One of the goals of biotechnology is to use modern molecular genetics to solve agricultural problems dealing with plant and animal stress in challenged environments. Hence, the overall theme of NABC 9 — “Resource Management in Challenged Environments” — was extremely appropriate, especially since the meeting was held in Saskatoon, Saskatchewan, an area where growing seasons are short and the environment for agriculture is challenging. While the topic is extremely timely, it was apparent from the plenary sessions at NABC 9 that biotechnology has not yet provided significant solutions for modern agriculture in challenged environments. This is likely because important characteristics such as heat, cold, salt, and drought tolerance have been less investigated at the molecular level than agrichemical tolerance, pest and pathogen resistance, nutritional composition, and ripening, which constitute the transgenic crops commercialized. In addition, heat, cold, salt, and drought tolerance may be multigene traits that will require more sophistication in producing useful transgenics.

On Sunday evening in Plenary Session I, we heard Robert Herdt, director for agricultural sciences and acting director for global environment at the Rockefeller Foundation, discuss “Agricultural Biotechnology in the Twenty-first Century: Promise and the Pitfalls.” Herdt outlined an impressive array of promises, starting with feeding the world, improved product characteristics such as the Flavr-Savr™ tomato, pest resistance, increased yields, and unique plant metabolites. He also pointed out significant pitfalls, including the fact that very little work had been done on crop characteristics important in the developing world, i.e., the so-called international traits. He also outlined other issues, including pesticide resistance, tolerance to herbicides, and the potential for unintended results, both social and scientific, as a result of applying DNA technology to plants. Also in Plenary Session I, we heard Mark Winfield, director of research, Canadian Institute for Environmental Law and Policy, discuss “Agricultural Biotechnology and Sustainable Development.”
In his provocative talk, Winfield challenged the concept that agricultural biotechnology could feed an increasing global population. He further espoused the idea that public discomfort with biotechnology grows as the public becomes more informed about the scientific issues and that the production of transgenic plants and animals goes against fundamental, natural laws. These two presentations generated considerable debate about the issues of biotechnology in solving important agricultural problems.

Plenary Session II addressed “Perspectives on Biotechnology for Agriculture in Challenged Environments.” In developing the charge to the meeting, George Lee from the University of Saskatchewan eloquently pointed out that biotechnology is not a “yes or no” issue; it is a “how” issue. This concept was reinforced by Joyce Groote, president of the Industrial Association of Biotechnology, who emphasized that biotechnology is actually a series of tools that can solve important biological problems, especially as they relate to medicine and agriculture. Rick Walter, of the Canadian Institute of Biotechnology, discussed the international regulatory climate and commented on some of the survey data on public attitudes. Walter also pointed out the problems in interpreting survey information as it relates to consumer acceptance of agricultural products that involve the use of biotechnology. He issued a call for action to develop a communication strategy to decide who does what and to prepare regular progress reports so we can track our progress in a variety of areas. Presenting the perspective of an environmentalist in a very provocative talk entitled “Biotechnology: Evolution or Revolution, Friend or Foe?” Sheila Forsyth, chair of the National Agriculture Environment Committee, discussed biotechnology from the standpoint of a “evolution or a revolution.” She accurately pointed out that the key to the use of biotechnology is safety and that there will have to be a balance between risks and the ability to feed the world. Raphaël Thierrin from Food and Fibre EcoStrategies gave us the perspectives of organic agriculture on biotechnology. His message was mixed, indicating that the organic agriculture industry would pick and choose between various biotechnologies. For example, he indicated that a biotechnology-derived solution to drought tolerance might be acceptable to practitioners of organic agriculture but that Bt-containing potatoes were definitely not acceptable because of the pesticide-resistance issue.

In Plenary Session III, we had the opportunity to hear Timothy Reeves from CIMMYT in Mexico discuss global challenges and agricultural production. This excellent talk highlighted several fundamental issues: first, improved agricultural technology will allow people to have enough to eat; second, yield efficiency that minimizes agricultural inputs is of great importance; and third, at least initially, classical plant breeding will continue to be important in improving heat and drought tolerance, especially in maize. His analogy between loss of life in airline disasters and starvation emphasized that on a worldwide basis we forget how many people starve each day.
The presentations given in the plenary sessions generated significant discussion, which included the following:

- Sustainable agriculture means a variety of things depending on the specific location and the nature of the agricultural enterprise,
- Diversity has great variability in meaning depending upon the specific case, and
- Advances in agricultural biotechnology will continue to suffer from the difficulties of educating an intelligent but scientific illiterate population that increasingly gets information in 30-second sound bites.

Finally, the luncheon speaker, Murray McLaughlin, the deputy minister for agriculture and food from the province of Saskatchewan, very correctly pointed out that we probably will never reach total agreement on the use of biotechnology in agriculture and that this lack of agreement might be a good thing because it could promote progress in solving the problems of agriculture using these new tools.