritional changes, compositional changes and the presence of allergens (Canadian Biotechnology Advisory Committee, 2001).

The desire for an informed choice has led many Canadians to ask for some form of labelling on genetically modified foods. In four surveys that examined Canadians views on labelling, respondents overwhelmingly (between 72% and 98%, according to the study in question) wanted labels on genetically modified foods. A few examples may help illustrate this claim. Ninety-eight percent of Canadians in a Toronto Star poll (June 22, 1998) wanted all genetically modified food to be labelled. A CHFA study indicated that 94 percent of respondents across Canada believed that foods containing genetically modified organisms should have a label indicating that fact (Canadian Health Food Association Health Study, 2000). A national survey by the Council of Canadians (1999) found that 87 percent of Canadians who were familiar with genetically engineered foods wanted genetically modified foods to be labelled. Hoban's survey (2000) indicated that, when Canadians were asked whether they agreed or disagreed with the statement "it is not worth putting labels on genetically modified foods", 72 percent disagreed.

<b>Desire for Labelling of Genetically Modified Foods by Research Study (%)</b>				
	Toronto Star June 22, 1998	Canadian Health Food Association Health Study 2000	Council of Canadians 1999	Hoban 2000
Desire for labels on genetically modified foods	98	94	87	72
<p><i>Toronto Star question wording: In Canada, genetically engineered food must be labelled only when it changes the nutritional value or could pose a health risk to some people. Should all genetically engineered foods be labelled?</i></p> <p><i>Council of Canadians question wording: Do you strongly agree, somewhat agree, somewhat disagree or strongly disagree with each of the following statements...? Genetically engineered foods should always be labelled as such.</i></p> <p><i>Hoban question wording: It is not worth putting special labels on genetically modified foods – 72% disagreed</i></p> <p><i>CHFA question wording: I am going to read a short list of statements concerning genetically modified ingredients. Please tell me whether you strongly agree, agree, disagree or strongly disagree with each statement ... Foods that contain genetically modified ingredients should have a label on them which states that there are ingredients in the food which have been genetically modified.</i></p>				

When pressed further, two-thirds of Canadians (67%) feel that it is important to know whether the food they eat contains genetically modified organisms (Canadian Health Food Association Health Study, 2000) and that information about the processes used in the production of these foods should be readily available to the consumer (Consumers' Association of Canada, 1998; Environics, 1998b).

It is interesting to note that few studies explored people's preferences for mandatory versus voluntary labelling standards. When this issue has been investigated, opinions appear to be mixed. Pollara and Earncliffe Research and Communications (2000a) found that while many Canadians accept voluntary labelling as a reasonable step, others (primarily Canadians who tend to be more interested and involved in public policy issues) tended to lean toward mandatory labelling as a preferred solution.

Some of those who are against the labelling of genetically modified foods indicate that this type of labelling would translate into added cost to the manufacturer and this, in turn, would be translated into increased costs for the consumer. When asked whether they would be willing to pay more for foods that are genetically modified and labelled as such, 61 percent of Canadians agreed. This level of agreement was the highest among the eight countries surveyed by the Angus Reid Group in 2000. In another survey, four in 10 Canadians indicated that they would continue with the purchase of genetically modified foods that they normally buy and only half of the remaining six in 10 shoppers would delay their purchase until they had more information (Environics, 1998a).

When respondents in 10 countries (including Canada and the United States) were asked about their willingness to buy genetically modified foods with labels that did not indicate the benefits of these foods, there were more people in each country who would discontinue buying genetically modified labelled foods than who would continue to buy these foods. When a benefit condition, such as benefits for the environment, the requirement of fewer pesticides or increased nutritional value were added, there was a dramatic improvement in willingness to buy genetically modified labelled foods. The benefit of improved nutrition has somewhat greater motivational power than either the environmental or the reduced pesticide benefit (Environics International, 2000a).

There is general desire for genetically modified food to be labelled and some consensus as to the information that labels should not contain. A majority of Americans (55%) said that simply labelling the products as containing biotechnological ingredients did not provide enough information for consumers (International Food Information Council, 2000), a finding borne out in a Canadian qualitative study for the National Institute of Nutrition on labelling (National Institute of Nutrition, 1999b). There is a consensus that the most important information concerns nutrition, and that the product should be labelled if the nutritional content has actually changed as a result of the genetic modifications (Hoban, 2000, Paragas, 1999).

