

PART I

Ideological Gridlock

Introduction

For all its vast demonstrated value, agricultural biotechnology remains dramatically underutilized, mired in controversy around the world. The commentators in this opening section of *Let Them Eat Precaution* are Thomas Hoban, professor of food science and sociology and anthropology at North Carolina State University; Channapatna S. Prakash, professor of plant biotechnology at Tuskegee University, and Gregory Conko, director of food safety policy at the Competitive Enterprise Institute; and Tony Gilland, the science and society director of the British Institute of Ideas in London. They outline the current state of the technology and explain why the debate has played out so differently around the world.

While Europe has aggressively blocked the use of agricultural biotechnology, consumers in the United States have been somewhat indifferent, at least when GM crops are used as ingredients. More than 86 percent of soy, a key ingredient in thousands of food products, and 40 percent of corn are genetically modified. As a result, the federal government has been cautious about introducing what the biotech industry sees as intrusive oversight. In May 1992, the U.S. Food and Drug Administration (FDA) stated that it was not aware of any information showing that foods derived by these new methods differ from other foods in any meaningful or uniform way. The government claims that no substantive scientific evidence has been presented to justify altering that policy or requiring specific labeling of foods with GM ingredients.

In Britain and Europe, however, food scares during the 1990s undermined public confidence in government oversight and sowed confusion over the benefits and potential dangers of GM products, throwing a wrench into the regulatory machinery. The European Union has been observing an unofficial moratorium on new bioengineered food since 1998. Only in 2004 did

the EU approve the importation of two genetically modified corn varieties made by Monsanto, based in the United States, and the Swiss biotechnology company Syngenta, although neither corn was approved for cultivation. The embargo on food with genetically modified ingredients remains in place and will not likely be lifted until the EU receives assurances that the United States won't resist its new strict labeling rules.

Japan, Korea, Australia, New Zealand, and other countries require, or have announced plans to require, labeling of GM-derived foods. A number of developing countries also support more restrictions on GM foods, mostly because they fear they could lose access to primary export markets in Europe if they should move to GM crops and anger EU countries. There is also a general unease in segments of the developing world, fed by European non-governmental organizations (NGOs), that large corporations will develop too much power and control over seed technologies.

These varying perspectives are captured in "Global Views on Agricultural Biotechnology," by Thomas Hoban. The premier researcher in attitudes toward agricultural biotechnology, Hoban is a member of the Advisory Committee on Agricultural Biotechnology of the U.S. Department of Agriculture (USDA) and recently served on the FDA's biotechnology labeling panel. He is also an advisor to the Council for Biotechnology Information (CBI). Hoban offers a sobering snapshot of the shifting perspectives among leaders in government and industry, who act as public opinion gatekeepers. He believes that the current ambivalence about GM food products expressed by the food industry, wary of a consumer backlash, presents the biggest hurdle to going forward.

C. S. Prakash and Gary Conko draw on their vast network of international contacts to explain the roots of this sharp divergence in public opinion in "Agricultural Biotechnology Caught in a War of Giants." Prakash is the founder and Conko a board member and vice president of AgBioWorld, the most respected agricultural biotechnology Internet site in the world, with endorsements from more than 3,300 scientists in fifty-five countries. The AgBioWorld "Declaration in Support of Agricultural Biotechnology" has been signed by twenty-five Nobel laureates such as Norman Borlaug, James Watson, Arthur Korenberg, Marshall Nirenberg, Peter Doherty, Paul Berg, Oscar Arias, and John Boyer.

Based in London, the epicenter of the antibiotech protest industry, Tony Gilland's "Trade War or Culture War? The GM Debate in Britain and the

European Union” offers a scathing critique of the lack of resolve of British and EU politicians when faced with an organized antiscience backlash. Gilland has long focused on the interstecction of science and politics at the British Institute of Ideas, where he has organized provocative conferences on “Genes and Society” and “Interrogating the Precautionary Principle.” He has also edited or contributed to numerous books, including *Science—Can We Trust the Experts?* (2002) and *Nature’s Revenge?* (2002). Gilland provides evidence that the opposition to biotechnology in Europe is wide but not deep, and flows less from an intrinsic distrust of GM products than from the “growing distrust of political authority and scientific expertise,” which he believes are correctable problems.

