Through the magnifying glass

Seeds for the Future: The Impact of Genetically Modified Crops

by Jennifer A Thomson

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Reviewed by Joel I Cohen

Jennifer Thomson's *Seeds for the Future* takes a macroscopic view of issues regarding surrounding the research and development of genetically modified crops. A wide-lens view is evident, as the book captures many examples, references and data, including classical plant breeding, traits expressed in genetically modified (GM) crops, socioeconomic impact and specific policy areas. It concludes with a future look at biotech developments currently in the pipeline. All of these data, information, case examples and complex policy matters come out in a highly readable, concise format, making the book useful for educators, researchers, policy makers and politicians.

The book looks at real opportunities for GM crops while balancing a sense of optimism with hardy doses of reality. This realism comes from Thomson's own work in biotech, her many years in Africa and a well-planned analysis of foreseeable outcomes from the use of biosafety-approved GM crops. Topics include insect and virus resistance, herbicide tolerance, effects on biodiversity and chances for cross-pollination. She gives concrete examples of how GM traits are advancing, and alerts the reader to any significant environmental effects. Although many GM crops are in use, a precautionary approach regarding field trials and commercial approval for use continues. The reasons for the disparity between scientific advances, science-based regulatory data and encouraging results from many economic impact studies on the one hand, and precautionary approaches towards regulation and use on the other, are debated globally. Thomson provides a concise, well-referenced explanation of these findings and complexities.

Regarding biosafety, the author emphasizes why the focus point for regulation should be on the product, not the process. Although useful in many ways, this position has its difficulties. First, many governments and the public want to know the process used (not just the product). Second, the Cartagena Biosafety Protocol calls for a process-oriented approach. Third, concerns exist that conventionally bred crops could be required to pass regulatory standards in addition to those already in use.

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When scientists discuss GM crops with broad or lay audiences, many participants express concern about safety and risk. However, separating development from safety assessment creates a misperception. The fact is that advancing GM crops automatically includes biosafety assessments. This point is often missed by the public, believing that research focuses on development alone and that safety is minimized while trying to rush products to the field. It is not clearly understood that safety is an integral part of GM crop development, as numerous biosafety reports demonstrate. In chapter 8, a section titled "A strong regulatory system" describes key topics that warrant continued international examination, helping to build regulatory leadership that provides greater confidence in undertaking regulatory reviews.

The book's final chapter presents an exciting look at new GM crop developments in the making; however, most important is the section titled "Genetically modified crops and hunger relief in developing countries." Thomson's discussion of world food production, redistribution, organic farming, effects of GM seeds on the informal seed sector and the reality of soil and environmental constraints is very useful. As for nutritionally enhanced crops, she states, "Unfortunately, the introduction of Golden Rice into target countries has been seriously delayed by the lengthy processes necessary to obtain permits to deploy seed for field testing." The book increases its credibility by describing the many factors needed, and those lacking, for successful crop productivity, including soil degradation, use of fertilizer and organic farming methods. These broader reflections make it clear that GM crops are only one possible approach to overcoming the stresses, diseases and productivity decline in developing countries.

The one drawback of *Seeds of the Future* is the lack of a final synthesis, bringing the total picture together. For example, the current state of use or non-use of GM crops in developing countries is described very clearly in chapter 9. What's missing are the implications of this situation. For example, could the author identify areas where research is urgently needed to increase informed decision-making regarding specific GM crops and traits in developing countries? Given Thomson's own experiences here as a microbiologist very familiar with African regulatory systems, a well-crafted summary should be possible.

This does not detract from the overall success of Thomson's effort. For, as the author states in a concluding sentence, "This is one scientist's effort to facilitate the understanding of the effects of GM crops on the environment." In fact, the book succeeds beyond this goal, covering socioeconomic analysis, costs of GM seed and licenses, profitability, production inputs and policy matters dealing with regulation and intellectual property rights.

Thomson's view through the magnifying glass is rewarding. Readers will find many aspects of GM crops identified and discussed in an open, balanced manner. Social, economic and safety concerns are addressed directly and clearly. It is rewarding to see a competent author put forward clear messages in a concise manner, and to see financial support for such rather than dialogues to ensure 'broad stakeholder participation' while leading to no explicit action plan or follow up. The author puts the emphasis on the right topics at the right time and openly addresses the reasons for concern regarding GM crops in the developing world. To get all of this into a brief book is clearly a great accomplishment.

COMPETING FINANCIAL INTERESTS
The author declares no competing financial interests.