

Farmer Concerns: Food Safety, Biotechnology and the Consumer

Introduction

The goal of this conference is to identify and evaluate the impact of biotechnology on improving the safety and quality of food. At the same time, we have been asked to evaluate the relative safety of foods and food products derived from biotechnology. I am going to approach this issue from a slightly different perspective. Rather than assess the potential of biotechnology, I will focus on how farmers can more effectively deal with the concerns of consumers over food safety and biotechnology. Without consumer backing, biotechnology products face a bleak future.

First is a review of two recent public opinion surveys on food safety and on biotechnology. The first survey indicates that consumers want farmers to speak out about food safety issues. The second survey indicates that both consumers and farmers need more information about biotechnology. On the basis of these survey results, strategies will then be discussed. To strengthen the link between farmers and consumers to prepare the public for the introduction of biotechnology products, two goals will then have to be accomplished. First, farmers' awareness of biotechnology must be increased. Secondly, means must be developed which allow farmers to speak directly to consumers about the farmer's needs and how biotechnology products fit into their farming operations.

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Public Attitudes Towards Farmers and Food Safety

Recently, the American Farm Bureau Federation took steps to determine more precisely the public's attitudes towards farmers and food safety. Working with the

public relations firm of Porter/Novelli, the consumers' image of farmers, their current awareness of food safety issues, and their perceptions about the involvement of farmers in these issues were examined.

To accomplish our objectives, a nationwide telephone survey was commissioned by National Research, Inc., a market research firm located in Washington, D.C. Interviews were conducted by telephone between January 4 through 10, 1990. A total of 1,200 interviews were completed. Among our findings:

Farmers and Food Safety

In their attitudes toward farmers, nine out of ten respondents (93 percent) believed farmers are "trustworthy" and 56 percent felt that farmers are "very trustworthy". The majority (88 percent) agreed or strongly agreed (45 percent) that "farmers are doing a good job of producing healthy food". Men (51 percent) and those over 50 (52 percent) were more likely than women (39 percent) or age groups between 18-49 (40 percent) to highly praise the efforts of farmers.

However, the public was less convinced that farmers are conscientious about protecting food safety and the environment. While four out of five (79 percent) agreed that "America's farmers are very concerned about the safety of the food they produce", only one third (34 percent) agreed strongly. Consumers living in the West were less inclined than their counterparts to perceive farmers as being very concerned about food safety.

Family Farms and Corporate Farms

Two out of three respondents (63 percent) believed that most of our food is produced on large corporate farms. "Corporate farm" believers tended to reside in the West, have incomes over 50,000 dollars, and be somewhat more distrustful of farmers. They were more concerned than other respondents about pesticides and hormones in farm products. In contrast, the third (32 percent) who believed family farms produce most of the food eaten were more likely to live in the Midwest, have incomes under 20,000 dollars, and consider farmers to be "very trustworthy". The actual structure of agriculture differs from these perceptions and is reviewed in the Appendix (see p. 114).

The public also felt that the "family farmer" (upon which their positive image is based) is rapidly disappearing in favor of large, impersonal, "corporate" farms. "Corporate" farmers were characterized as relatively uncaring business executives. Their "intelligence" and sophistication may be greater, but their trustworthiness related to food safety issues is quite suspect.

Corporate farms were credited as being chief suppliers of food in large grocery stores and as heavy users of agrichemicals. Conversely, small farmers were described as caring, honest and less likely to use agrichemicals, seen chiefly as suppliers of food for local and pick-your-own markets.

Most believed corporate farms were more likely than family farms to "use sophisticated equipment" (90 percent), "adopt new and improved farming methods" (66 percent), and "be more efficient and productive" (59 percent). However, though the public acknowledged the sophistication of corporate farms, it doubted their ability to produce safe and wholesome food. Compared to corporate farms, the public was more likely to trust family farms to "produce foods of higher quality". (72 percent), "use chemicals safely" (70 percent), and "respond to consumer concerns and desires" (62 percent). The perceived trustworthiness and caring of the "family" farmer appeared to be more important than the intelligence and sophistication of the corporate farmer when the issue was safe use of farm chemicals.