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Global Views on Agricultural Biotechnology

Thomas Jefferson Hoban

Conflicts over the use and future of agricultural biotechnology are intensifying between countries that support the development of genetically modified (GM) crops—including the United States, Canada, and many developing countries—and those that oppose such development—mainly the European Union (EU) and Japan. These conflicts are affecting the entire food system from farm to table and presenting challenges for many key stakeholder groups.

Debates have been underway for almost twenty years over the safety of GM crops for the environment and for human health. In addition, biotechnology has become a “lightning rod” for a diverse set of political, social, and economic issues, many of which cannot be resolved by scientific analysis or regulation. These include concerns about corporate control over the food system and the decrease in the number of ag input suppliers (i.e., fewer choices for farmers). Questions are also being raised about the distribution of the benefits and risks of biotechnology.

Clashing cultures and shifting standards have led to a wide range of poorly understood concerns. These conflicts occur because of the way biotechnology affects groups differently. People with adequate food can afford to be increasingly particular about how their food is processed and produced, a trend reflected in the growing interest in organic foods by elite consumers. The poor, however, do not have that choice.

Interest groups have fueled these social conflicts by raising issues that would otherwise not be considered. The organic industry uses consumer

anxiety over GM food to win an increasing share of consumers' hearts, minds, and stomachs. Activist groups have launched campaigns against multinational biotechnology companies and industrial agriculture. On the other side, the biotechnology industry and the U.S. government are pushing their own economic and political interests.

At the heart of the public relations battle is the extent to which each opponent develops messages and rationale for its positions. The United States and the EU both want to win support on the African continent. In an attempt to position the EU's cautious stance toward GM food as immoral, the Bush administration, the scientific community, industry groups, and others are making the case that resistance to GM crops inhibits the African countries from accepting U.S. humanitarian aid. Each side claims to have law and/or science on its side.

This conflict reflects significant underlying differences in each country's approach to the evaluation and regulation of technology. In the United States and Canada, private business and government have assumed the stance that a particular technology is safe unless and until it can be proved dangerous. Conversely, European leaders have adopted a version of the precautionary principle that assumes a particular technology is too risky unless and until it can be proved safe.

Many in the EU and elsewhere are not convinced that the safety concerns have been adequately addressed. As the EU labeling policies and procedures become established, it will be necessary to set up complex systems of "identity preservation"—that is, of keeping genetically modified products separated from others—that will add to the price of food, at least in Europe. This will affect consumers in other parts of the world as well, along with key companies from across the food values chain.

Biotechnology has also become a symbol of globalization and a target for growing anti-American sentiment. As trade issues are complicated by the difficulties of segregating grains economically to meet the EU's identity preservation standards, governmental policies and private decisions are implemented in arenas where competing interests must be accommodated. Recently there have been several global government initiatives related to biotechnology that affect the availability of and markets for genetically modified crops. It is important to understand how global policies are created and applied in both developing and industrialized countries.

Food industry opinion leaders also serve as gatekeepers for biotechnology to enter the food system. The food industry plays a vital role in shaping consumers' attitudes and appetites for new food items, including those developed with biotechnology. The world has become one global market for both raw commodities and finished food products, and decisions by food industry gatekeepers have an enormous impact on important stakeholders, from the scientists in the biotech labs to consumers. Market forces have in some cases slowed or stopped development of new crops.

