

INTELLECTUAL PROPERTY ON AGRICULTURAL RESOURCES, FOOD PRICES AND INNOVATION

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The impact of intellectual property on food prices and availability has not been subject to any sustained empirical analysis. At a theoretical level, it is unlikely, however, to have any significant effect on the price of food or the production of traditional crops. On the other hand, intellectual property is likely to affect the choice of which genetic modifications are made to crops as well as the identity of those making and selling those modifications. Firm conclusions are, however, difficult to draw given the absence of good empirical data on the effects of intellectual property.

For the purposes of this section, we concentrate on patents and plant variety protection. Of the two, plant variety protection applies generally to plants produced through hybridization whereas patents apply principally to direct genetic manipulation. While both forms of protection apply to crops used in food production, patents provide far greater rights. Principal among these greater rights is the ability to exclude others who independently develop the same crop. Thus, one can circumvent a particular plant variety certificate by developing the same hybrid oneself whereas this would not be permitted under patent law.

Biotechnology Intellectual Property

We also draw, in this section, on the recent study by the International Expert Group on Biotechnology, Innovation and Intellectual Property (the “IEG”). The IEG examined the relationship between intellectual property in agricultural and health biotechnology and their effects on innovation and access to innovation.¹ The IEG’s central argument is that the

¹ For the work of the International Expert Group on Biotechnology, Innovation and Intellectual Property, see generally <http://www.theinnovationpartnership.org/en/ieg/>.

biotechnology industry is undergoing a fundamental change in the way it uses intellectual property: from Old IP, in which innovation was heavily patented and closely held, to New IP in which fewer patents are obtained and those obtained are shared more broadly so as to build and sustain research and distribution partnerships. According to the IEG, “Old IP understood patents, copyrights and trademarks to be simply mechanisms that permitted a company, having invested in research and development, to recoup its costs and make a profit before others are allowed to copy its idea.”²

The move from Old IP to New IP began toward the end of the 1990s and beginning of the 2000s, as new product development was decreasing and companies faced pressure to make their products accessible to middle and low-income countries.³ The global biotechnology industry had never made a profit, overall, over its 30 year history. This led Harvard Business School Professor, Gary Pisano, to conclude: “While there have been a few very successful biotechnology firms (e.g., Amgen, Genentech, Genzyme), the economic performance of the sector overall has been disappointing by any objective standard.”⁴

Old IP encountered severe and increasing resistance by civil society and low- and middle-income governments in the early 2000s. Examples of the decline in Old IP include decisions by the World Trade Organization, World Intellectual Property Organization and World Health Organization to prioritize access and development over intellectual property rights.⁵

The failure of Old IP is not a failure of intellectual property laws themselves, but the interaction of those laws with practices (e.g. business and university practices with respect to the protection, licensing and enforcement of patents) and institutions (e.g., the inability of patent offices to vigorously apply legal standards in an efficient and timely manner). In fact, a change

² *Ibid.* at 17.

³ *Ibid.* at 18-20.

⁴ Gary Pisano, *Science Business: The Promise, The Reality, and The Future of Biotech* (Boston: Harvard Business School Press, 2006) at XX (chapter 1, The Biotechnology Experiment)

⁵ IEG, *supra*, note **Erreur ! Signet non défini.** at 19.

of patent or other intellectual property right alone would likely be ineffective in addressing the problems with Old IP. Rather, industry, government, universities and non-governmental organizations need to pay equal or greater attention to the ways they use, share and institutionalize patent and other intellectual property rights. That is, the IEG concluded that any call to reform that focuses solely on patent statutes will necessarily miss the mark unless they are accompanied by a modification in the way universities think about and manage technology transfer and the way that industry licenses its ideas.

As Old IP falls into decline, new visions of IP are taking root. The IEG found that these visions have a common form and, according to the IEG, constituted 'New IP': "In the era of New IP, the focus turns away from amassing IP and toward managing it in such a way as to enhance the functioning of innovation systems."⁶

Price and Availability

According to the IEG, the agricultural biotechnology industry continues to follow Old IP. This has implications for the type and variety of crops placed on the market but, as argued below, is likely not to have an impact on food price or availability.

As neither plant variety protection nor patents prevent farmers from growing traditional crops, neither system is likely to have any effect on subsistence farmers. Traditional plants cannot be patented or protected as a plant variety because they are not 'new', an essential criterion for awarding both types of protection. To the extent that patents and plant variety protection have effect, it is on altered plant crops and only then in countries in which protection is sought.

Given this, to the extent that crops subject to intellectual property rights are more expensive than are traditional crops, they must offer the farmer some advantage (or he or she would continue to use traditional forms of the crop). These advantages may be higher yields,

⁶ *Ibid.* at 16.

reduced use of pesticide, or crops that grow in less than ideal environments (due to draught, salt, etc.). Thus, any price increase due to patenting or plant variety protection would, if the farmer makes his or her decision correctly, be offset by reductions in cost elsewhere or by the ability to produce higher quality crops.

