
Resource Management in Challenged Environments

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NABC 9: AN OVERVIEW

One of the promises of modern biotechnology is that it will increase productivity in challenged environments. Thus the topic of the ninth annual meeting of the National Agricultural Biotechnology Council (NABC), "Resource Management in Challenged Environments" was extremely appropriate and made even more so by conducting the meeting in Saskatchewan, an agricultural region facing a continually challenged environment. It became evident from the plenary and workshop sessions that little progress has been made toward achieving the goal of increased productivity. Not only were genetic manipulation of traits such as heat, cold, salt, and drought tolerance proving to be much more difficult than initially perceived because of their multi-gene nature, but problems also were evident in social awareness and acceptance of biotechnology in various sectors. One recurring concern was the reduction in public research funding and the trend toward privatization — focusing agricultural research on economic benefit and away from research for the public good.

The meeting was organized around three plenary sessions and concurrent morning and afternoon workshops that focused on three central themes: biodiversity conservation, regulatory and economic aspects of accessing international markets, and social issues facing rural agriculture communities. From very different perspectives, the two speakers in the first plenary session introduced the issues facing agricultural biotechnology today, generating considerable debate. Speakers in the second plenary session brought often contradictory perspectives to the issues, representing viewpoints of industry, organic farming, consumers, and environmentalists. The final session was represented by a single speaker, Professor Timothy Reeves from CIMMYT in Mexico. He highlighted global implications of biotechnological research and our social responsibility to use any means possible to solve the world's hunger

problem. As Eugene Sanders, vice provost and dean of the College of Agriculture, University of Arizona, pointed out in his summary of the meeting, all of the sessions generated significant discussion in three general areas: first, sustainable agriculture means different things depending on the specific location and nature of the agricultural enterprise; second, diversity also varies greatly in meaning depending on the specific case; and third, advances in agricultural biotechnology will continue to suffer from difficulties in educating the general population.

In addition to the provocative and often controversial nature of the speakers, the success of NABC 9, like past meetings, was successful because of the widespread participation and enthusiasm of those attending the meetings.

PLENARY SESSION HIGHLIGHTS

PLENARY SESSION 1

Robert W. Herdt, Director for Agricultural Sciences and Acting Director for Global Environment, The Rockefeller Foundation

Herdt began the meeting by identifying an impressive array of perceived promises of agricultural biotechnology: to increase productivity and our ability to "feed the world," to increase the investment in agricultural research, to expand the range of gene sources, to develop a sustainable system, and to produce specific products, such as pharmaceuticals by introducing new genes into plants. The promise that plant biotechnology may raise innate productivity, he suggested, relies on the belief that because plant genes can be manipulated there must be a way to apply this knowledge, rather than a demonstrable strategy for doing so. Furthermore, the promise to "feed the world" requires that the biotechnology be applied to address the needs of the developing world, whereas fact efforts directed at applications for developing countries are small, especially when compared to those for industrialized countries. Still, Herdt does see definite progress being made toward achieving the remaining goals. Clearly, the advent of biotechnology has stimulated further research and there is little doubt that genetic engineering will make new sources of genes available for use in plants. Herdt's major criticism was that the direction of biotechnological research is now largely under the control of the private sector, which brings into question the concept of property rights associated with biological organisms. Herdt was reluctant to address the issue of sustainability. He cited the potential reduction in pesticide usage with the introduction of the Bt gene into crops but also pointed out the potential for an increase in insects resistant to Bt, reducing the usefulness of this relatively benign pesticide. Clearly, alongside each promise is a potential pitfall — if only in the public's perception of the technology. Herdt contends that the potential dangers associated with

genetically engineered crops are small compared to the potential benefits, and he remains optimistic about the future role of agricultural biotechnology.

Mark Winfield, Director of Research, Canadian Institute for Environmental Law and Policy

Challenging the claim that agricultural biotechnology is essential to meeting the food needs of a growing world population, Winfield outlined the arguments presented by a variety of organizations, communities, and developing world governments that have been at the forefront of this challenge. His first concern related to the ethical and philosophical issues raised by genetic engineering. Many individuals are disturbed by the idea of genetic manipulation and question whether human beings are capable of making appropriate decisions with respect to this technology. Winfield's second concern was the potential effects on the environment and human health of biotechnological products. He cited specific examples and raised more general concerns about the risk of reducing biological diversity by the implicit drive to breed uniformity into plants and animals. The third aspect of his critique challenged the value and purpose of many of the applications of the emerging technology. He claimed that many applications do not establish more ecologically sustainable food systems and instead are technological fixes to fundamentally social, economic, and political problems. Central to all three of his criticisms was his perception that both the Canadian and U.S. federal governments have refused to address these issues while continuing to subsidize the development of biotechnology heavily.