Food Safety Concerns

Most of the concern over food safety centered around the use of agricultural chemicals. Consumers were more concerned about pesticides (89 percent) than other food issues such as spoilage (85 percent), fat and cholesterol content (82 percent), additives and preservatives (80 percent) and hormones (77 percent). Overall, women were more concerned than men about food issues. Older consumers (60 percent) expressed more concern about pesticides than their middle (54 percent) or younger (48 percent) counterparts. Consumers with a high school education or less (59 percent) were more concerned than those who had more education (49 percent).

However, consumer concern had minimal impact on consumption. Only one out of three consumers (36 percent) avoided foods because they thought those foods might be harmful to their health.

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In general, the survey found that consumers were "chemophobic". That is, they were fearful, confused and concerned about the use and possible misuse of farm chemicals. Farm chemicals were primarily perceived as harmful tools used for financial gain. This perception is particularly disturbing in view of a recent study which documents how damaging this kind

of chemophobia could be on the quality and quantity of our food supply if carried to extremes (Knutson et al., 1990).

Getting Farmers Involved

The food safety survey showed that the public strongly supports farmers having a proactive voice in the food safety issue. Most felt that farmers should speak out more forcibly about their views on food safety issues (94 percent), provide consumers with information about all the chemicals they are using (93 percent) and educate consumers about their farming practices (89 percent).

Public Attitudes Towards Biotechnology

Because few products have reached the market yet, it is difficult to gauge public concerns over biotechnology. It is obvious, however, that biotechnology is evolving under intense public scrutiny.

Late in 1988 and early in 1989, the North Carolina Biotechnology Center and the North Carolina Agricultural Extension Service undertook an educational needs assessment of agricultural biotechnology (Hoban and Woodrum, 1990). Telephone interviews were conducted at random with rural non-farm consumers, urban consumers, and farmers in North Carolina. In addition, information about biotechnology was also collected from agricultural leaders through interviews and mail surveys. The results provide a snapshot of one state's attitudes towards biotechnology. For survey purposes, biotechnology was narrowly defined as genetic engineering.

Awareness of Biotechnology

However, only one-third of the farmers had heard of how genetic engineering might change their farming operations.

Public awareness of genetic engineering in North Carolina in 1989 was low. Slightly more than one-third of the people reported they had read or heard something about it. Almost half said they had heard only a little about it. The remainder (13 percent) had heard nothing about it. Awareness was highest among urban residents and those who were younger, better educated and more affluent. Farmers were more aware of genetic engineering than were rural non-farm residents. However, only one-third of the farmers had heard of how genetic engineering might change their farming operations. Most of the information on genetic engineering had been gleaned from the mass media.

Desirability of Biotechnology

Respondents were in favor of most genetic engineering applications. Producing more nutritious food was cited as a very desirable use of agricultural genetic engineering (77 percent) with frost-resistant plants (58 per-

cent), insect-resistant plants (53 percent), and herbicide-resistant plants (41 percent) also scoring high. On the other hand, only one third of the respondents said that genetic engineering to produce larger or faster growing livestock was very desirable. Those who were most favorable towards genetic engineering included people with higher incomes and more education. Younger respondents and men were also more favorable.

Attitudes towards genetic engineering of plants as compared to animals differed. Only 12 percent of respondents thought plant genetic engineering

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was morally wrong. Rural non-farmers were most likely to feel this way and farmers were least likely. However, 38 percent of all respondents felt genetic engineering of animals was morally wrong. Again, non-farmers were more likely to feel this way and farmers least likely. About 16 percent of the respondents did not have an opinion about the morality of engineering either plants or animals.