It would thus seem that intellectual property is unlikely to play a significant role in the price of final food products. Despite the absence of good empirical evidence, there is little reason to believe that patents or plant variety protection would raise any concern in terms of prices.

Similarly, neither patents nor plant variety protection are likely to have any material effect on the availability of food in general. While both may have an impact on the choice of variety of plant to grow – and thus have an indirect effect on the quality and quantity of crops grown – neither form of protection applies to food produced from plants subject to intellectual property rights. Intellectual property only applies to the planting of seed and growing of plants. Once the plants are grown and sold in raw form, intellectual property rights in the crops cease to apply. Apart from regulatory requirements and consumer demand, food producers (other than the original farmers) are free to use whichever crops they choose regardless of patent and plant variety rights. Further, while methods used to process foods may be patented, there are usually alternative methods available. Thus, it is unlikely that intellectual property on either crops or on food would have any material effect on availability.

One area where both patents and plant variety protection may effect food production is in the ability of low- and middle-income farmers to grow modified foods. If a company chooses, for example, not to offer its own brand of seed for a particular, modified, crop over which it holds patents in a country, then access to seed in that country could be limited. In theory, however, a failure to make the seeds available in a country is a ground upon which patent authorities can override applicable patent rights through compulsory licence. While the process of obtaining such a licence may be burdensome, it is at least possible. Unfortunately, there is no data available on whether patent holders refuse to sell seed in certain countries and, if so, whether compulsory licences have been made available.

Research and Development

If intellectual property has no substantial effect on the price or availability of food products, they are more likely to affect the variety and types of seeds put on the market. This is particularly true of crops where farmers expect each new advance in seed technology to incorporate all previous innovations.

Since each previous innovation may be subject to a patent right or plant variety certificate, the producer of the newest seed would need to obtain licences from all previous intellectual property holders. Where these innovations are widely held, this may prove difficult if not impossible. This is called a patent thicket. Further, where the innovation is held by a competitor it may similarly be impossible to obtain a licence. This is called a hold-out problem.⁷

The actors best able to overcome patent thickets and blocking patents are those holding substantial patent portfolios. As patents are stronger than plant variety protection, a holder of multiple patents affecting a particular seed has substantial power to negotiate licences with other holders.⁸ On the other hand, the holder of a single patent, unless that patent is thought critical, has less bargaining power.

One would therefore expect intellectual property systems, particularly patents, to lead to larger rather than smaller innovator companies. While this may result in a decrease in competition, it will not necessarily result in an increase in cost since other, non-patented crops, will remain available. This situation will likely, however, decrease the variety of new seed products placed on the market due to the lower number of innovator companies and to their targeting market segments of interest to them.

⁷ Michel Trommetter, "Intellectual Property Rights in Agricultural and Agro-food Biotechnologies to 2030" a report prepared for the OECD International Futures Project on 'The Bioeconomy to 2030: Designing a Policy Agenda' (2008) available on-line at: <http://www.oecd.org/dataoecd/11/56/40926131.pdf>; Richard C. Atkinson et al, "Public Sector Collaboration for Agricultural IP Management" (2003) 301 Science 174 at 174.

⁸ Atkinson, *supra* note 1 at 174.

In particular, it is unlikely that large innovator companies will develop seeds aimed at addressing the specific crop needs of low- and middle-income countries.⁹ This is so because of the relatively small financial pull of markets in those countries. Further, because they hold patents that usually cover many crops, innovator companies have the ability to prevent or delay development of products by other companies. While smaller firms based in low- and middle-income countries may have more interest in providing the specific genetic modifications needed in those countries, they will still need licences to use any intellectual property held in those countries. Unfortunately, there is little information available on global patent coverage for seed-related patents, so it is difficult to assess whether patents only affect the development of new crops in high-income countries or in all countries.

Because of the above, one can conclude that innovation in plants grown principally in low- and middle-income countries are likely to be fewer. While traditional crops will continue to be available in these countries, new crops aimed at addressing changing needs – due to climate change, associated environmental deterioration and changing consumer preferences – can be expected to develop more slowly than in the absence of patent rights.¹⁰

As a result of this concern, university leaders in the United States proposed and created the Public Intellectual Property Resource for Agriculture (PIPRA). Since many patents in the field of agricultural biotechnology are held by public institutions and universities, PIPRA aims at facilitating the use of patented technology to develop crops that respond to low- and middle-income food needs. This will assist those scientists developing crops to more easily develop and eventually market new food crops. So far, however, initiatives such as PIPRA have yet to show results.

⁹ *Ibid.*

¹⁰ E. Richard Gold, Matthew Herder & Michel Trommetter, “The Role of Biotechnology Intellectual Property Rights in the Bioeconomy of 2030” a report prepared for the OECD International Futures Project on “The Bioeconomy to 2030: Designing a Policy Agenda” (2008) available on-line at: <http://www.oecd.org/dataoecd/11/58/40925999.pdf>.