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# *Biotechnology: Is It Defendable?*

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Biotechnology is defendable. It is here to stay, and it is going to grow at a faster pace. The questions now relate to its direction and boundaries. Let me state that I am making this presentation as an agricultural producer. I do not profess to be a scientist providing a lot of scientific data. I will leave that aspect to those of you in this room, for I recognize that you are some of the world's finest agricultural scientists.

I am a nurseryman. That was my training. That has been my life. Through the years, I have seen a great deal of genetic management in the materials we produce in our greenhouses. I have accepted those changes and adopted many of them. Doing so has helped me stay in business, improve our products, and stay competitive. By and large, I think that farmers and ranchers believe in science and research as applied to our industry. To them, it is an easy step to accepting and believing in the potential benefits of biotechnology. They recognize that older methods of genetic manipulation are too slow and not specific enough. They see biotechnology as the future.

For the past decade, agriculturalists have heard a lot about the promise of biotechnology. It has been only in the past several years that we have been seeing the results. So far, results have been everything we were led to believe. We have seen crops grown on ground where growth was not previously practical. There are plants that fight disease, drought, and destructive bugs. We have seen dairy animals become tremendously more efficient because of growth hormones. We have seen animals being developed to produce pharmaceuticals for use in humans. US farmers do not need any more convincing about new genetically altered plants. They know that:

- New soybeans are resistant to specific herbicides.
- Cotton repels caterpillars.
- Corn is either a new high-oil type, borer-resistant, or resistant to a specific herbicide.

Preliminary harvest data are extremely promising. Cotton designed to fight bollworms is yielding 15 to 17 percent more than cotton grown with applications of conventional pesticides. And this new cotton is getting a good test. Field inspections indicate bollworm infestations at 20 times the level that used to send farmers scurrying for their sprayers. But cotton carrying the anti-caterpillar bacterial toxin in its genes is doing a better-than-expected job. One southern state Extension director said that farmers with genetically altered crops took their sprayers into the fields one time compared with the traditional 20 to 30 passes.

Think of the cost savings. Think of the reduced soil compaction. Think of the reduced likelihood of run-off or drift. Cotton growers are enthusiastic, so are soybean farmers. Nine out of 10 producers of genetically altered soybeans say that they are getting the results they expected or better.

Corn growers are equally upbeat. The benefits of this new seed, genetically altered to repel corn borers, are obvious. Farmers get relatively easy borer control without the hassle of field scouting, calculating economic thresholds, determining whether or not to apply an insecticide, and then worrying about how the weather will affect the application. By planting this biotechnology corn, farmers will save money and time and still get top yields.

Farmers know that population growth means expanded markets for food and other products. However, the potential for conflict grows too. Farmers are blamed for many environmental issues. By using less pesticide, fertilizer, water, and other resources, the sustainability of agriculture will be greatly increased. Farmers believe in biotechnology, but they have concerns. I think those concerns are brought about not from absolute knowledge, but from a sense that the future is going to be greatly different from the past. And they sense that scientific projects sometimes become widely accepted before the research is complete. As I drive through the southeastern section of the United States, I sometimes think that Kudzu is the natural habitat. Of course, it isn't. Kudzu was introduced to control soil erosion, and it became a noxious weed.

In my own state of Florida, Malaleuca was introduced to help draw water out of the ground to lower the water table. I guess it does but that's not what it is known for today. It has become an invasive weed that has overrun the land, clogged ditches and canals, and in general has become an intolerable nightmare. The point I am trying to make is that all things that appear good do not always turn out that way. We must know how new products will react in the real world under real conditions and not just in the laboratory.

Farmers recognize that there is risk involved as we attempt to improve

things. As scientists, you are also aware of that fact. We must be aware that in some people there is no fear. It is full speed ahead. In other people, there is too much fear. That certainly is the case in dealing with biotechnology.

As I look at biotechnology, there are five issues I'd like to address. They are changes to agriculture, competitiveness, ethics, public understanding, and public policy. Some people think of biotechnology and genetic engineering as simple modification of plants and animals. It is far more. It will lead to a completely changed agriculture. I'm not certain I can begin to comprehend all the changes, but let's think of a few. A crop that is engineered for mechanical harvesting, instead of hand harvesting, will be far more attractive production-wise. A crop made tolerant to colder weather or varying soil conditions will create expanded production areas. Products made healthier and more attractive will increase consumer demand, therefore affecting production and marketing.

Biotechnology may well change production areas, as well as who will grow a product and who will market that product. As these things become different, there will be waves of change in all aspects of management. The very structure of the agricultural industry will be affected. Biotechnology has already started to change agriculture. Its application is spreading faster than most people realize. It is estimated that more than one-half of all cotton, 40 percent of the soybeans, and 20 percent of the corn grown in this country in 1998 were genetically altered. And, acceptance is worldwide. Recently, a *Wall Street Journal* article estimated that one company alone would provide genetically engineered seed for 55 million acres worldwide. That's about equal to the farmland of Iowa and Illinois.

Who will control agriculture is of vital concern. If a farmer is limited to the available seeds or breeding stock, then control is exerted on him. If a company producing the seed indicated that products coming from that seed can only be marketed in a certain way, then more control is placed on farmers. Many people think that whoever controls the genetic input in seeds and animals also controls agriculture.

