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**Review: The State of Food and Agriculture: Agricultural
Biotechnology: Meeting the Needs of the Poor?**
By the United Nations Food and Agriculture Organization (FAO)

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United Nations, Food and Agriculture Organization. *The State of Food and Agriculture , 2003-04: Agricultural Biotechnology: Meeting the Needs of the Poor?* (FAO agriculture series, no. 35). Rome: Food and Agriculture Organization of the United Nations, 2004. 209 pp. ISBN 92-5-105079-1. US\$65.00 ISSN 0081-4539.

In May 2004 the United Nations Food and Agriculture Organization (FAO) released its 2003-2004 book-length report, *The State of Food and Agriculture: Agricultural Biotechnology: Meeting the Needs of the Poor?* It immediately garnered significant press and media attention. Without doubt, the context for this unusual attention being paid to a UN branch's biannual report is, as the report quotes, "the global war of rhetoric" (p.3) that is focused on biotechnology's agricultural applications. With a fundamental questioning about whether the "global war of rhetoric" is preventing a "reasoned debate regarding the hazards and opportunities posed by biotechnology" (p.3), the FAO report seeks a balanced appreciation of the risks and promise of biotechnology for the farmers of developing nations. In fact, while reporting on its survey of existing examinations of risks posed by agricultural biotechnology, the FAO report concludes that "biotechnology is capable of benefiting small resource-poor farmers" (p. 104) and that in numerous situations the benefits clearly outweigh the risks. This salient thrust of the report no doubt accounts for the unusual attention given at its public release. Yet *The State of Food and Agriculture: Agricultural Biotechnology: Meeting the Needs of the Poor?* is much more than an argument for biotechnology for development, and details, among other biotechnology-related concerns, the state of environmental and health assessments for biotechnology and how the global mode of researching and dissemination of biotechnology has failed to properly address the needs of the poor.

In addition to attempting to re-orient biotechnology discussions and lessen the polemics attendant to them, the FAO report offers and illuminates much factual information that is encompassed by biotechnology research, applications, and distribution. In fact, *The State of Food and Agriculture: Agricultural Biotechnology: Meeting the Needs of the Poor?* lays out a coherent understanding of what biotechnology is, and offers a clear exposition for general readers—as well as policy and scientific specialists—of

essential biotechnology concepts and methods such as genomics, market-assisted breeding, synteny, cell and tissue micropropagation as well as genetic engineering. An additional feature that is very helpful is the report's enlightening chapter on the public perceptions of biotechnology. This chapter contains survey information from all over the world that reflects surprisingly nuanced opinions regarding the different potential applications of biotechnology.

Of particular importance, *The State of Food and Agriculture: Agricultural Biotechnology: Meeting the Needs of the Poor?* has a thoughtful discussion on the health and environmental concerns associated with biotechnology. While concluding that, as to health concerns, there is a scientific consensus that biotechnology-altered foodstuffs are safe, the report stresses the scientific consensus on the need for case-by-case studies for all biotechnology products and processes. Regarding environmental concerns, of which the report describes the science community's call for more scientific research and investigation, the FAO report surveys and describes the international instruments that are beginning to direct policy and regulatory standard development for biotechnology, such as the International Plant Protection Convention and the Convention on Biological Diversity. It similarly describes recent developments in the Codex Alimentarius Commission, the international forum that addresses food safety.

Notwithstanding its multi-faceted examination of biotechnology for the 21st century, the FAO report's other major emphasis—alongside the potential of biotechnology for poor farmers—is that the mode for bringing this biotechnology potential to poor farmers is woefully deficient. At the present time of a "Gene Revolution," there is a need for research and distribution support similar to that which existed for the "Green Revolution." However, as the report states, "the paradigm for research and technology delivery that made the Green Revolution possible has broken down. That system was explicitly designed to promote the development and international transfer of productivity-enhancing technologies to farmers in poor countries as free public goods" (p. 87). Today and in the immediate future, these farmers would significantly benefit from the new technologies, given a reasoned estimate of an "additional 2 billion people to be fed over the next thirty years from an increasingly fragile natural resource base" (p. vii). In addition to focusing research on responses to biotic and abiotic stresses and higher yields, biotechnology research should be properly applied, which it has not been, on "the so-called 'orphan crops' such as cowpea, millet, sorghum, and tef that are critical for the food supply and livelihoods of the world's poorest people" (p. viii).

Fundamentally, the problem is that there is little public research being conducted, as private corporations that are not disposed to create agricultural public goods for poorer farmers overwhelmingly drive biotechnology development. What is overwhelmingly developed is mass-market based and homogeneous in output, as is evidenced by the striking figure that “just six countries, four crops, and two traits account for 99 percent of global transgenic crop production” (p. 99). Additionally, the current private sector predominance over biotechnology has engendered a complex collection of intellectual property restrictions that run counter to the public goods nature of agricultural inputs formerly used and expected by developing nation farmers. These developments and obstacles are cogently described by the FAO report.

Although these obstacles are indeed formidable for bringing biotechnology potential benefits to the poor, *The State of Food and Agriculture: Agricultural Biotechnology: Meeting the Needs of the Poor?* does not despair, and it offers ideas and even an agenda for reorienting the biotechnology enterprise for greater technology transfer and benefits for the poor. To overcome technology transfer and development obstacles, the FAO report calls on all countries and the international community as a whole to: “establish transparent, predictable science-based regulatory procedures; establish appropriate intellectual property rights... to insure that developers can earn an adequate return of investment; strengthen national plant-breeding programs and seed systems; and promote the development of efficient agricultural input and output markets and reduce trade barriers on agricultural technologies” (p. 88). Along with these supportive measures, more direct measures for biotechnology need to be taken, and these include a dramatic increase in public research, a fostering of public-private partnerships, greater focus on the crops that poor farmers grow, and the emergence of developing world regional centers of biotechnology research and dissemination.

The FAO report is hopeful that this can be done. Underlying its propounding of this hopeful vision is not only an examination of what is currently amiss, but also important case studies in which biotechnology is actually helping poor farmers, in terms of economics and also human health, as is the case with biotechnology-modified cotton in China. With these prescriptions for the future and its examination of biotechnology perceptions and applications, *The State of Food and Agriculture: Agricultural Biotechnology: Meeting the Needs of the Poor?* merits the attention it has received, and is certainly must reading for those interested in biotechnology, food security, and, indeed, in the larger issue of globalization.

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