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Food Safety Concerns

Consumers expressed greater concern about eating genetically engineered meat and dairy products than they did about genetically engineered fruits and vegetables. One-third of the non-farm respondents said they would be very concerned about eating genetically engineered fruits and vegetables and 43 percent said they would be somewhat concerned. Twenty-three percent said they would not be concerned. Rural non-farm residents were significantly more concerned than were urban residents or farmers. When asked about eating genetically engineered meat or dairy products, most respondents answered that they would be either very concerned (45 percent) or somewhat concerned (37 percent). Only 18 percent of the consumers said they would not be concerned. Our current diet contains hybrid fruit and vegetables and meat and milk from hybrid animals but 33 percent of consumers were not aware of this.

Farmers in the survey were asked how concerned they thought consumers would be about eating genetically engineered food. When asked about

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genetically engineered fruits and vegetables, one-third (35 percent) thought consumers would be very concerned, one-half (48 percent) thought they would be somewhat concerned, and 13 percent thought consumers would not be concerned. Their perception of consumer concerns about genetically engineered meat

and dairy products was similar. Agricultural leaders, however, tended to underestimate the level of consumer concern over genetically engineered products.

Conclusions From Survey Results

These two surveys tell us the following:

1. Consumer concerns over food safety remain high, especially regarding pesticide residues. This concern, along with the lack of knowledge about biotechnology, raises the possibility that consumers could react negatively to food produced by biotechnology.

2. The public perceives two distinct types of farmers, "family" and "corporate." Family farmers are seen as caring and honest. Corporate farmers are regarded as smarter, more innovative, better trained but basically uncaring. The public believes that American agriculture is becoming dominated by large corporate farms which mainly supply big grocery store chains. Given this belief, it is not surprising that one of the most controversial issues in biotechnology centers around the potential impact of these products on small family farms.

3. The public regards farmers as a credible source of information on food safety. Consumers are eager to hear from the farm community. However, at this point, most farmers do not yet know enough about biotechnology to talk to consumers.

Given these findings, where do we go from here? If we believe that biotechnology promises many potential benefits for farmers and consumers, we have to work towards two goals. First, we have to raise the awareness level of farmers about biotechnology. Secondly, we have to provide the means for farmers to speak out to consumers about what farming looks like and how these technologies might be used on their farms.

Increasing Farmer Awareness

Farmers need to know more about biotechnology to adopt these products successfully and to interpret the impacts of these technologies on food production for themselves and for consumers. In general, farmers will adopt the products of biotechnology in much the same way as they have other farm technologies. Knowing this, we can design programs to reach all segments of the farming community (Hoban, 1989).

Basically, farmers adopt new technologies by going through a five step process. First they become aware that a new product exists. This leads to an interest in finding out more about it. They then try it out on a small scale to see if it will work on their farm. They evaluate the results and, if

they like what they see, they adopt it for the next growing season. Because of economics, early adopters often make the greatest profit. A profile of an early adopter would look something like this (Hoban, 1988):

A commercially successful operation, large-scale and more specialized than the normal farming operation; is a sophisticated financial manager, relying on credit; looks at farming as a business rather than a way of life; tends to have more formal education; is often more capable farm and business manager who is highly motivated, willing to take risks, well connected to communication networks, and tends to be a community opinion leader.

In addition, farmers who respond well to biotechnology are younger than the average farmer (who is 52 years old), better educated (college or beyond), newer to agriculture, and farm more acres with a higher gross income (Bultena and Lasley, 1987). An average farmer is described in the Appendix (see page 14).

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In most cases, early adopters will probably not be the "family farmers" that the public wants to protect. We can minimize the adverse impacts on these farmers by working towards improving their management skills. Indeed, to more easily integrate technological advances, most farmers will need better management skills in the future (Kalter, 1985). According to the North Carolina survey, in early 1989 only one-third of their farmers had heard of how genetic engineering might change their farming operations. Most indicated that they would like to receive much more information about genetically engineered products before they are marketed.

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The best way to reach farmers is through a variety of sources. Four sources that come immediately to mind are the Extension Service, the farm and commodity organizations, professional consultants and farm publications.

Extension Service

To learn about biotechnology, farmers will continue to rely heavily on information from the Extension Service. They will be particularly receptive to information presented by university researchers at local meetings (Thomas J. Hoban, personal communication). As the primary source for information, the Extension Service needs to be sensitive to the uniqueness of concerns surrounding biotechnology (Sorensen, 1989). The following suggestions are offered as possible ways to address these concerns:

- Extension could increase efforts to assist limited resource farmers in expanding their management skills.

