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## FEEDING THE WORLD

# THE HARD REALITY

MIAMI—Delegates were forced to confront the reality beyond the technology in taking on the daunting topic of this year's Miami Bio/Technology Winter Symposium, "Feeding the World in the 21st Century." In the preamble to his talk, for instance, John Sanford of Cornell University (Geneva, NY) put its subject—the biolistics or particle gun process—into a larger perspective. Putting aside the question of population control as a solution to world undernutrition, Sanford reflected that while agricultural technology was essential in increasing agricultural productivity in developing countries, there were at least three other indispensable, and possibly more important, components: economic stability, social stability, and environmental sustainability. And just as agricultural technology is but one part of the solution, then in turn, plant genetics is just one small part of agricultural technology; gene transfer, just one small part of plant genetics; and biolistics, just one small part of gene transfer.

Another speaker who urged delegates to adopt a realistic perspective was Dick Flavell, director of the John Innes Institute (Norwich, U.K.). Recognition of the magnitude of the task was essential,

he said, because: "Unless we have the scale of the problem in mind, then few of us are going to find the energy necessary to tackle it." One of the first tasks, he felt, was to be more sophisticated in identifying gaps in the application of modern genetic techniques to crops of importance in the developing world. For instance, if one looks at developing countries as a whole, one might gain some reassurance from the status of genetic-improvement technology in most-valuable staple and export crops. Rice is the most valuable, and its genetic engineering is relatively well advanced. So is that for wheat and maize, the third and fifth most-valuable crops, respectively. But for the second and fourth most-valuable crops, fuel wood and banana/plantain, and for others high up the list—sweet potato and cassava—virtually no research has been performed.

And if the analysis is restricted to one of the least developed regions, sub-Saharan Africa, the picture is much less rosy. There, the three most-valuable crops are fuel wood, banana/plantain, and cassava—not on anybody's list of research priorities. "There is little for us to be contented with in seeing major companies in the developed countries develop the technologies if the technologies are not going any further," said Flavell.

One model put forward by Flavell for stimulating at least the science relevant to developing countries was the Rockefeller Foundation's (New York) Rice Network. According to Flavell, the availability of funding specifically for work on rice has generated a much greater interest in rice worldwide and considerably improved communications between scientists in different parts of the world. On a more pragmatic level, not only has the program resulted in the training of Asian scientists in molecular genetics, it has also meant that scientists outside Asia have been trained in the needs of Asian rice growers. Pragmatism should, perhaps, be the order of the day: as Flavell put it, with a nod to the conference organizers, "Publishing a paper in PNAS—or *Bio/Technology*—does little to help feed the world." —John Hodgson

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