Leaders' Views on Biotechnology: Results of a Survey

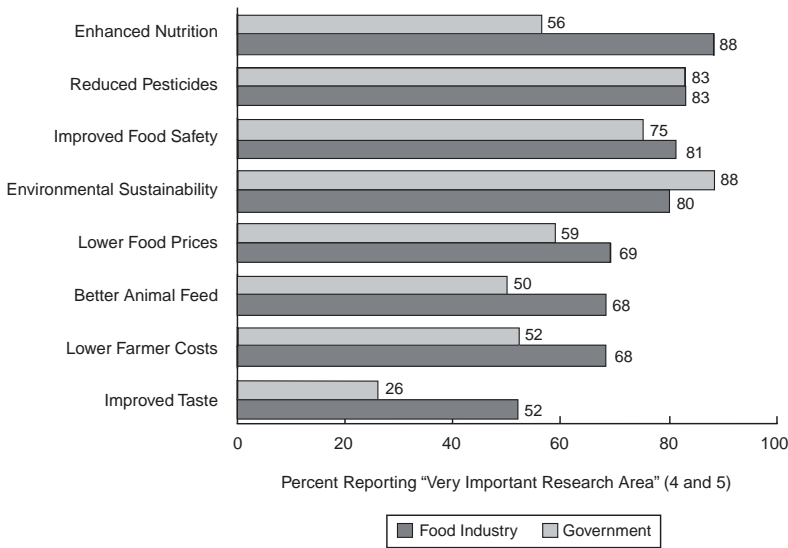
A survey research project, completed in the spring of 2002, was designed to ascertain the views of key worldwide opinion leaders representing the food industry and national governments. It assessed stakeholders' attitudes toward the benefits, risks, and regulation of biotechnology, and its findings suggest some strategies for improving communication among all the main stakeholders in this arena.

For the first component, the survey focused on government representatives who had been appointed to represent their countries in one of three international policy arenas. The government officials were drawn from three areas: environmental protection, public health, and agricultural trade. No one from any nongovernment organization or industry was included. Seventy-six of those surveyed were from the thirty member countries of the Organization for Economic Co-operation and Development (OECD), and 109 were from less-developed, non-OECD countries. These respondents completed and returned a mail questionnaire.

As for the second component, since no publicly available lists are available for the food industry, we had to rely on the advice and assistance from food industry trade associations. Food industry respondents, 241 in all, represented suppliers, manufacturers, distributors, retailers, and restaurants. These were generally from the United States and were interviewed by telephone. For the most part, this chapter will simply compare and contrast the views of the food industry and government leaders. Where this is not the case, it will be clear from the chart and text which of the groups is being discussed.

FIGURE 1-1
LEADERS' VIEWS ON BIOTECHNOLOGY RESEARCH

Question: How important are each of the following research areas related to the use of biotechnology in agriculture and food production? Use a scale from 1 to 5 (where 1 is not at all important, 3 is somewhat important, and 5 is very important).



SOURCE: Hoban (2002).

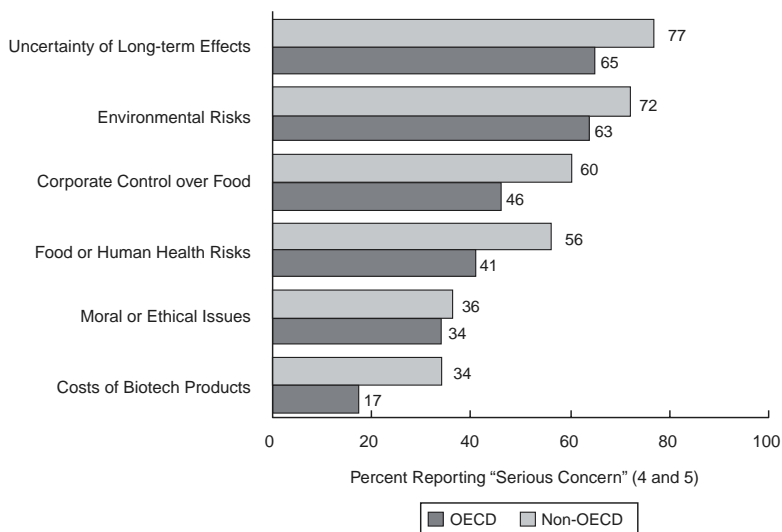
Perceptions of Biotechnology. The food industry and government leaders were asked to rate the importance of a number of different research areas that could be pursued through biotechnology. As figure 1-1 illustrates, both groups saw reduced use of pesticides and environmental sustainability as important research areas. Particularly important for global government leaders were environmental benefits. Food industry leaders were much more enthusiastic than global representatives in their support for research to enhance nutrition, lower costs, improve animal feed, and improve taste, benefits that will be important for developing countries.