—Extension could play an expanded role in conducting on-site tests to determine if new crops or products are well-suited to local conditions.

Companies may not have the resources or incentives to do this. A potential problem is whether or not Extension agents will have access to innovations before they are marketed to farmers (Buttel, 1987).

Dr. Thomas Hoban (1989) presents a strong case for making social science research available to Cooperative Extension Service directors, research administrators, and public policy makers who are interested in evaluating and mitigating the impacts of technology. In particular, there are three areas of inquiry worth exploring:

Technology assessment tries to identify a wide range of social, political, economic, and environmental consequences that may result from technological change before they happen. Like cost-benefit analysis it weighs beneficial consequences against adverse impacts (Molnaret al., 1987).

Social Impact Assessment includes another related set of useful tools and ideas that could help identify, evaluate, and deal with negative impacts of new technologies (Freudenburg, 1986). Public participation and education play an important role in this type of assessment.

Interorganizational Relationships attempts to analyze relationships among organizations and develop mechanisms to insure efficient and equitable collaboration with optimum resource exchange (Rogers and Whetten, 1982). We will need coordination and cooperation from the universities, the Extension Service, and the private sector if the transfer of new technologies is to be successful.

Farm and Commodity Organizations

General farm organizations and commodity organizations can also serve as conduits for information about biotechnology. For example, the American Farm Bureau Federation has made biotechnology one of its priority issues. Workshops on biotechnology have been held at Farm Bureau national meetings, state meetings, and county meetings for the last four years. State and county Farm Bureaus are encouraged to:

- Identify biotechnology research within the state and develop a list of contacts for information. Establish information sources both within industry and within the academic community.
- Identify state legislators who have shown an interest in biotechnology legislation. Notify them if regulations will affect farming operations.
- Make use of free information from the USDA including their newsletter and electronic bulletin board on agricultural biotechnology.

- Keep track of local zoning and environmental statutes. These are important determinants of policy that may affect future tests and applications.
- Help educate the public about farming practices and the need for and impact of new agricultural technologies. Work with Agriculture-in-the-Classroom coordinators to introduce these issues into schools. Participate in the Adopt-a-Scientist program. Identify effective spokespeople that can answer questions on biotechnology and farm issues. (These recommendations are explained in more detail in the next section).

Professional Consultants

Professional consultants represent another loosely defined group that will be important in technology transfer. They will probably work more closely with early adopters than will Extension agents because of resource limitations within the public sector. The demand for qualified experts will grow as more products and increasingly sophisticated technologies become available.

Over the last few years, representatives of several scientific societies have worked to develop a concept of integrated certification for agricultural and environmental professionals. The Board on Agriculture, part of the National Academy of Sciences' National Research Council is currently exploring the possibility of examining the potential benefits of a registry and certification process for professionals engaged in the delivery of technical services and advice to farmers. Their efforts are supported by the National Association of Independent Crop Consultants.

Farm Publications

Farm publications also have an important role in getting information out to the agricultural community. We have seen a sharp increase in the number of articles about biotechnology in the last few years. Most articles are speculative in nature but serve to prepare farmers for the wide variety of products and potential concerns. As products become more widely available, specialized trade journals and Extension publications can give pointers to farmers on how to make use of them.

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Linking Farmers to Consumers

Once farmers have learned more about biotechnology, we will have to provide the means whereby they can speak out on these issues. Since I am

most familiar with what the Farm Bureau is doing, I will review our programs as examples of ways in which we can improve the communication links:

1. Involving farmers in the early stages of biotechnology research will give both the researchers and farmers a better idea of what is needed and what to expect. The American Farm Bureau Federation started the Adopt-a-Scientist program in 1988. It was developed to improve communications and the flow of information between scientists and farmers. The exchange program places leading scientists on farms across the United States and provides the host families an opportunity to visit the scientist's lab. More importantly, the program opens a dialog between scientist and farmer. The scientist visits his or her host family before planting, during the growing season, and at harvest. Each visit lasts two to three days. Scientists chose which crops or livestock and which area of the country they want to visit and are then matched with a farm family. In the inaugural year, nine scientists from three companies teamed up with farm families in eight states. In 1989, the program involved 18 scientists from nine companies. This year, there are 27 scientists gearing up to visit 14 states. At present, the program is limited to scientists from private industry. However, several universities have expressed an interest in participating as well.

