

Book Review

The Economic and Environmental Impacts of Agbiotech: A Global Perspective

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THE ECONOMIC AND ENVIRONMENTAL IMPACTS OF AGBIOTECH: A GLOBAL PERSPECTIVE. Edited by Nicholas G. Kalaitzandonakes. New York: Kluwer Academic/Plenum Publishers, 2003. 336 pp. \$161.00 (hardcover). ISBN 0-306047501-4.

The compendium of studies that make up this book, along with the cohesive introduction and conclusion sections written by the editor, presents a comprehensive picture of the global impacts of crop biotechnologies thus far. For the most part, this is accomplished through chapters written by economists in the various regions of the world where crop biotechnologies have been commercialized. The global synthesis is left to the reader with some very good help from the editor in the concluding chapter. The book is unique in that allows the reader to get a glimpse of geographically diverse assessments and viewpoints on the topic of the impacts of crop biotechnologies. It also provides some state-of-the-art economic analyses that attempt to shed light on some of the most controversial aspects of these technologies—such as their impacts on pesticide use and consequent environmental impacts, on the relationship between adoption of these technologies and changes in agronomic practices and ecological impacts, and on human health and changes in other sources of risk.

Because the editor has effectively synthesized the findings of the various chapters in his concluding remarks, I do not feel it necessary to repeat that effort here. I do want to point out the areas in which the book presents information on the frontiers of economic analysis of this topic and in areas where controversy still reigns and further analysis is needed.

Most publications up to now have been US-centric in trying to deal with aggregate impacts of biotech, but a few studies have looked at aggregate impacts in other countries. Although a formal global impact analysis is still in the future, this book brings those country-level studies together, making it easier for the reader to compare them and to begin to form some ideas of the potential global effect. This is a significant service to those of us interested in this topic and could lead to the first attempt at a global assessment.

The first accountings of the farm-level nonpecuniary impacts of crop biotechnologies appear in this volume. The relationship between soil-saving production techniques and use of crop biotechnologies is studied in sev-

eral chapters, using various state-of-the-art analytical methodologies. The results are mixed. Some conclude that there is a direct relationship between adoption of one or more crop biotechnologies and reduced tillage practices (Kalaitzandonakes & Suntornpithug, Chapter 6). Others conclude there is no relationship (Fernandez-Cornejo et al., Chapter 4). These analyses are based on different types of transgenic crops, different analytical techniques, and different datasets. Further independent study of this issue is called for, especially because claims have been made by the technology providers and others that some crop biotechnologies cause adoption of more reduced tillage practices.

Other chapter authors find that use of crop biotechnologies can reduce damage to beneficial insects relative to conventional control technologies or that overall pesticide toxicity (as measured by mammalian LD₅₀) can be reduced significantly by adoption of crop biotechnologies (Nelson & Bullock, Chapter 5). This is contrary to the recent literature that warns of increased use of pesticides with crop biotechnologies, based on the “pounds on the ground” measure of pesticide use as a proxy for environmental impact. This result points to the need for more study of the measurement and ramifications of changes in pesticide use associated with these crops.

Human health is another nonpecuniary aspect considered in this volume. The first direct measurement of changes in farmer health associated with adoption of a crop biotechnology is reported by Pray and Huang in Chapter 12. They find that the percentage of farmer poisonings from pesticide use declined from 22% to 4.7% with full adoption of Bt cotton. Still other authors find that the riskiness of production is reduced with the adoption of some of the crop biotechnologies, which is a benefit to all farmers who are risk averse (See Penna & Lema, Chapter 11, for example).

The book is a goldmine of information and data for analysts as well as for others interested in the topic. As is always the case in published materials—especially books containing chapters written by a diverse set of

authors—publication lags do not allow for up-to-the-minute time series information. In this particular case, up-to-date information on adoption levels, pesticide use, and other variables associated with farm-level impacts would be interesting to know. In a second edition, therefore, it would be helpful to be provided with all sources of data so that updating could be accomplished by the reader.

It is clear that this book will provide impetus for much more study on the various aspects of the economic and environmental impacts of crop biotechnologies. It also provides a firm foundation for such study. In the end, this is a prominent characteristic of any successful scientific endeavor. I recommend this book highly to anyone, economist or not, who has an interest in crop biotechnology.