

COMMUNICATION OF FOOD-RELATED RISKS

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Assessing the scientific risks of agri-food technologies must be coupled with appropriate, research-based risk management and communication activities, in order to provide consumers, the media, and others with a balanced, science-based assessment of both the potential benefits and risks of a particular technology. Those responsible for risk management must openly communicate their activities to reduce levels of risk.

Key Words: risk communication; risk perception; food safety.

The ability to effectively communicate about food safety—and indeed, any perceived or technologically induced risk—is now recognized as an integral component of an integrative risk management strategy (Powell, 2000). The Canadian (and international) food sectors are facing a crisis of confidence, as awareness of food related risks (such as, *E. coli* O157:H7, bovine spongiform encephalopathy (BSE), and genetically engineered foods) has been elevated to the national stage. The use of chemicals in agriculture, along with other food-related technologies, management techniques, and ethical concerns (such as animal welfare) are being intensely scrutinized, and continue to raise questions. But the ability to apply science-based solutions to such challenges is intricately dependent on issues of public perception, the regulatory environment, fairness, accountability, and trust. Assessing the scientific risks of agri-food technologies must be coupled with appropriate, research-based risk management and communication activities, in order to provide consumers, the media, and others with a balanced, science-based assessment of both the potential benefits and risks of a particular technology, and to positively impact the development of public policy. The challenge is to incorporate public perceptions into policy development without abdicating the leadership role of science.

The public's judgment of risk is sensitive to many factors. Research in the psychological sciences has identified 47 factors that influence public perception of risk, including whether the risk is dreaded, uncontrollable, catastrophic, and not offset by compensating benefits (Covello, 1992, 1983). Perception of controlling agents also influences perception of the risk. The disconnect between the way the public and scientists—and there are many publics and many scientists—measure risk may help explain why public concern does not always reflect scientifically-determined levels of risk, or in some cases leads to complete misperception about associated risks. For example, an annual North American survey found that consumers mentioned foot-and-mouth disease as a food safety concern for the first time in 2001 (Ipsos-Reid, 2001).

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Risk Communication Of Food Related Risks

The use of chemical inputs into agricultural food production has a lengthy history. The Chinese used sulfur as a fumigant as early as 1000 BC. In the sixteenth century, arsenic-containing compounds were used as insecticides; by the 1930s, the production of modern synthetic chemicals commenced (Hayes, 1993). With the onset of World War II there was a rapid increase in the production and use of chemical substances such as DDT, which was used for control of malaria-transmitting insects. As a direct result of technical advancements in chemical production during this period, various insecticides, fungicides, and fumigants found their place in agricultural and food production. The desire to increase crop yields to meet escalating demands for food was one of the driving forces behind the use of chemical applications in agriculture in the past and present. As such, the postwar era marked the start of the modern agrochemical industry (Hayes, 1993). Today, rather than externally spraying chemicals to bolster crop production, natural chemicals are genetically engineered into plants. The public discussion of agricultural biotechnology is evolving much like the public discussion of pesticides before—in terms of risk versus benefit, rather than as a richer discussion about maximizing benefit while minimizing risk.

A body of knowledge has been created over the past decade that can assist in the understanding of public perceptions of agricultural biotechnology, how the media translates this information, and how government, industry, and other organizations can better relate risk information over a wide range of disciplines. Risk communication—the science of understanding scientific and technological risk and how it is communicated within a sociopolitical structure—is a relatively new scientific endeavor. Several collections, guides, and reviews of risk communication have been published over the past 15 years (Covello, Sandman, & Slovic, 1988; Covello, von Winterfeldt, & Slovic, 1986; Hance, Chess, & Sandman, 1988; Leiss, 1989; Lundgren, 1994; Morgan, 1993; Morgan, *et al.*, 1992; Powell, 2000; Powell & Leiss, 1997; US National Research Council, 1989).