Canadians want labels that are clear, accurate and simple (National Institute of Nutrition, 1999b). Part of the clarity and utility of labels might be found not only in the wording but in other aspects such as design. Focus group participants have expressed interest in a system of symbols, for example, one symbol to indicate the presence of an ingredient made from BT corn (Consumers' Association of Canada, 2000b). In addition, label wording has an effect on the level of consumer understanding and there is a further link between this understanding and the perceived value of a label message (National Institute of Nutrition, 1999b). Canadian consumers definitely know when label

wording is unappealing, unclear, and misleading but are not at all definite on the wording that they would see as clear or desirable.

Examples of negatively perceived labels are found in a few studies. Canadians perceived numerous messages on foods with a number of biotechnology-created ingredients as both 'complex' and 'unreadable' (National Institute of Nutrition, 1999b). Furthermore, consumers had negative perceptions of scientific terminology used on labels (Environics, 1998b; National Institute of Nutrition, 1999b).

When asked about specific scientific terminology, respondents perceived the terms 'contains genetically modified X' or 'product of biotechnology' negatively and saw the term 'genetically modified' either negatively or neutrally (Environics, 1998b; National Institute of Nutrition, 1999b). The former two terms were often misinterpreted and generated concern (National Institute of Nutrition, 1999b) while the latter phrase was viewed in terms of 'tampering' and 'completely against nature' (Environics, 1998b). The phrase 'genetically enhanced' received mixed reviews from Canadians. Some focus group participants saw it positively (Environics, 1998b) and others did not understand it well and felt that the phrase did not inspire confidence (National Institute of Nutrition, 1999b). As well, when asked about the phrase 'may include X', respondents tended to perceive this very negatively and almost derisively (Environics, 1998b). In fact, the Consumers' Association of Canada, in their presentation to the Standing Committee on the Labelling of Genetically Modified Organisms (2000c) underscored the negative impact of such a phrase by stating that this term was meaningless and totally useless.

The only positively received label found in the literature reviewed was the message that biotechnology was NOT used in a particular product (National Institute of Nutrition, 1999b). Participants in this study felt that producers who use negative labelling were at an advantage over other producers (National Institute of Nutrition, 1999b). The success of the one label indicating that biotechnology was not used in products may have implications for the acceptance level of Canadians toward genetically modified foods in general. It should be noted that participants in the same study expressed concerns that negative labelling may imply that products, which do not feature such labels, may contain genetically modified foods regardless of whether or not this is actually the case.

In addition to labels, a number of other information sources have been identified. In fact, there is a contingent of both Canadians and Americans who want information on foods produced through biotechnology available to them in other means than labels, such as toll-free numbers, brochures, and web sites (Hoban, 2000; International Food Information Council, 2000; Paragas, 1999). The need was underscored in focus groups conducted by the Consumers' Association of Canada where participants indicated that information from toll-free numbers, accompanied by the company name, and with the phones answered by a real person rather than a voice message system, would be trusted (2000b).

### **13.0 ENVIRONMENTAL STEWARDSHIP**

The advent of any new technology also introduces a host of social and ethical implications that should be taken into account. Environmental stewardship, one of these issues, builds on traditional environment protection resources such as assessments for environmental impacts as well as protection and enforcement activities (Canadian Biotechnology Advisory Committee, 2001). Stewardship, as outlined in this consultation document, involves leadership with respect to the products and technologies one generates, and the consideration of possible long-term cumulative impacts of all kinds (Canadian Biotechnology Advisory Committee, 2001). Canadian perceptions of this issue can influence the priority given within the larger area of environmental stewardship.