As illustrated in figure 1-2, the government leaders expressed the most concern over the uncertainty associated with any long-term effects

FIGURE 1-2

GOVERNMENT REPRESENTATIVES' CONCERNS ABOUT BIOTECHNOLOGY

Question: How serious are each of the following concerns that have been raised about the use of biotechnology in agriculture and food production? Use a scale from 1 to 5 (where 1 is not at all serious, 3 is somewhat serious, and 5 is very serious).



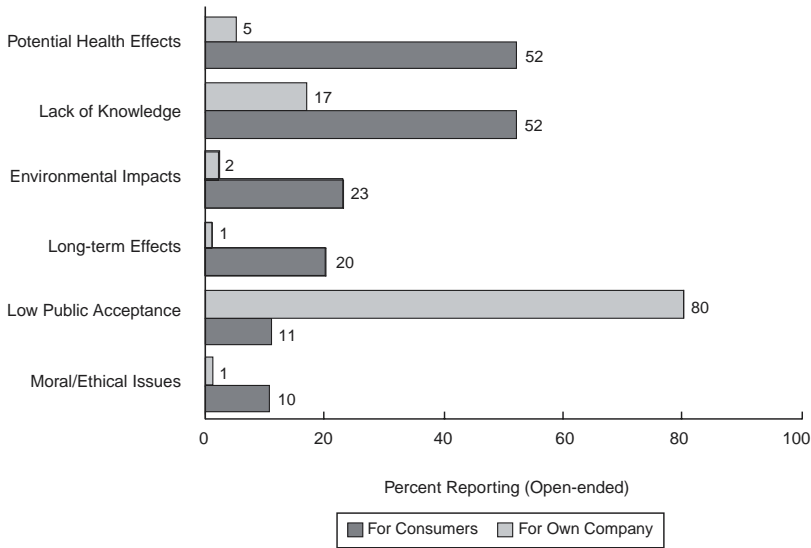
SOURCE: Hoban (2002).

of biotechnology. Almost as many were concerned about environmental or ecological risks (significantly more than were concerned about food safety and health). Only a third expressed concern over moral and ethical issues. The least concern was expressed about the costs of biotech products. In all cases, government representatives from non-OECD (i.e., less developed) countries expressed greater concern about the potential for problems.

Results from the food industry leaders, presented in figure 1-3, are based on open-ended questions in which respondents were asked to name the most serious concerns their company had about biotechnology. This was followed by a question asking what respondents thought consumers were most concerned about. Over three-quarters of respondents

FIGURE 1-3
FOOD INDUSTRY LEADERS' CONCERNS ABOUT BIOTECHNOLOGY

Question: *What is the most important concern your company has [consumers have] about the use of biotechnology in agriculture and food production?*



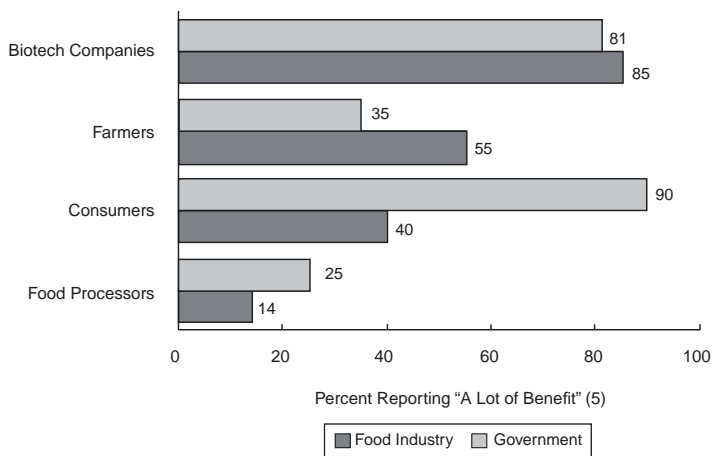
SOURCE: Hoban (2002).

indicated that their companies were most concerned with lack of consumer acceptance. Another 17 percent indicated that lack of knowledge was their most serious problem. When asked about consumers, most food industry leaders mentioned concerns over potential health effects and an overall lack of knowledge about food biotechnology.