PLENARY SESSION 2

George Lee, University Coordinator, Agricultural Research, University of Saskatchewan

Lee set the stage for the workshop by presenting the Canadian Prairies as a challenged environment where we work "close to the margin" of environmental limitations on agriculture. He cited the role of technology in prairie history, recognizing both its favorable and unfavorable impacts. He also identified some of the changes and challenges facing today's agricultural milieu.

Rick Walter, Director, Canadian Institute of Biotechnology

Walter took the theme of the meeting one step further and invited his audience to meet the challenged environment of low public awareness. He began by educating us to the international regulatory situation and public attitude toward agricultural biotechnology in selected regions. He outlined the regulatory system in place for obtaining product approval in Europe, Japan, Australia, and North America and identified the role of antibiotic lobby groups such as Green Peace in each area, pointing out the importance of such

groups in providing a reality check on our progress. Walter then narrowed his focus to public opinion polls carried out in North America. He cited an increase in public awareness of biotechnology between 1993 and 1995 but little progress toward public understanding. A common thread through all of the NABC meetings over the past decade was the recommendation that public awareness be increased. He challenged members of the NABC not only to recommend it but to meet it head-on — claiming that the products of biotechnology are a reality and that the consumer has a right to make informed decisions.

Raphael Thierrin, Food and Fibre EcoStrategies

Presenting the organic farming perspective on agricultural biotechnology, Thierrin identified the main potential threat from biotechnology as disabling or eliminating organic agriculture. He did not suggest that biotechnology should be eliminated, but recommended the development of policy that will allow several distinct food production technologies to exist. According to Thierrin, the organic industry feels most affected by three facets of agricultural biotechnology: dissemination of transgenic plants through the ecosystem; availability (or nonavailability) of nontransgenic seeds and feed sources; and rapid insect resistance to Bt. Current organic production standards do not allow genetically modified organisms. Practically speaking, this means keeping bioengineered products (consumer products and seeds and feeds) completely separate from organic products. Thierrin stressed that agricultural technology needs to be developed in a manner that will enable all agricultural practitioners to benefit from it, including ensuring that the benefits of future plant breeding are not lost to the organic industry. He stressed that as other types of biotechnology applications are developed, their impact on organic agriculture should be assessed, and technologies that make organic agriculture impossible to practice should be discontinued.

Joyce Groote, President, Industrial Association of Biotechnology

Groote began her discussion by reminding us that biotechnology is a tool to develop new products, not an end in and of itself. While the industry is a developer, manufacturer, and user of biotechnology, it would not exist if the products did not meet environmental, consumer, and community needs. She stressed that a more holistic approach must be taken to address the needs of and impacts on the entire system. Groote also reminded us of Canada's leading role in biotechnological research and application. She speculated that if the industry left Canada we would not become biotechnology — free but would continue to be users of the technology because of the exportation of products by other countries. Instead, we would fall behind competitively and economically. Groote emphasized a systems approach to solving today's problems with sustainability and integration as the priorities.

Sheila Forsyth, Chair, National Agricultural Environment Committee

Addressing the question of the role of agricultural biotechnology in challenged environments, Forsyth raised a series of questions meant to help us find our way through the social, economic, environmental, political, and ethical maze that biotechnology presents. According to Forsyth, the debate around biotechnology is not so much what we can do with it but whether we should be doing it — weighing the risks and benefits. One example of the many interesting scenarios she presented is as follows. If a scientist discovers a way to eliminate the allergenic component of peanuts using biotechnology but does not act on the idea and people continue to die, is this an abuse of the knowledge or is it an acceptable consequence because the technology changes the genetic code of a plant and therefore is not considered allowable by some? If we implement a technology that should not be used we have clearly failed. But, if we do not implement a technology that we should have then have we similarly failed? Which is worse? With challenges such as these Forsyth forced us to consider the various perspectives toward biotechnology.

PLENARY SESSION 3

Timothy Reeves, Director General, CIMMYT

As the only speaker in the third plenary session, Reeves gave an impassioned talk about the current state of global food security and the role of agricultural research. He began by giving some statistics on food insecurity and malnourishment in the developing world and cited the current trend of stagnating and sometimes falling yield growth rates in many areas. A common theme throughout his talk was the necessity for expanding research in developing countries and increasing collaboration among developed-country research institutions, international agencies, and the developing country's own research institutions. Reeves proposed implementing all appropriate science and technology, including conventional breeding and genetic engineering and biotechnology, to solve the global food crisis. Reeves contends that it is unethical to withhold solutions to problems that cause thousands of children to die from hunger and malnutrition.