Soby, Simpson, and Ives (1993), in a review of risk communication research and its applicability for managing food-related risks, developed the concept of the risk management cycle. In this model, public and other stakeholder concerns are actively sought at each stage of the management process assessment. This integrative approach to risk analysis was endorsed by the United States Presidential/Congressional Commission on Risk Assessment and Risk Management (1997), which developed a framework to help all types of risk managers of the public stages:

- Define the problem and put it in context;
- Analyze the risks associated with the problem in context;
- Examine options for addressing the risks;
- Make decisions about which options to implement;
- Take actions to implement the decisions;
- Conduct an evaluation of the action's results.

Fundamental to this approach is the use of risk communication to engage stakeholders throughout the process. According to a US National Research Council committee on risk perception and communication (1989, p. 2), risk communication is now defined as “an interactive process of exchange of information and opinion among individuals, groups and institutions. It involves multiple messages about the nature of risk and other messages, not strictly about risk, that express concerns, opinions, or reactions to risk messages or to legal and institutional arrangements for risk management.” In essence, risk communication must be treated as a reciprocal process rather than a process where those with a vested interest in a message develop more effective techniques to sell their side of the story. The current state of risk management and communication research suggests that

those responsible for food safety risk management must be seen to be reducing, mitigating, or minimizing a particular risk. Those responsible must be able to communicate their efforts effectively, and they must be able to prove that they are actually reducing levels of risk. The current climate of distrust in regulatory agencies and industry, particularly in Europe (less so in the United States), makes communicating about risks not only more challenging, but also much more important. In the absence of credible, honest messages about the nature of a food-related risk, a vacuum will develop.

Agricultural Biotechnology

This has been seen, to a large extent, with the discussions surrounding agricultural biotechnology. Society as well as nature abhors a vacuum; it is therefore filled from other sources. In the absence of credible messages on the nature of the risks of biotechnology and the efforts taken by regulators to reduce these risks, opponents of genetic engineering have filled the void with their own memorable messages (e.g., the fish gene in tomatoes; Greenpeace, 2001).

Media coverage of genetically engineered food (and biotechnology in general) has often been polarized: safety versus risk; science moving forward versus science out of control; competitiveness versus safety (Powell & Leiss, 1997). Films and novels have a long history of feeding the public an image of science out of control. When this is coupled with Western society's tendency to attach unrealistic expectations to technology, an ideal environment for public apprehension is created. Until 1994, when rBST and other products of agrobiotechnology begin to appear in the US, many reports raised the specter of science out of control, as best exemplified in the 1993 movie Jurassic Park, where recombinant DNA technology replaced nuclear energy as the latest science to fail society. Stories such as: "Research Skewed: Bioengineered Food Serves Corporate, Not Public, Needs" (Dubey, 1993); "Science Is Playing With Our Food" (Murray, 1993); "Invasion Of The Mutant Tomatoes" (Powell, 1992); and "Genetics Expert Fears Mutant Monsters" (1993); provided ample fodder for editorial cartoonists, who almost invariably drew upon the Frankenstein ("Frankenfood") metaphor.

Media analysis is a tool used to help understand the formation of public opinion—to look at what people are saying and what they are being told. Previous research has demonstrated that North American consumers receive much of their science information from media (Powell & Griffiths, 1994; Consumers' Association of Canada, 1990; Nelkin, 1987). This reliance on the media helps to define the public's sense of reality (Nelkin, 1987) and their perceptions of risks or benefits. Media not only reflect public perceptions of an issue (journalists, at least in theory, cannot make up newsworthy stories, but rely instead on sources and interviews), but also shape public perceptions by telling society what to think about. As such, the way in which the media portrays issues surrounding agricultural biotechnology and food safety can have an effect on consumer perception. How this translates into consumer behavior is less clear and more controversial. Nevertheless, it is generally agreed that the effect media messages will have depends on the social and cultural context in which they are received.

Most worrisome is that the public discussion of agricultural biotechnology seems to be following the path laid out by the widespread adoption of agricultural chemicals following WWII, with proponents urging better education and critics deriding the value of high-yield agricultural production. Discussions focus on risk versus benefit, instead of a more mature public discussion of maximizing benefit and minimizing risk.