Another important area involves the distribution of benefits from agricultural biotechnology. As shown in figure 1-4, over 80 percent of both groups indicated that the biotechnology companies would be receiving most of the benefits. It is interesting that government leaders are much more likely than the food industry respondents to anticipate consumer benefits from biotechnology. One clear issue of concern for the future is that the food industry generally does not foresee any benefits from the use of biotechnology.

FIGURE 1-4
**LEADERS' ASSESSMENT OF HOW MUCH DIFFERENT STAKEHOLDER GROUPS
 WILL BENEFIT FROM THE USE OF BIOTECHNOLOGY**

Question: How much do you think each of the following groups will benefit from the use of biotechnology in agriculture and food production? Please use a scale from 1 to 5 where 1 means they will not benefit at all, 3 means they will receive some benefit, and 5 means they will receive a lot of benefit.



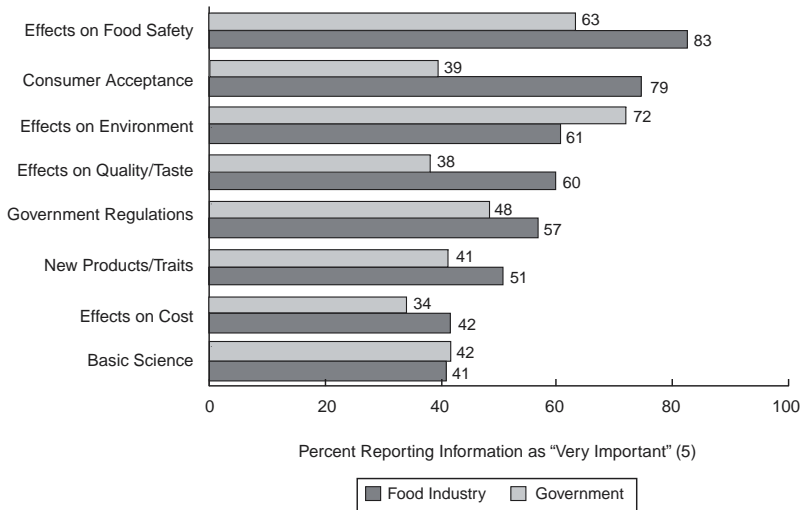
SOURCE: Hoban (2002).

Communication Challenges and Opportunities. Improved communication will play an important role in making sure that the benefits of biotechnology are achieved, while keeping risks and negative socioeconomic impacts to a minimum. What types of information will stakeholders need? As shown in figure 1-5, food industry leaders were most interested in information about the impacts of biotechnology on food safety and nutrition, consumer acceptance issues, effects on the environment, and effects on food quality and taste. Global government leaders were particularly concerned about the impacts of biotechnology on food safety, nutrition, and the environment. Neither group was very interested in basic scientific information or effects on costs.

According to figure 1-6, leaders from both sectors reported the most trust in university scientists and medical associations. Not as many would

FIGURE 1-5
LEADERS' RATINGS OF IMPORTANCE FOR ADDITIONAL BIOTECHNOLOGY INFORMATION

Question: How important would it be for you to receive more information about each of the following? Use a scale of 1 to 5 (where 1 is not at all important, 3 is somewhat important, and 5 is very important).



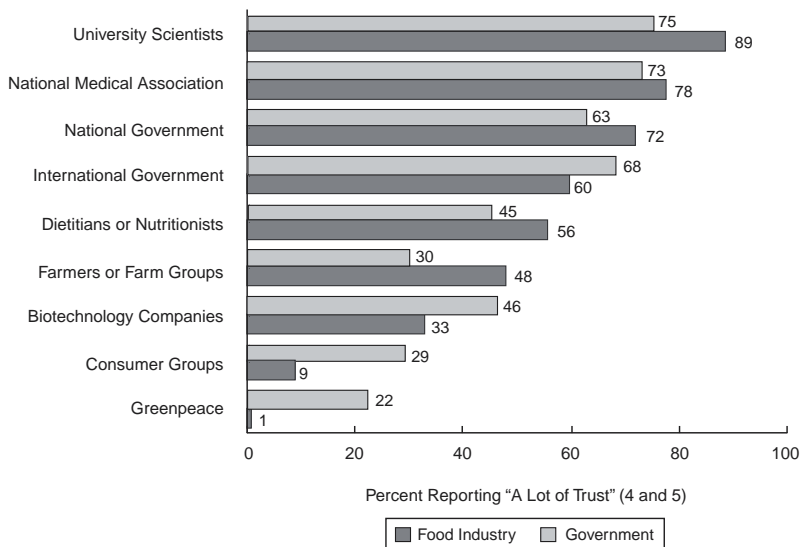
SOURCE: Hoban (2002).

