Successful Agricultural Innovation in Emerging Economies: New Genetic Technologies for Global Food Production


A series of food crises and price spikes in the last decade have brought a much-needed refocus on agriculture as an integral part of food security, ushering in funding to agricultural research and development after a 20-yr freeze. This increased funding flow has coincided with the genomic revolution, placing advances in genomics squarely in the center of agricultural innovation debates. Successful Agricultural Innovation in Emerging Economies: New Genetic Technologies for Global Food Production seeks to give a “collected, reliable, succinct review” of the application of “recent developments in genetic technologies of plant breeding” in emerging economies, embedded in regulatory, social, ethical, political, and trade matters. The book is written by a panel of science, development, and policy experts, in addition to agricultural economists, industry representatives, a journalist and an activist, who individually offer their reflections on the topic.

The book is structured in four parts to guide the reader through understanding the science behind new genetic technologies, the current status of their application to crop production in developing and developed countries, and lastly placing them in larger policy and social contexts. Part 1 lays out some background on current food-security challenges and plant-science solutions. Part 2 overviews “new genetic crops” and their emerging economic context, Part 3 integrates issues explored in Part 1 and Part 2 into a policy perspective, and Part 4 takes a step back to review social, legal, ethical, and political issues.

In Chapter 1, David Baulcombe starts the book off with four case studies of new developments in plant science: companion cropping; priming for disease resistance; gene mining, marker-assisted selection (MAS), and cisgenics; and homologous gene targeting. Baulcombe concludes that best available technologies, not silver bullets, must be mobilized for food security. Jim Dunwell explores a comprehensive list of issues facing the future of farming in Chapter 2, and points to population growth and urbanization, especially in Africa, as a great challenge to food security. Dunwell highlights the importance of extension, incentives for farmers to adopt new technologies, and balance in the public sector between traditional and novel approaches in plant breeding as development priorities. Gordon Conway and Katy Wilson describe a “confluence of crises” in Chapter 3, where changes in supply (input prices, decreasing productivity, land/water scarcity, climate change) and demand (population growth, consumption patterns, biofuels) conflagrate food-price spikes, rising hunger, and food insecurity. Conway and Wilson emphasize the need for appropriate technologies, and synthesize a brilliant classification of technologies into traditional, intermediate, conventional, and new platforms. In Chapter 4, Graham Brookes reviews the economic and environmental benefits of genetically modified (GM) crops.

The next two chapters give examples of innovations in plant breeding other than GM technology, and offer perspective on their application to developing countries. In Chapter 5, Wayne Powell and Tina Barsby start with a comprehensive overview of principles, advances and history of plant breeding, which seems to me, should have come sooner in the book. This is the most technically comprehensive chapter in the book, and the authors give good examples of “new genetic technologies” in...