In response to public risk controversies (such as agricultural biotechnology), many politicians, company executives, and academics urge citizens to become better educated in matters scientific, to therefore overcome public fear as a barrier to "progress." This rhetorical strategy has been advocated

by technology promoters in discussions of technological risk for the past 200 years. More recently, promoters of agricultural chemicals in the 1960s and nuclear energy in the 1970s have embraced the public education model. It has failed. Today, the notion of public education is the basis of dozens of communications strategies forwarded by government, industry, and scientific societies, in the absence of any compelling data suggesting that such educational efforts are successful.

Surveys repeatedly show that while those who are more aware about biotechnology thought biotechnology would offer more benefits, these same people also thought biotechnology would offer more danger (Angus Reid Group Inc., 1999; Environics, 2000; Frewer, Howard, & Shepherd, 1995; Hoban, 1997). The notion that enhanced education would automatically increase acceptance of biotechnology is not borne out by these results. An alternative suggestion is that those with more education may be better able to critically assess both risks and benefits of a new technology like biotechnology. In a democracy, voters routinely make decisions about policies about which they have no detailed academic understanding. Consumers will continue to make decisions about biotechnology, whether they are “better educated” or not.

An Issue Of Trust

What is an alternative? Several surveys in North America and the United Kingdom have found that trust in government regulation (and industry), regarding either pesticides (Dittus & Hillers, 1993) or the products of agricultural biotechnology (Frewer, Howard, & Shepherd, 1995), is the strongest predictor for consumer support. People either trust that pesticides and agricultural biotech products are adequately regulated or they do not. Those with low trust have the highest concern about possible risks. Those with high trust perceive greater benefits from both products (Frewer, Howard, & Shepherd, 1995). In short, trust in government and industry may be a more important influence on risk perception than the inherent safety or danger of a particular agricultural chemical or biotechnology.

Consumers need information from trusted sources that explains the risks and steps taken to manage these risks, as well as the safety and benefits of the technology. Most trusted sources on food, health, and agricultural issues for Canadians include consumer groups, farmers or producer groups, and not-for-profit organizations (Ipsos-Reid, 2001); Canadian respondents considered activist groups least credible. Other research indicates the high credibility of independent scientists (affiliated with universities or public research institutions, rather than to industry) and health professionals (Earncliffe Research and Communications, 2001).

Producers must remain vigilant about enforcing good management practices, and communicating about them. Consumers want honest information on the nature of risks. Producer-led risk management programs are an appropriate risk management strategy that demonstrates that producers are aware of consumer concerns about food safety and agricultural biotechnology. Cooperating with the media and communicating early and often about such programs and initiatives can also enhance the perception of trust. In addition, providing continuous updates on the findings and progress of such programs will help show that actions match words (Powell, Bobadilla-Ruiz, *et al.*, in press).

In a trial of consumer acceptance of genetically modified foods that took place on a commercial fruit and vegetable farm near Hillsburgh, Ontario, Canada, genetically engineered *Bacillus thuringiensis* (Bt) sweet corn and Bt potatoes were grown side by side with conventional varieties. Neither the Bt sweet corn nor the Bt potatoes required any insecticides. The corn and potatoes harvested through the trial were segregated and labeled, and direct consumer testing for purchasing preference was conducted. Overall, the Bt sweet corn outsold the regular sweet corn. The final sales numbers were 680 dozen Bt sweet corn sold, compared with 452.5 dozen conventional sweet corn sold. Surveys of

consumers who were given the opportunity to buy the Bt corn indicated that reduced pesticide use and improved taste and quality influenced purchasing decisions (Powell, Blaine, *et al.*, in press).

This trial indicates that consumers can handle messages about risk. The corn was clearly labeled as genetically engineered, and background information was provided on what “genetically engineered” meant. The majority of consumers, after reading the information, chose to buy the genetically engineered corn. The point of this project was not to play one risk against another (pesticides versus genetically engineered), but rather to acknowledge the concerns present in society and to openly provide the information that consumers want.

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