have high trust in farmers or the biotechnology companies. Both food industry and government representatives reported relatively low trust in consumer groups (especially Greenpeace). Put another way, respondents reported the most trust in information from third-party sources (such as university scientists and health professionals), but had much less confidence in the interest groups on either side of the debate.

Societal Acceptance of Biotechnology. Respondents were asked to rate the effectiveness of various ways of building consumer confidence in biotechnology. As shown in figure 1-7, the food industry was most supportive of increased consumer education. They also recognized the importance of science-based regulations and products with clear consumer

FIGURE 1-6
**FOOD INDUSTRY AND GOVERNMENT LEADERS' TRUST IN KEY
 BIOTECHNOLOGY STAKEHOLDERS**

Question: Suppose a number of groups made public statements about the safety of foods developed through biotechnology. Would you have a lot, some, or no trust in statements made by . . . ? Use a scale of 1 to 5 (where 1 is no trust, 3 is some trust, and 5 is a lot of trust).



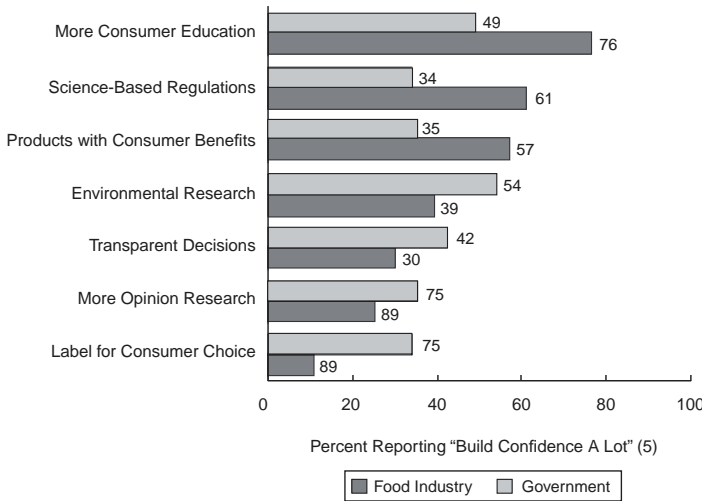
SOURCE: Hoban (2002).

benefits. Global government leaders indicated that conducting more research on the environmental implications of biotechnology would be the most effective means of building consumer confidence, and they recognized the importance of consumer education and more transparent decision-making processes.

Looking again at just the food industry leaders, respondents were asked to evaluate the importance of eight possible reasons the EU had been more negative about biotechnology than the United States. In figure 1-8, two reasons stand out as most important: negative media coverage and previous food safety scares. Other important issues included lack of

FIGURE 1-7
EFFECTIVENESS OF ALTERNATIVE WAYS TO BUILD PUBLIC
CONFIDENCE IN BIOTECHNOLOGY

Question: Suppose that someone was interested in how to build consumer confidence in food and agricultural biotechnology. How much would each of the following build consumer confidence in modern biotechnology?



SOURCE: Hoban (2002).