American agriculture has long had the reputation of being the wonder of the world. That reputation was brought about by a great public and private research system making information available. Our incentive system rewarded farmers for adopting new technology. This has always given us a competitive advantage. To let other nations move into the role of being the dominant agricultural producer would be a tragic error. Food supply is the key to security.

We now see biotechnology research being conducted in all parts of the world. We see technology being adopted worldwide as well. Will that make competition keener? American farmers must be able to sell products abroad. The efficiency of our agricultural system makes that possible by requiring exports. A concern that I have is that some nations are using the issue of biotechnology as an artificial trade barrier. They claim there is a problem in the safety of genetically engineered food.

We are hearing the same concerns here at home. A coalition of consumer groups has sued the US Food and Drug Administration (FDA) to remove 36 genetically engineered foods from store shelves until the items are tested and labeled. The suit, filed in US District Court, claims consumers are put at risk by eating foods that are genetically engineered. We must work for worldwide acceptance of scientific standards so that safe in one country also means safe in another. When the mainstream scientific community proclaims a product safe, the statement should mark agreement. If people choose not to buy, that's fine, but let them have a choice.

A problem exists in this area because the World Trade Organization has not yet identified any scientific body as the primary reference point for biotechnology. One such entity does exist for food safety and animal health. I understand that a working group is meeting and will recommend a protocol for testing genetically modified organisms. A major concern of many people is the matter of the ethics of the people who conduct biotechnology projects.

When research was being done on plants, no one seemed to think much about it. As work expanded to animals, there was more concern. With the public announcement of the cloning of Dolly, the sheep, voices have been raised about the role of biotechnology. I suspect there are even some who fear its future.

Certainly we will see the second wave of biotechnology progress. This will include the development of natural compounds to fight cancer and other diseases. There will be genetic modifications to create more nutritious, healthier food and, in addition, the development of compounds for improved human health.

I hope that the scientific community will take the lead in establishing bioethical guidelines and peer review procedures. If that is not done, then government will step in. I'm not at all sure that government would provide a set of sound ethical guidelines.

Some people fear that scientists will become financially greedy in their biotechnology efforts. There has always been that temptation. I believe that most scientists are dedicated to the development and application of science in the best interest of humanity. It seems to me that in most instances recognition of peers and scientific accomplishments is more important to these individuals than financial motivation.

I also recognize that a major fear on the part of some people is that of corporate greed. There is a belief that developers of biotechnology projects will be motivated only by money. The cost of developing new products is tremendous. Developers must be protected. Once these products are licensed and get into foreign hands can they be controlled? If they become obsolete, or a better product comes on the market in three to five years, a 17-year patent doesn't have much value.

I am a realist who knows that financial considerations do matter. Economics

is a strong motivating force. But let me point out two things. If there is no incentive or reward, there will be no effort put into a project. Why should an individual or corporation risk capital on developing a product if there can be no gain. Secondly, we must remember that financial gain comes only after or through consumer acceptance. We cannot force individuals to use a product or service.

Yes, money will be made by those who are successful in the areas of biotechnology development and genetic transfer. That is the reward for contributions in serving society. A major concern to me is public attitude and acceptance of scientific advances generated by biotechnology. We all know that the public seems to live on the edge of fear regarding food supply. Just a little push throws many people off balance. Unfortunately, there are some scientists and others who, for their own reasons, seem willing to provide that little nudge. I certainly hope that scientists have a questioning attitude. That creates good science. It would seem, however, that a goal should be to establish criteria that would mean agreement on safety and acceptability.

It seems to me that the scientific community must become more active in an educational, public relations type of effort to create consumer understanding of biotechnology accomplishments. The public must understand that product safety is of major concern to scientists. Really, scientists and farmers do not want to produce products that harm consumers. To do so would be very shortsighted. Consumers must become aware that scientists are dedicated to actions that benefit consumers. At the same time, scientists are constrained by program safeguards established by government, the scientific community, and common sense.

The last issue I will mention is the establishment of public policy regarding biotechnology. This is an area where sound-thinking individuals of the scientific community must be active. You cannot let the extremist within your ranks become the alarmist voices that poison the work done in biotechnology. I hope scientists will discuss and disagree on issues. That causes progress. But I would hope that self-discipline and self-control would be a major behavior of scientists.

One thing is for certain — we must not turn over all the decision-making about biotechnology to the politicians. To do so would guarantee an ineffective program of biotechnology development, a costly boondoggled program, and would assure the success of our competitors in other countries.

In closing let me summarize several points:

- Biotechnology is accepted by most farmers, and they know that this is where the future lies.
- We must educate the consumers and bring them along as new products are being developed.
- Safe must mean safe, and there needs to be an international body that is respected and responsible to say so.

- Incentives must be in place to encourage development and use.
- If we are going to remain strong agriculturally, protect the environment, and be competitive in a world market, then in my view biotechnology is a must.

I believe in the future of this nation and in agriculture, its most important industry. I believe all parties will be better off in the future because of the efforts being made in biotechnology. And, I believe that biotechnology will provide better conditions for humans and the world. Therefore, biotechnology is defensible.