Although Canadians rate themselves as not very familiar or aware of biotechnology, there is a concern that there is a potential impact of this technology on the environment and a need for this potential impact to be assessed (Environics, 1998b; Environics International, 2000a; 2000b; Pollara, 1999a; Pollara and Earncliffe, 2000a; 2000b; 2000c). One study found that Canadians emphasized health and environmental stewardship along with a strong focus on research into the long-term health and environmental impacts of biotechnology (Pollara and Earncliffe, 2000c). Research into the long-term environmental impacts of biotechnology and related issues was the fourth most important issue in a list of 11 biotechnology issues tested in this study, with two-fifths of Canadians (41%) rating it as a priority. Furthermore, when asked whether further research into the long-term environmental impacts of biotechnology should be conducted before allowing any further use of biotechnology, 84 percent of Canadians agree (52% strongly) (Pollara and Earncliffe, 2000c). In another study, Canadians rated various concerns about biotechnology. Possible impacts on human health were rated as most important (31%). The government's ability to ensure safety (17%) and the possible long-term impact on the environment (17%) were both next in importance (Environics International, 2000a). Of those Canadians who are uncomfortable with what they have heard of foods derived from biotechnology, ten percent are most concerned with the long-term environmental impacts (Environics International, 1999). Finally, 16 percent of Canadians remain generally concerned about the impacts of biotechnology on the environment (Environics International, 1999).

Although agreement with this view has decreased since 1998, Canadians still feel that governments, rather than the private or not-for-profit sectors, should be primarily responsible for assessing the environmental impact of biotechnology. In 2000, 45 percent of Canadians felt that the government should be primarily responsible for assessing new biotechnology products to ensure that they are not harmful to the environment (Environics, 2000). This is down from 61 percent of Canadians who held this belief in 1998 (Environics, 1998a).

A general perception held by Canadians is that maintaining biodiversity should be an important consideration when introducing new products (Environics, 1998a). Ninety percent of Canadians agreed with this statement, and 43 percent indicated that this

issue was very important. Similarly, other Canadians are concerned about how genetically modified organisms will interact with other organisms in the same environment (Consumers' Association of Canada, 2000b).

When considering the impact of biotechnology on the environment, it appears that perceptions are modified by the comparison of the risks and the benefits associated with this technology. In an example of this type of risk/benefit analysis used for biotechnology issues, Canadians were asked to indicate whether the benefits outweighed the risks, were equal to the risks, or whether the risks outweighed the benefits in a series of areas. A plurality of Canadians found that the benefits and risks were fairly equal for the respondent as an individual (46%), the health and well-being of Canadians in general (45%), the environment (43%) and the Canadian economy (42%). However, it is worth noting that the issue of the environment had the largest proportion of respondents (albeit still a minority) that indicated that the risks of biotechnology products outweighed the benefits (30%) (Environics, 2000).

<b>Benefits versus Risks (%) (Environics 2000)</b>				
	Benefits outweigh risks	Benefits and risks are fairly equal	Risks outweigh benefits	DK/NA
The Canadian Economy	36	42	16	6
The health and well-being of Canadians in general	31	45	21	3
Yourself as an individual	26	46	23	4
The environment	23	43	30	5
<i>Based on what you know, would you say that when it comes to biotechnology products, the benefits outweigh the risks, the risks outweigh the benefits or the benefits and risks are fairly equal for ...? a) Yourself as an individual b) The health and well-being of Canadians in general c) The Canadian economy d) The environment</i>				



## **14.0 BROADER SOCIAL AND ETHICAL CONSIDERATIONS**

The CBAC consultation document (2001) identified broad social and ethical issues related to the production of genetically modified foods and their introduction into different societies. It was outlined that these issues were related to justice, beneficence and the respect for diversity and traditional knowledge.

There is a general public perception that the ethical and moral dimensions of biotechnology are important, but the level at which ethics are considered to be important varies depending on the specific ethical questions considered. One group of studies has found that Canadians want morals and ethics to be an integrated part of biotechnology research. The National Institute of Nutrition (1999) discussed the Citizen's Jury findings where participants recommended a Code of Ethics reflecting Canadian values be developed by CBAC and be applied as part of the regulatory process for food biotechnology products. Further evidence of the importance of ethics in biotechnology was found in the Einsiedel, Findlay and Arko (2000) study, where the results indicated that ethical and social dimensions play a role in judgements regarding food concerns. Survey evidence showed that 11 percent of Canadians were concerned about the ethical and social dimensions related to biotechnology (Environics, 1998a) and 13 percent of Canadians were most concerned about the moral and ethical questions of using biotechnology (Environics, 1998a). Furthermore, Canadians' concern about the overall moral and ethical issues related to biotechnology has increased steadily since 1996, from seven percent to 13 percent in 1999 and 17 percent in 2000 (Environics International, 2000a).