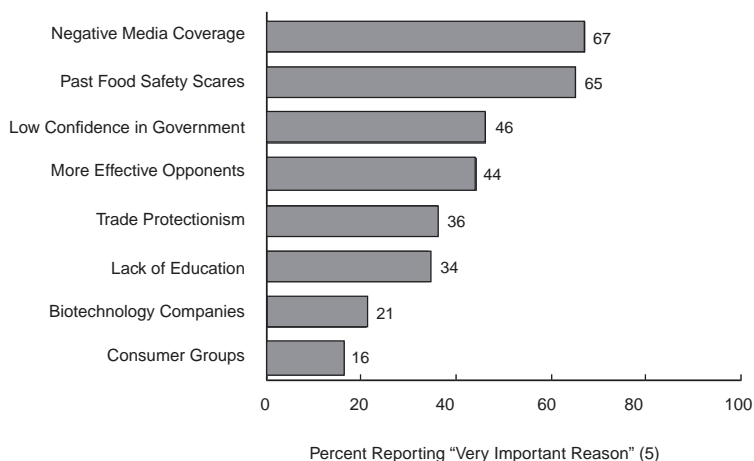
confidence in government agencies and the fact that biotech opponents had been much more successful in Europe. On the other hand, relatively few food industry leaders felt that different cultural views on food or supermarkets’ reactions to biotechnology were important reasons for the differences between the United States and the EU.

Finally, government policies are important for ensuring that the products of biotechnology are safe for human health and the environment. Respondents in each group were asked to rate three different government entities in terms of confidence in each government’s capabilities. As shown in figure 1-9, by far, the food industry leaders expressed the greatest confidence in the U.S. government’s approach and capabilities relative to biotechnology regulation. They had the least confidence in the European

FIGURE 1-8

**FOOD INDUSTRY LEADERS' VIEWS ON WHY EUROPE HAS BEEN MORE
NEGATIVE THAN THE UNITED STATES TOWARD BIOTECHNOLOGY**

Question: *As you may know, consumers in some countries (such as Great Britain) have been more negative about modern biotechnology than consumers in other countries (such as the United States). Tell me how important each of the following reasons is for explaining why consumers in some countries are more negative.*



SOURCE: Hoban (2002).

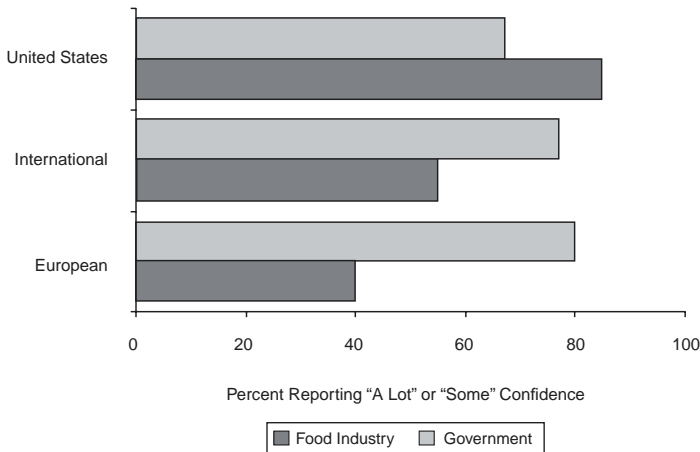
approach to regulation. Responses of the global government representatives were the opposite, with greatest trust shown in the EU's more precautionary approach.

Conclusions

Food industry leaders have been supportive, while government representatives have been less comfortable with food biotechnology. Government representatives from non-OECD countries have been much more likely to express concerns about the risks of biotechnology than OECD government

FIGURE 1-9
**LEADERS' CONFIDENCE LEVELS IN DIFFERENT GOVERNMENT BODIES TO
 REGULATE BIOTECHNOLOGY EFFECTIVELY**

Question: Briefly consider the role of government in biotechnology. Do you have a lot, some, or no confidence in . . . to effectively regulate biotechnology?



Source: Hoban (2002).

representatives. Food industry and government representatives have agreed that increasing crop yields and enhancing nutrition are important priorities for farmers and the food industry.

Both food industry and global government representatives appear to agree that consumer education is critical to market acceptance of foods produced through biotechnology. The key is to build understanding of biotechnology's safety and benefits, while also acknowledging the risks. Opinion leaders will ultimately be responsible for communicating with the public in particular countries, so it is vital they receive balanced information in a timely and credible manner. We need to enhance communication and ensure mutual benefits for all parties in the food value chain, from technology providers to farmers, food handlers and processors, retailers, and food service providers.

