
Agricultural Biotechnology: Finding Common International Goals

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Agriculture is one of the central and universal activities of humans on the planet and whether they know it or not, every person is a stakeholder in it. It, along with the food and fiber and other products it yields, is intimately entwined with nutrition and livelihoods, with changes to the environment, with global markets, and with human emotions. The sixteenth annual meeting of the NABC provided a unique forum to examine agricultural biotechnology's place within this global context.

Agriculture has had a long history of innovation and adaptation as new ideas and practices, and new technologies, emerged. One need only look at the tractor as a not-too-distant example of how technology radically altered food production throughout much of the world. More recently, agricultural biotechnology has emerged as a new engine of change in farming. Through directed genetic alterations, crops have been given new traits that enhance their resistance to insect pests, that permit more targeted and safer control of weeds, and that eventually will improve their nutritional value or their value as industrial feedstocks. Like every new technology, it too is being viewed from the perspective of how it will affect the fundamental activity that for centuries humans have depended upon.

Technology, innovation, change... these all speak to a sense of promise for the future. But, there are significant clouds on the horizon, clouds that for some people are so ominous that they can no longer be dissipated, and that for others merely represent a solvable, albeit tricky, dilemma. The problem stems from a set of global trends that are unprecedented in human history. Since the time our species appeared on the planet, our population hovered far below one billion people. In the last 100 years it has suddenly risen to six billion, and is *en route* to an estimated nine billion before this century is even half over. Some time around 1980, the human ecological footprint exceeded the estimated carrying capacity of the planet, an imbalance that is being sustained only because it is heavily "subsidized" by inputs of non-renewable resources. For many people, particularly in

North America, Europe, Australia and some parts of Asia, it is sustained in excess. For others, in the chronically poor parts of the world, inadequacies in diet and income remain lethally acute and many people remain deprived of basic essentials needed for an acceptable quality of life.

Our species is in uncharted waters when it comes to coping with this problem. The energy that is so crucial for food production is for now at least finite in supply, there is no more arable land to open up, existing arable land is becoming depleted of nutrients or contaminated, the world has in the past few years produced less food than it needs, lifestyle expectations continue to rise, and population growth continues. This is an era in which pessimists have more than enough facts in hand to reinforce their ongoing doubts about the future.

And as has been the case throughout much of our history as a socialized species, agriculture will be a major player in meeting the challenges of there being a safe and healthy food supply, in struggling to minimize our ecological footprint on the planet, and in improving the quality of life of many people. These challenges are more or less indisputable, but finding ways of achieving them will be difficult and frustrating.

NABC 16

Three Goals

For this reason, NABC 16 addressed the issue of “finding common international goals.” The conference focused on if and how agricultural biotechnology could be used to address these three goals that are common to all countries. Can it address issues of the environment and minimize the ecological footprint of people on the planet, can it address the quality of life for all people including those who grow crops, and can it continue to address the growing need for safe and healthy food? Over 160 people from more than twenty countries around the world attended, and throughout the meeting there was a strong emphasis on keeping the discussion focused on broad global perspectives.

Opening Global Dialogue

The opening plenary session provided a broad overview of perspectives from different parts of the world. M.S. Swaminathan from India, Kanayo Nwanze from Africa, and Neal van Alfen from the United States spoke about the extent to which biotechnology is now being used in agriculture worldwide. All of the speakers emphasized a theme that was to be repeated throughout the conference. They highlighted the importance of local and national communities and farmer participation in new technology development and implementation. Whether in the most technologically sophisticated systems or in the most rural and traditional settings, they spoke of the importance of local know-how in achieving adequate nutrition and improved livelihoods of people, social and economic stability, and minimal environmental impacts.

Diminishing the Ecological Footprint

Each of the three subsequent modules dealt with one of the three goals that the conference addressed. In the session on the ecological footprint, William Rees (Canada), David Lavigne (Canada), and Klaus Ammann (Switzerland) discussed the complexities of estimating the impact of human activity on the planet, and highlighted not only the fragility of a global food system based on high energy-input agriculture and the toll that self-interest exacts on the environment, but also the opportunity that might be realized by looking for new alternatives for food production.

Improving Quality of Life

Joel Cohen (United States), Ruth Chadwick (United Kingdom) and Tom Remington (Kenya) spoke about agricultural biotechnology and the quality of life, drawing upon many examples of how the regulatory issues associated with biotechnology can both enhance and constrain adaptation of new technology.

Ensuring Safe and Healthy Food

In the final module, Edilberto Redoña (Philippines), Florence Wambugu (Kenya), and Suzanne Harris (United States) discussed the many ways in which nutrition is inadequate for many people in the world, and suggested ways in which these challenges could be overcome and ways in which biotechnology could be of value. They all highlighted the importance of combining biotechnology with traditional plant breeding for improving crop varieties, particularly since traditional approaches not only are scientifically tried and tested, but because they also benefit from local knowledge and cultural familiarity.

Understanding Cultural Differences

In a closing address at the final luncheon, Ron Herring (United States) provided an overview that picked up on many of the themes of the meeting, particularly on the importance of understanding the cultural differences between countries, the attractiveness of biotechnology to farmers who see it giving them a competitive advantage, and the downsides of assuming that the North American approach to regulation of the technology will be reflected worldwide.

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The meeting was highlighted by exceptional audience participation during the plenary sessions and in smaller breakout groups. Transcripts of the audience Q&A sessions are included in this volume as is a summary of the breakout discussions and recommendation that emerged from them.

This report articulates from different perspectives a strong consensus from the meeting that the ability of agricultural biotechnology to address global challenges is very great, but that it will absolutely require multidisciplinary engagement at

many different levels for the benefits to be broadly appreciated. It is also clear that in a global context, agricultural biotechnology means much more than just transgenic crops. It covers a diversity of new technologies ranging from the application of molecular biology to traditional crop breeding strategies to tissue culture.

These proceedings also clearly demonstrate that the scientific issues that speak to the environment, to food, and to the quality of life must be studied hand in hand with the social forces at play in different parts of the world. For that reason, this volume occupies a critical place in the on-going efforts of the National Agricultural Biotechnology Council to help all of us understand why agriculture remains at the heart of human existence on this planet.