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Book Review

The Coexistence of Genetically Modified, Organic and Conventional Foods: Government Policies and Market Practices

Nicholas Kalaitzandonakes, Peter W.B. Phillips, Justus Wesseler, and Stuart J. Smyth, Editors

New York: Springer. 2016. ISBN: 978-1-4939-3725-7, 426 pages

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This book is the authoritative collection of existing research and evidence on the analysis of coexistence policy and regulations related to genetically modified crops. This book makes a great companion for an advanced graduate level course examining biotechnology Research and Development (R&D), deployment regulation, and trade policies in developed and developing countries. I highly recommend this book to academics and scholars to improve their knowledge about the topic, and also as a teaching material that will be used in advanced classes centered upon cutting-edge policy and regulatory analysis.

The introduction and posterior adoption of genetically modified (GM) crops have been unprecedented events in the deployment of agricultural technologies. By 2015, approximately 179.7 million hectares have been planted to GM crops, having reached a peak of 181.5 million hectares in 2014 (James 2015). In some countries and for some crops, adoption increased at such a fast rate that in a few years, adoption reached almost

100 percent of total area planted. Total adoption areas after 2011 have been higher in developing than in developed countries, reaching up to a total of 28 countries that have adopted—and in some cases—later dis-adopted GM crop technologies.

The GM technology, however, has been largely limited to four crops (maize, soybean, canola, and cotton) and two traits (herbicide tolerance and insect protection). Multiple variations for each specific crop and trait combination derived from a genetic transformation (defined loosely here as an “event”) have entered the market and in some situations, several traits have been incorporated into a single crop. These are known as “stacking or pyramiding” options. Other crops and traits have been released commercially in developed and developing countries but continue to be a small share of area. The development and diffusion of GM technologies have been driven mostly by the private sector. In fact, I am only aware of two examples of GM crop technologies where the public sector has had a successful commercial release in developing countries:

insect resistant cotton in India and China, and viral resistant beans in Brazil.

This situation is likely to change as several GM crop technologies in different crops with a diverse set of traits have entered the regulatory pipeline in developing and developed countries, both by the public and the private sectors. The growing portfolio of GM crop technologies, which have entered the regulatory pipeline have the potential of helping address food security and many productivity constraints that have proven to be intractable to R&D efforts in the past. They also have the potential of introducing regulatory asynchrony issues, where some GM crops technologies have been formally assessed and approved but not in other countries; these technologies enter trade channels causing disruptions.

GM crop applications adopted and used to date in developed and developing countries have contributed significantly to productivity increases. Several studies have shown their economic and social impacts, although many questions remain about the institutional context, which shapes their socio-economic impact and their deployment (National Academies of Sciences, Engineering, and Medicine 2016). Furthermore, their release has been controversial in many countries, as several stakeholders have been opposed to their development and deployment. The controversies surrounding GM crops have been unnecessarily polarized and the policy debate even more confounded by the introduction of other policy and social issues that may not be exclusive only to GM crops but also to modern agriculture in general.

Within this complex and often chaotic policy landscape, several countries have introduced legislation and regulations, which seek to ensure the possibility that different production systems can coexist; in this case—conventional, organic, and genetically modified crops systems. Some of the coexistence laws and regulations were derived from extensive practice in several countries where coexistence

has been a reality with other production systems, such as those used to produce hybrid seed. The resulting policy milieu can often seem intractable, and in fact, the existing literature to date seems to lack sufficient coherence to be of practical use to decision- and policymakers, academics, policy analysts and the different stakeholders in the policy debate. There was a need for a book that summarizes the existing evidence related to the coexistence issues in agriculture in a manner that will help answer existing questions about the implementation of such policies in developed and developing countries.

The editors of the book “The Coexistence of Genetically Modified, Organic and Conventional Foods-Government Policies and Market Practices,” Nicholas Kalaitzandonakes, Peter W. B. Phillips, Justus Wesseler, and Stuart Smyth, are well recognized in economic research of genetically modified crops and distinguished professors at Wageningen University, University of Missouri, and University of Saskatchewan. Chapter authors come from public and private sectors involved with specific research, policy analysis, and regulatory issues related to coexistence.

This book introduces four objectives for discussion: (1) developing a conceptual framework defining government and market roles from the examination of national and international value chains; (2) developing an overarching framework for assessing economic, legal, regulatory, and other technical issues related to coexistence; (3) examining trade related issues derived from the existing regulatory asynchrony between adopting and non-adopting countries while discussing policy options to resolve trade disruptions; and (4) describing policy landscape in developed and in some developing countries where coexistence policies have emerged or are being discussed for potential implementation. The book helps answer two core questions: one, finding what market failures exist and

what options does society have to ensure coexistence; and two, whether government interventions can be better in resolving these issues rather than relying on market corrections. There are often multiple policy options to address market failures. The issue then becomes examining the benefit and cost tradeoffs to define an intervention. Obviously, the existence of an intervention does not guarantee that it will be the most efficient alternative to proceed.

