

## **Legal, Regulatory, Business and Technological Solutions to Intellectual Property Challenges**

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*Goals:* This research will examine legal, regulatory, business and technological solutions to the intellectual property challenges faced by developers of genetically modified soybean varieties, as well as farmers that adopt this technology. Specifically, the research will investigate application of alternative business and technological strategies related to soybean intellectual property in various legal and regulatory environments for three sub-themes: (1) use restrictions on soybeans protected by utility patents and/or plant variety protection certificates; (2) liability for misappropriation or otherwise unauthorized use of genetically modified soybeans; and (3) efficient methods of enforcing intellectual property rights in areas with relatively weak intellectual property legal regimes. Measurable goals include publication of at least one peer-reviewed research paper for each sub-theme identified above, with attendant research results presented at intellectual property and agricultural law symposia with national and international audiences.

*Procedures:* This is an applied research project with descriptive and prescriptive modules. The descriptive module involves legal research using a doctrinal, as well as a law and economics approach, where appropriate, to investigate use restrictions on genetically modified soybeans that are protected by various forms of intellectual property and to evaluate proposed statutory changes to the current legal and regulatory paradigm. Further descriptive research from a doctrinal and comparative perspective will investigate liability schemes for unauthorized use of genetically modified soybeans. The results of this research will analyze the appropriateness of possible alternatives to strict liability for innocent infringement of intellectual property rights. Finally, this project will integrate business and technological options for enforcing intellectual property rights in comparatively weak legal and regulatory environments and offer a prescription to firms designed to encourage continued research investment in soybean varieties and equalize competition for domestic farmers.

*Timelines:* Legal research with a descriptive focus will commence immediately and build upon ongoing doctrinal, comparative, law, and economics investigations. Research will be finalized, and at least one peer-reviewed paper relating to soybean use restrictions and proposed changes to the current intellectual property system that prohibits seed saving will be submitted for publication in the fall of year one. Research will be complete and a paper submitted for publication scrutinizing alternatives to strict liability for innocent infringers of intellectual property rights by the fall of year two. In addition, research results for the first two research sub-themes will be presented at symposia in the spring and fall of year two. A paper prescribing business and technological solutions for enforcement of intellectual property rights in weak legal environments will be finalized in the spring of year three, with results presented at a conference in either the summer or fall of year three.

*Impact of studies on: Legal, Regulatory, Business and Technological Solutions to Intellectual Property Challenges:* Recent developments in intellectual property protection for soybean seeds derived from genetic engineering have changed the legal environment faced by farmers, university researchers, and commercial seed breeders. For example, most licensing agreements for using soybeans protected by utility patents prohibit farmers from saving farm-produced seed for replanting the following growing season. In addition, growing evidence suggests that utility

patents for methods of genetic manipulation of soybean DNA may be concentrated in a smaller number of private-sector firms. Concentration of intellectual property rights within the life-science industry and profit-oriented licensing agreements may restrict the ability of universities and other public research institutions to develop new plant varieties resistant to emerging diseases. Growing concern over farmers' inability to save soybean seed and restrictions on public sector research has prompted some legislators to propose changes to the current intellectual property laws at the state and federal level.

In addition, liability for misappropriating intellectual property rights in soybean seeds presents unique legal challenges. Liability for infringement of utility patents in the US does not require proof of intent or even knowledge. Accordingly, there is no "innocent infringer" defense. Other countries with relatively strong intellectual property enforcement regimes, however, include an escape valve for infringement liability. Legal research investigating the relative costs and benefits of an innocent infringer defenses will assist the ongoing policy debate over the appropriateness of a strict liability regime for infringement of utility patents relating to soybeans.

Finally, unauthorized saving of soybean seeds presents a competition problem for farmers operating in legal regimes with strong intellectual property rights and an enforcement problem for seed developers attempting to expand their markets and recover research and development costs. Farmers in counties with weak or non-existent enforcement mechanisms for intellectual property may save seed with impunity, thereby lowering their input costs relative to farmers in areas characterized by strong intellectual property enforcement, such as the US. Likewise, the inability of private seed development firms to protect their intellectual property rights (and thereby recover research and development costs) challenges incentives for investment in improved soybean varieties, and shifts investment portfolios away from soybeans and towards more corn. Legal research regarding institutional and technological solutions for enforcing intellectual property rights will provide strategies to preserve investment incentives for continued soybean research and level the playing field for farmers operating under the constraints of an enforceable intellectual property paradigm.