2. Increasing the public's awareness of current farming practices has to be a priority. One of the most successful efforts is Ag-in-the-Classroom, a program developed by the USDA to teach children in our schools about agriculture. One component of the Ag-in-the-Classroom curriculum is a section on new technologies in agriculture. These programs offer an effective way to familiarize young consumers with agricultural biotechnology.

Farm Bureau has developed a parallel program called Agriculture-in-the-Classroom that compliments the USDA effort and adds a state perspective to the material. Along with videos, brochures, and coloring books designed by state Farm Bureaus, states have developed programs to educate school administrators, state policy decision makers, and others who provide input to the public about agriculture.

3. Developing effective spokespeople for the agricultural community is another priority. Farm Bureau is currently offering spokesperson training. These workshops include a session on presentation excellence aimed at improving presentation skills. It focuses on how to improve delivery techniques, gain audience attention, and use visual aids effectively. Participants also attend a media workshop. Skills learned include an understanding of the print and electronic mass media, how to develop and deliver a message and how to anticipate questions.

4. Identifying appropriate forums for farmers to reach consumers is a bit more difficult. County and state fairs offer an opportunity for farmers to inform consumers in friendly surroundings. Local civic organizations which hold regular meetings are also a good way to exchange information. Some of our state Farm Bureaus are now helping to underwrite local public television station programs on agriculture and the environment. Through Agriculture-in-the-Classroom, some states offer farmers an opportunity to adopt-a-classroom. Writing letters to the editor of the local newspaper is another way of getting a message heard. Developing contacts with the local media, both television and radio reporters, and maintaining those contacts by providing reliable and credible information is also effective.

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Conclusions

Farmers have always been concerned about providing safe and nutritious food to the consumer. However, following the revelations about possible pesticide residues and hormones in our food supply, this message has fallen on hard times. The lack of public understanding about modern farming practices is approaching a critical test. In the next few years, farmers will have to make choices about products resulting from biotechnology. These technologies are poorly understood by the public but they may have a profound effect on farming. Farmers have to do a better job of telling their story. We can begin by giving farmers as much information as possible about biotechnology. Once they decide how these products will affect them, they can then convey their needs and concerns to consumers.

The lack of public understanding about modern farming practices is approaching a critical test.

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Appendix

The Current Farming Sector

The United States Department of Agriculture defines a farm as any place that sells, under normal circumstances, at least \$1,000.00 of agricultural products in a year (U. S. Department of Commerce, 1989). Almost all of our farms are family-owned. About 3 percent of all farms are organized as corporations and almost all of these are family-held. Only 0.3 percent of farms are owned and operated by a unit other than a family. Eighty-seven percent of our farms are owned and operated by a single family. The remainder are operated as multifamily partnerships.

The 6,000 non-family corporate farms account for about 6 percent of farm output (Mazie and Carlin, 1990). Despite fears that this form of farm-

ing is gaining ground, non-family corporate farming did not change as a percentage of all farms during 1982-1987. The long-term trends of declining farm numbers and land in farms, coupled with increasing farm size, did continue through the 1980s. At 2.1 million, the 1987 farm count was down 6.8 percent from 1982. Forty-nine percent of these farms had gross sales of less than 510,000, 36.5 percent grossed between \$10,000 to \$99,999, 12.6 percent grossed between \$100,000 to \$499,999, and 1.5 percent grossed over \$500,000 (U.S. Department of Commerce, 1989). While fewer in number, hobby farms increased as a proportion of all farms during the 1980s. The number of farms with \$10,000 to \$100,000 gross sales decreased in both absolute and relative terms. The proportion of large farms, which produce the bulk of U.S. food and fiber, continued to increase.

