

# Biotechnology: The Future As Viewed By Land-grant University Administrators

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Research directors at American land-grant universities are optimistic regarding the future of agricultural biotechnology and expect the ongoing "biotechnology revolution" to benefit the public, including consumers and farmers. Unresolved public policy questions involving biotechnology do concern many of the research administrators who responded to an opinion poll, but the prevailing attitude appears to be one of confident expectation that solutions will in time emerge for all outstanding biotech problems.

Asked about "biotechnology's ethical questions," a majority of the respondents indicated that U.S. land-grant institutions are well equipped to deal with such questions.

The respondents said biotechnology may pose environmental risks, but they did not expect biological catastrophes to occur. They said biotechnology could be used to foster low-input methods of agricultural production, and they were in favor of pursuing biotech research that might improve agriculture's sustainability.

## An Opinion Survey

This opinion survey requested 142 land-grant university (LGU) research administrators to indicate their concurrence or disagreement with 40 statements concerning biotechnology's present status and future prospects. Each of the statements had public policy implications. Questionnaires were distributed by mail to directors of state agricultural experiment stations, deans of

colleges of veterinary medicine, and research directors of the 1890 land-grant institutions originally established as agricultural and mechanical colleges for Afro-Americans. This was a one-step survey; no follow-up communications were directed to non-respondents..

Respondents were invited to submit written statements amplifying any of their answers to the 40-item questionnaire. In addi-

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tion, they were asked four open-ended questions regarding benefits the public might receive from biotechnology, benefits which might accrue to LGUs, ways in which the mission of LGUs might be changing, and the public's ability to influence the research agenda of publicly supported universities. By this means, many thoughtful comments were elicited.

Questionnaires were mailed to 30 editors of agricultural publications, in order to sample the opinions of agricultural communicators.

Replies were received from 86 research directors and 22 editors. The response rate of the research administrators was 60.5 percent, and that of the editors was 73 percent.

#### **Addressing the Future**

On key questions regarding the future of biotechnology, the research administrators were in strong agreement. A majority endorsed these statements:

- "American farmers must prepare for a high-tech future. To survive economically, they will have to use biotech products."
- "Biotechnology research is desirable. Likely benefits far outweigh the possible risks."
- "To lead in science, an LGU must become increasingly involved in biotech research."
- "The worldwide competitive position of U.S. agriculture will be damaged if governmental regulations closely restrict biotech research."

There was strong agreement concerning the desirability of having LGU scientists work in close cooperation with commercial biotech firms. LGU research administrators also agreed that private firms "will become increasingly involved in agricultural research during the 1990s."

A majority of administrators agreed with the following statements concerning the ethical dimensions of biotech research:

- "Universities should be careful to sanction or endorse only those biotech products and processes that are sound socially and environmentally."
- "An important aim of biotech research should be development of crop production systems that do not involve heavy use of agricultural chemicals."
- "Land-grant universities are the ideal agencies to mediate effects of the biotech revolution — helping families and communities to adjust to new realities."

Philosophically, the research administrators appear to be pragmatists. Almost all concurred with this statement: "For researchers, problem-solving is an ongoing process. In solving one set of problems, we may unintentionally create a new set of difficulties."

A smaller group — but still a majority — took the position that social and environmental consequences of agricultural research can "be predicted with a high degree of certitude." A majority endorsement also was given to this statement: "The consequences of new technologies should be studied closely. Major problems can be foreseen."

Looking to the future, the research administrators agreed with this prediction: "Genetic engineering research involving animals is likely to provoke intense controversies."

#### **In Substantial Agreement**

There was a great diversity of opinion on other topics. However, when "agree" and "inclined to agree" categories were combined, a majority of the respondents concurred with these statements:

- "Because biotechnology will make possible dramatic increases in food production worldwide, its desirability is not open to serious question."
- "Agricultural research centers should give top priority to biotechnology research projects."
- "If biotechnology is not introduced rapidly into U.S. agriculture, foreign producers will reap the initial benefits from the new technologies."
- "In view of today's high research costs, LGUs must commercialize their biotech discoveries."
- "At universities, traditional scientists believe their research is undervalued in the biotech age."
- "Biotechnology may induce ecological changes that are not readily apparent. Careful monitoring will be necessary."
- "The costs of monitoring the environment for biotechnology-induced changes should be borne by the biotech industry."

