

**9th International Conference on
Agricultural Biotechnology: Ten Years After**

organized by the:

**International Consortium on Agricultural Biotechnology
Research (ICABR)**

and the:

Catholic University of Leuven

CEIS - University of Rome "Tor Vergata"

Centre of Sustainable Resource Development, University of California at Berkeley

Economic Growth Centre, Yale University

Ravello (Italy), July 6-10, 2005

**“Intellectual Property Rights on Research Tools - Incentives or
Barriers to Innovation?:
Case Studies of Rice Genomics and Plant Transformation
Technologies”**

Carl Pray and Anwar Naseem¹
Rutgers University

ABSTRACT

It has been long recognized that intellectual property protection, like patents, can provide an incentive for private firms to undertake research. In biotechnology, the patenting of innovations has led to a vigorous debate among scientists and policy makers on the appropriate role of such intellectual property protection. These debates particularly focus on platform technologies, which are defined as specific technical developments that can be applied to various research areas and which could potentially give rise to multiple and diverse set of innovations. Such platform technologies include transformation methods to introduce foreign gene constructs into unrelated organisms, and the sequencing and mapping of genomes that will help researchers identify location and the functions of those genes. The defining attribute of platform technologies is that whereas they have generally no direct commercial value to end users, they are often a critical input to developing such products.

Much concern has been expressed by biotech scientists and others that the patenting of such platform technologies and research tools may holdup innovation of

¹ Pray is Professor and Naseem is Research Associate in the Department of Agricultural, Food and Resource Economics, Rutgers University, New Brunswick, NJ. E-mails: pray@aesop.rutgers.edu, naseem@aesop.rutgers.edu

downstream researchers and may reduce the efficiency of the research process, and the subsequent commercialization of new products for farmers and consumers (Eisenberg and Heller, 1998). In particular, there is considerable unease about “reach-through” provisions, which give patent holders of platform technologies the ability to extract rents from downstream innovators. Reach-through provisions would not only increase costs for sequential innovators, but would also increase incentives for upstream innovators diverting scarce research resources. In addition there is the concern that upstream innovators might prevent the commercialization of some downstream technologies

This paper employs a case study methodology to examine the role of patents in the development and use of two platform technologies for plant biotechnology – plant transformation techniques and structural genomics. Our first objective in conducting these two case studies is to understand the role of patents and the public sector in the development of these technologies. This objective is realized by an analysis of patenting by public and private sectors, a historical analysis to examine how research has evolved in these areas and key interviews with researchers active in the field. Our second objective is to identify some of the benefits and cost of patenting of platform technologies. The benefits include more rapid development of new platform technologies while the costs are the negative impacts on downstream research activities in both public and private sectors. Specifically, we search for evidence of hold-ups of technologies that slow the pace of downstream research and reduce efficiency. Our third objective is draw lessons from these case studies about what the public sector might do to reduce the negative consequences of patents.

We undertook a preliminary analysis of these issues in 2002. This paper updates that our previous and reports on new interviews conducted with scientist, lawyers and managers in biotechnology firms and universities about the issues of hold-up. In addition we provide detailed analysis on a specific case where the Dept of Justice intervened in the innovation market by forcing a company to relinquish its research tool to a university for non-exclusive licensing in order to prevent concentration in the corn biotech industry.

Based on our case studies, we find that patents were important in inducing private firms to develop these platform technologies. Their development led to the commercialization of more GM varieties, more rapidly than would have been the case otherwise. We did identify a number of examples of GM varieties that were slowed down by the patents on tools. However, our preliminary assessment of the evidence suggests that the benefits from patents on tools outweigh the costs.