When more specific questions on this topic are posed to Canadians, it appears that they demonstrate a larger concern over the ethical dimension of biotechnology than initially indicated. Of nine variables considered, the moral and ethical conundrums pose the largest drawbacks for Canadians, with 26 percent seeing modest drawbacks and 16 percent seeing major drawbacks (Pollara and Earnscliffe, 2000b). When asked to rank several impacts of biotechnology, two-fifths (41%) of Canadians rank the issue of ensuring that biotechnology is used in ethical ways in third place behind doing long-term research (47%) and protecting the public against health risks (46%) (Pollara, 2000c).

Science appears to be the final arbiter over ethics and morals when biotechnology decisions are made. Pollara and Earnscliffe (2000b) found that focus group participants rated ethical dimensions as important, although perplexing, and should be considered legitimate factors in decisions that are made; if an outcome is very desirable and science says it is safe, this would typically overrule ethical concerns if the two came into conflict. Considering the decisions that should be made in biotechnology, one-third (30%) of Canadians felt that decisions should be made on the moral and ethical issues involved and two-thirds (65%) felt that decisions should be made based mainly on the scientific assessment of risk and benefit (Pollara, 1999). While it is apparent that science supercedes ethics and morals in biotechnology decision-making, some have argued that there is a need to identify where Canadians draw the line between ethical and scientific considerations (Consumers' Association of Canada, 2000a).

There were mixed perceptions of the government's role as the primary body responsible for making ethical decisions on behalf of the country. A majority of Canadians (58%) felt that the government should have the primary responsibility for ensuring that ethical considerations are taken into account in biotechnology research (Environics, 1998a) and a majority (57%) also felt that it is the government's primary responsibility to ensure that new developments in biotechnology contribute to our overall quality of life (Environics, 1998a). However, in other research, focus group participants initially asserted that ethical and moral issues should play a role in the government's decision-making, without a consensus as to how this should be done. After further reflection, participants felt that the government should resist making moral and ethical decisions on behalf of society (Pollara, 2000c). When asked whether the government should make ethical decisions on behalf of the country in a related quantitative study, one-quarter (25%) strongly agreed and one-half (49%) agreed. However, when other respondents were asked whether the government should NOT make ethical decisions on behalf of the country, one-quarter (23%) strongly agreed, two-fifths (42%) agreed, one-quarter (25%) disagreed and seven percent strongly disagreed (Pollara and Earncliffe, 2000a). Thus, there is some ambivalence as to the government's role in making ethical and moral decisions, and perhaps future research could ask for specific situations where it would be appropriate or not appropriate for the government to make ethical and moral decisions regarding biotechnology.

In terms of the issue of ethical responsibilities toward developing countries, focus group participants felt that Canada could play a constructive role in helping the developing world help themselves with regard to biotechnology, primarily through training local scientists and assisting in the development of regulatory standards and policies (Environics, 1998b). Other social and ethical considerations were mentioned in another focus group research project. The Consumers' Association of Canada (2000a) found that there was clear concern about the control of biotechnology by large multi-national corporations due to recent mergers and concentration in this sector.

There is little information on how the Canadian public feels about moral and ethical dimensions of genetically modified foods and biotechnology, such as the issue of life science companies acquiring an increasing share of the genetically modified market, the potential power imbalance and vulnerability, and the appropriate forum for addressing these ethical and moral concerns. These areas represent possible avenues for further analysis.