The book has 32 chapters including two chapters for an introduction and conclusions/synthesis. The book in general covers issues related to coexistence and production, as well as trade-related issues such as asynchrony and Low Level Presence (LLP), and regulatory aspects. The editor's description in the "Structure of the Book" gives a well-defined rationale and structure where the book is divided into three general thematic areas: (1) policy and legal framework; (2) LLP and trade disruptions; and (3) cost to the market of policy decisions. Interestingly, the book itself is not formally organized into thematic areas or sections in the table of contents. As it stands, it is a long list of papers, which may have benefited from the introduction of a more formal book structure in its table of contents to help readers follow through all the different papers.

In the coverage of the contextual, technical, and production conditions, which the policy and legal framework will operate, an important issue covered by several chapters is the question of value loss introduced from commingling. Commingling arising from pollen and gene flow and accidental admixtures are an important issue, which is why coexistence measures are introduced in legislation. Several chapters discuss technical measures to reduce the possibility of pollen flow including time and space field segregation as well as measures designed to maintain segregation trade channels. These measures have a cost associated with them as the accumulated experience with previous coexistence models have shown

in practice. Such practice also has shown that it is reasonable to expect some commingling in practice, which introduces the issue of threshold and tolerances. A zero percent threshold and tolerance is not practical anymore.

The policy and regulatory development and implementation will have an influence on the feasibility of coexistence frameworks. Brazil (and to a degree, Vietnam) is an interesting example of a country, which has developed feasible coexistence frameworks. Contrasting examples are those of the European Union (EU) and its member countries, where existing coexistence measures may not ensure efficiency or even their applicability in ensuring coexistence. The multiple policy and regulatory frameworks interact with the legislative and especially, the judicial system. Several book chapters cover court cases that have helped define multiple issues related to coexistence frameworks, while regulatory and other policy developments such as zero tolerance policies described in other chapters have introduced trade related regulatory asynchronies.

One trade related regulatory asynchrony is the issue of LLP and the trade disruptions that have occurred. Several chapters in the book describe the LLP costs to producers and exporters but also the often overlooked costs on the demand side. From increased in animal feed prices to reductions in the availability of the products from multiple production systems, coexistence measures were designed to address these in the first place. Market costs from policy decisions regarding coexistence can be significant. One chapter introduces a comparison of the relative cost of food between the EU and the US. In general, EU households spend, on the average, twice as much as US households in food, where coexistence measures, which have evolved to a certain degree to ensure a GM-free food supply, contribute significantly to the additional cost.

As pointed out in the book, the multiple economic, policy, regulatory, and legislative

challenges are daunting. On the one hand, in many countries—especially but not limited to developing countries—multiple issues collide in this policy milieu, which are not economic or market related in nature. On the other hand, many of the issues related to coexistence are already located in the much broader discussion of the future of agriculture. Issues such as privatization, corporate control of agriculture, climate change, and a desire from some stakeholders to a return to basics and “slow agriculture” that produces “slow food” that is “natural and devoid from technology” is indeed a major push in some regions of the world, but one which may not help feed the poor and hungry in developing countries.

The idea that conventional, organic, and GM agriculture can coexist is based on the principle of consumers and producers satisfying a need. I do hope that we can come back and return to the idea of ensuring coexistence with the proviso that all production systems have a value, and thus we can identify through pragmatically best options to ensure a wholesome, safe, and abundant food supply.

The intended audiences are economic policy and legal analysts focused on the assessment of biotechnologies, specifically genetically modified crops. The book will satisfy the most advanced readers seeking to update their knowledge of the topic with a discussion of results from advanced policy research approaches and discussions, yet accessible enough to other analysts who plan initiating a research program in the area. This is a good reference book that may be used for teaching agricultural economic policy centered on the impacts of agricultural technology. Most book chapters are short and tightly focused on the issues. Due to the shortness and conciseness of chapters, most chapters avoid describing detail models, research approaches and/or the analysis used to derive the chapter’s content as it is not the objective of the book. This book is not intended

as a volume describing theoretical or modelling approaches to the issues. It is eminently a set of contributions describing practical applications to an important economic and policy issue.

Most of the chapters themselves are organized around an introduction to the context of the issue, a critical assessment, and policy lessons and options that can contribute to resolving existing and emerging issues. To provide an idea on the emphasis of book chapters, approximately half of the book chapters devote their attention to introductory and conceptual frameworks issues that help the reader frame the context of coexistence, nine chapters focus their discussion on North America, five on the EU/European countries, and four on developing countries’ issues.

Edited books are particularly difficult to be written and organized so that they flow in a manner that guides the reader in gaining functional knowledge about the topic. This general issue related to edited books is made even more difficult by the topic of coexistence, which as most issues related to genetically engineered crops are particularly sensitive, in that the policy debate has been unnecessarily polarized. This book, nevertheless, succeeds in contributing to the body of knowledge by bringing top academics and scholars who have conducted applied research in the area and have written extensively to showcase economic and regulatory policy issues derived from the potential adoption of genetically modified crops.

Readers should be aware that this book is meant for analysts and policymakers with a strong contextual basis in biotechnology policy and agricultural development issues. This book is not meant as an introductory book to the theoretical and modeling approaches to analyzing coexistence issues. If the desire is to close this knowledge gap, interested readers can consult complimentary and/or supplementary books including the *Biotechnology Regulation and Trade* by Smyth

et al. (2017), and a more general and broader coverage, *The Handbook on Agriculture, Biotechnology and Development* by Smyth et al. (2014).

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