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Looking at commodity sales, in 1982, small farms (grossing less than \$10,000) contributed only 2.7 percent of sales, small family farms (between \$10,000 to \$39,999) 8.2 percent, family farms (between \$40,000 to \$249,999) 41.5 percent, large family farms (between \$250,000 to \$499,999) 15.1 percent, and very large farms (gross sales over \$500,000) contributed 32.5 percent to commodity sales (Reimundet al., 1986). By 1988, the 4.9 percent of our farms with sales in excess of \$250,000 produced 54.6 percent of all cash receipts (Congressional Budget Office, 1990).

Higher yields from larger farms are attributed to several factors (Reimund et al., 1986). First, large farm operators may employ better management and cultural practices than operators of small farms. Secondly, larger farms have better quality resources than smaller farms. And thirdly, larger farms are located in areas better suited to the production of a specific commodity. If you ask farmers about the size of farms to come, they often conclude that as technology improves, they will have to farm more acres to stay competitive (Waterloo, 1990).

Slightly less than one-quarter of all farms fall between the small farm and large farm categories (Congressional Budget Office, 1990). The growing predominance of small farms, in terms of numbers, and large farms, in terms of production, raises concerns about whether these family-sized farms can survive. Many of the 537,000 farms in this middle group are sufficiently large to require a full-time manager-operator. This probably rules out off-farm employment as a source of additional income. It is not clear whether these farms are large enough to realize economies of scale in production, marketing, and finance as mentioned above (Congressional Budget Office, 1990).

The average farm in the United States is now 462 acres. This is a five-percent increase from 1982. About 22 percent of our farms grow cash grain, 11.7 percent grow field crops, 7.1 percent grow vegetables, fruits, and landscape plants, 6.6 percent are dairies, 1.9 percent are poultry farms, 42.8 percent raise other livestock, and 8 percent are classified as "other." (U.S. Department of Commerce, 1989). Last year, 15 to 20 percent of U.S. farm output was sold abroad (Mazie and Carlin, 1990).

For 55 percent of people living on our farms, the principal occupation is farming. Thirty-five percent work 200 or more days off the farm to supplement their income. The average age of the farm operator is 52 years old. Fifty-percent of our farms are in the Midwest, 14.6 percent in the West, 29.6 percent in the South, and 5.2 percent in the Northeast (Dunn and Walmer, 1989).

In 1988, the mean U.S. household money income was \$34,017. The level of farm assets required to generate a \$30,000.00 cash income for a farmer varies with the type of farm. For example, a corn-soybean farmer would have to invest \$429,000 for a \$30,000 return; a wheat farmer, \$600,000; a cotton farmer, \$300,000; a tobacco farmer, \$214,000; a hog farmer, \$375,000; a dairy farmer, \$600,000; and a cattle rancher, \$1,000,000 (Dubman and Hanson, 1987).

Most of our farms do not produce government-supported program commodities and, among those that do, not all participate for one reason or another (Mazie and Carlin, 1990). Nationwide, about one in three farms received some of \$14.5 billion in direct government payments made in 1988. Participation varies by size and type of farm, and by location. For example, 90 percent of cotton farms reported receiving payments in 1988, while 49 percent of dairy farms reported payments. Participation in government programs is highest among producers in the Northern Plains, Corn Belt, and Lake States. Recipient farms reported average payments of \$14,300. Government payments helped participating farm families stabilize their financial situation during the financial stress and debt restructuring of the 1980s.

Farming now dominates the economy in less than one-fifth of all U.S. counties (Mazie and Carlin, 1990). Those who argue that keeping the farm sector strong will preserve rural America must realize that this now applies to only a few rural places. In the majority of rural communities, farming is no longer the cornerstone of the local economy. Except for meat packing and processing, much of the farm input and processing employment has also moved away from local communities as well and is now based in met-

ropolitan areas. This means farm policy is no longer synonymous with rural policy.

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