## REFERENCES

- Angus Reid Group, November/December 1998. International Awareness and Perceptions of Modified Foods. Economist/Angus Reid Poll. Toronto, Ontario.
- Angus Reid Group, September 1999a. Canadian Awareness and Perceptions of Genetically Modified Food. Toronto, Ontario.
- Angus Reid Group, December 1999b. National Angus Reid Poll. Winnipeg, Manitoba.
- Angus Reid Group, May, 2000. New Thoughts for Food: Consumer Reaction to Biotechnology in Foods – North American Report. Toronto, Ontario.
- Canadian Biotechnology Advisory Committee, 2001. Regulation of Genetically Modified Food, Consultation Document. Ottawa, Ontario.
- Canadian Health Food Association Health Study, 2000. (Conducted by Omnitel). Toronto, Ontario.
- Consumers' Association of Canada, May 12, 1998. Public Perception and Access to Information on Biotechnology: Submission to the House of Commons Standing Committee on Agriculture and Agri-Food Roundtable Discussion on Biotechnology. Ottawa, Ontario.
- Consumers' Association of Canada, March 4, 2000a. Consumers' Perspective on Biotechnology: A Presentation to the Office of Consumer Affairs, Industry Canada Biotechnology Workshop. Ottawa, Ontario.
- Consumers' Association of Canada, March 2000b. Biotechnology Focus Group – Food Applications: Prepared for the Office of Consumer Affairs, Industry Canada. Ottawa, Ontario.
- Consumers' Association of Canada, June 6, 2000c. Labelling of Genetically Modified Organisms: Presentation to the Standing Committee on Agriculture and Agri-Food. Ottawa, Ontario.
- Council of Canadians, 1999. Attitudes of Canadians Toward the Safety of Genetically Engineered Foods. Ottawa, Ontario.
- Einsiedel, Edna F., 1997. Biotechnology and the Canadian Public: Report on a 1997 National Survey and Some International Comparisons. University of Calgary, Alberta.
- Einsiedel, E.F., Findlay, Karen, & Arko, Jennifer, 2000. Meeting the Public's Need for Information. Ottawa, Ontario.

Environics International, 1999. The International Survey on Food Safety and Biotechnology, Toronto, Ontario.

Environics International, 2000a. The Environmental Monitor 2000-1. Toronto, Ontario.

Environics International, 2000b. Food Issues Monitor. Toronto, Ontario.

Environics Research Group, 1998a. Renewal of the Canadian Biotechnology Strategy Survey Final Report. Ottawa, Ontario.

Environics Research Group, 1998b. Renewal of the Canadian Biotechnology Strategy Survey Focus Groups Final Report. Ottawa, Ontario.

Environics Research Group, 2000. Risk/Benefit Perceptions of Biotechnology Products. Ottawa, Ontario.

Filière agroalimentaire du Québec, avril 2000. Points saillants du sondage sur les organismes génétiquement modifiés (OGM) par Léger-Léger.

International Food Information Council (Wirthlin Group Quorum Survey), 2000. U.S. Consumer Attitudes Toward Biotechnology.  
(Available: <http://www.ificinfo.health.org/foodbiotech/survey.htm>).

Hoban, Thomas, 2000. Current Consumer Perspectives on Biotechnology. North Carolina, United States.

National Institute of Nutrition, 1999a. "Views on Biotechnology", *Rapport*, Vol.14, No.2. Toronto, Ontario.

National Institute of Nutrition, 1999b. Voluntary Labelling of Foods from Biotechnology; Report on a Qualitative Study Among Canadian Consumers. Ottawa, Ontario.

Paragas, Natalie, August 1999. "Majority of Consumers Sees No Need for Labelling Foods with Biotech Ingredients", *Food Labeling and Nutrition News*. (Available: <http://www.biotechknowledge.com/showlib.php3?uid=2061&country=uk>)

Pollara and Earncliffe Research and Communications, January 2000a. Public Opinion Research Into Biotechnology Issues – First Wave. Ottawa, Ontario.

Pollara and Earncliffe Research and Communications, July 2000b. Public Opinion Research Into Biotechnology Issues – Second Wave. Ottawa, Ontario.

Pollara and Earncliffe Research and Communications, December 2000c. Public Opinion Research Into Biotechnology Issues – Third Wave. Ottawa, Ontario.

Pollara, August 1999a. Canadians' Attitudes Toward Biotechnology and Genetic Engineering. Toronto, Ontario.

Pollara, December 1999b. Canadians' Attitudes Toward Biotechnology and Genetic Engineering. Toronto, Ontario.

Rampton, Roberta, 2001. "Manitoba Prefers Non-GM Tomato", *Western Producer*, March 22, 2001. Saskatoon, Saskatchewan.

Royal Society of Canada, 2001. Elements of Precaution: Recommendations for the Regulation of Food Biotechnology in Canada. Ottawa, Ontario.

Toronto Star, June 22, 1998 "Public Prefers Genetically Modified Foods to be Clearly Labelled". Toronto, Ontario.