Developing countries (non-OECD) are in a key position to influence the future acceptance of agricultural biotechnology. They want and deserve to make their own decisions without pressure from either the United States or the EU. The developing world needs assistance and infrastructure from the developed world to utilize tools of modern biotechnology. Here again it will be important for government decision makers to have the most credible and accurate information available.

As with any innovation, the use of modern biotechnology has the potential for both benefits and risks. The challenge is to ensure that the risks are kept to a minimum, while the benefits become widely available. There is no such thing as a risk-free technology. The benefits of innovation must be weighed against the consequences of maintaining the status quo. It is also important to compare the risks of a new technology to the approaches that are already in use. The more we use biotechnology and the more complicated it gets, as in the fields of biopharming and transgenic animals, the greater the risks will be.

As the technology jumps from the fairly simple process of adding a single gene to a plant to the more complex ones of essentially reshaping plants at will, everyone involved will need to be more open with the public. The first crops were designed to benefit farmers by saving them money and time. Emerging products will have direct impacts on people. We need more regulation—not less—of those that are designed to be active in the human body.

Some outstanding issues need to be addressed. Most Americans still believe they are not eating GM food. As it shifts the way GM ingredients and foods are evaluated, the food industry needs to “break the news” about the widespread presence of GM ingredients. Currently, GM ingredients are evaluated in terms of “substantial equivalence.” According to this concept, if a new food or food component is found to be substantially equivalent to an existing one, it can be treated in the same manner with respect to safety—that is, it can be concluded to be as safe as the conventional one. However, the industry is moving to foods that will be functionally active in the human body (and therefore no longer “substantially equivalent”). In the future there will need to be much more stringent testing and regulation of foods that contain enhanced nutrition or other substantial changes.

The research presented here suggests ways to improve public understanding of biotechnology. The first need is for greater communication

among all groups. Universities and other third parties must disseminate balanced information to all stakeholders through a variety of communication channels. It is also important to improve and maintain the credibility of the government regulatory systems. This requires greater transparency and a real commitment to involving all interested and affected parties.

Ultimately it will be important to deliver products that have benefits for all stakeholder groups. More research needs to be focused on fruits and vegetables that provide real benefits to consumers, such as enhanced nutrition, improved taste, and extended shelf life. New products with direct benefits to food processors and others along the food value chain need to be introduced into the market soon. Steps also need to be taken to develop more cost-effective and efficient identity preservation systems so consumers can avoid GM foods if they prefer. Such systems are needed to ensure that specialty products can be kept separate and command a premium price for the producers.

Substantial trade disagreements involving biotechnology in food and agriculture still exist between the United States and the EU. In the aftermath of the Iraqi invasion, anti-American sentiment is at a historic high. There are also strong economic interests on both sides of this debate. An acceptable resolution is unlikely unless the parties view the dispute as a sociocultural conflict rather than a disagreement over scientific facts.

The results of the leaders' survey suggest how to move forward toward a global consensus. The biotechnology industry, farmers, and other biotech proponents need to accept the fact that "sound science" is only one criterion for public policymaking. For a growing number of people, particularly in Europe, science alone is not persuasive. People make decisions based more on emotion than logic, especially with regard to food. They also question the moral and ethical aspects of biotechnology. The only viable approach is to win consumers' hearts, minds, and stomachs, rather than try to force-feed them. The United States could win the trade battle but lose the consumer acceptance war.

Perception is even more important than reality when it comes to social acceptance of GM foods. Industry's simplistic reliance on education about biotech benefits will not be enough to calm deep-seated anxieties. So far, neither consumers nor the food industry have seen any real benefits from biotechnology. Many people have concerns that go beyond risks to human

health or the environment. They believe that benefits are unlikely to outweigh moral or ethical objections.

The fair distribution of costs and benefits is a key ethical issue that needs to be addressed. All parties need to discuss and debate who wins and who loses before products are commercialized. Like other innovations, biotechnology will have short- and long-term consequences. Anticipating potential impacts will inform public debate and policymaking, as well as minimize potentially disruptive effects.

Reference

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Raleigh: North Carolina State University.