There was general agreement regarding this observation: "Environmentalists and bioethics commentators tend to be highly critical of scientific progress and industrial development."

Fairly strong acceptance was given this statement: "To avoid duplication of effort, land-grant universities should engage in more cooperation and coordination." Counting those who "agreed" and were "inclined to agree," only a slim majority went along with this view of LGU coordination: "By 1999, most major programs of agricultural research will be conducted on a regional or national basis, with state universities and federal agencies participating jointly."

#### **Strong Disagreement Noted**

Research administrators strongly disagreed with these two statements:

- "Agricultural biotechnology tends to favor the use of crop production systems requiring large inputs of chemicals and energy."
- "Biotech products may have the effect of displacing large numbers of farm people."

A majority of respondents marked the "disagree" or "inclined to disagree" categories for the following statement: "Developers of new life forms or genetically altered organisms should not have the protection of patents."

#### **Opinions Vary Widely**

Important issues were clouded by wide variations in opinion. There was no consensus regarding the following statements:

- "Some biotech research has potential for exerting far-reaching negative effects on the environment."
- "Work with genetically altered micro-organisms may involve serious environmental hazards."
- "Since most Americans lack basic understanding of molecular biology, public opinion cannot provide valuable guidance to decision-makers who set biotech research policies."
- "The scientific community, acting on its own volition, has the capability to monitor research work in biological engineering and to enforce environmental safeguards."
- "Before long, biotech firms with major in-house research programs are likely to withdraw from sponsorship of university-based research."

- "State universities find it difficult to justify research undertaken for out-of-state biotech firms if the research does not address in-state problems."
- "To many farmers, state universities' current emphasis on biotechnology appears to be unwise."
- "State farm organizations have indicated that they prefer traditional problem-solving research and are uneasy about the diversion of university research dollars into biotechnology."

### Editors Express Their Views

The editors responding to the survey were a small sample numerically, but their opinions were extremely diverse. On most questions, their responses ranged over the entire plus-minus spectrum. Their responses to the open-ended questions were most instructive since these comments indicated that some editors are staunch defenders of the land-grant universities while others take a more critical stance.

One open-ended question asked: "In this high-tech age, is the mission of the land-grant university changing?" According to most of the research administrators who responded, the traditional LGU mission — service to the people of the state — remains unchanged. One-third of the comments written by editors were in the same vein as the administrators' remarks. However, changes in the LGU mission were noted by other editors.

An editor responded: "The land-grant university has strayed from its original mission. It needs to concentrate on information and assistance to agriculture."

Another editor said: "Biotech research at the land-grant university should be encouraged, but traditional research should not be

forgotten."

A third said: "In some cases, the rapid shift to emphasize biotech research is seen as an abandonment of applied research which has been the staple of widespread public support (of the LGUs). Universities are seen as moving further and further away from the people who are asked — and taxed — to fund them."

The final question in the survey asked: "How can the public affect the research agenda of public universities?" "Who wants them to?" was one editor's caustic reply.

Another said: "Enough hype in the media and enough angry letters to Regents can effectively control the agenda in many cases." The writer indicated that emotionalism is not likely to lead to positive results.

"Perception is reality," a third editor said. "If the general public becomes convinced that LGUs are more interested in projects with commercial firms than in unbiased science, the future of LGUs is in jeopardy."

"The public's sway is far-reaching," a fourth editor said. "The public should be included in any decision-making process by keeping it informed. Otherwise, there is a tendency to reject the unknown for the known." The need for better communications between LGUs and their various publics also was emphasized by many of the research administrators who responded to the survey.

### For Better Communications

In their information programs regarding agricultural biotechnology, LGUs should confront the issues which are troubling LGU clientele groups and other segments of the public. In the present study, a beginning has been made toward delineating land-grant university

administrators' opinions on biotech issues. The administrators' views should be studied more intensively, and attention should be given to the views of the LGUs' traditional clientele. Opinion surveys also can reveal the ways in which biotechnology is seen by taxpayers, by political leaders, and by journalists and other opinion leaders.

In a democracy, it is desirable to involve all segments of the public in the decision-making process. At present, many Americans have quieting doubts and misgivings concerning biotechnology's probable impact upon our society. By exploring the opinions of various publics, communication specialists can help set the stage for thorough discussion and enlightened decision-making in regard to important biotech issues.