

## Intellectual Property Rights for Plant Breeding and Rural Development: Challenges for Agricultural Policymakers

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Developing countries are being urged to strengthen intellectual property rights (IPRs) to foster innovation and expand trade. The field of agriculture is no exception, and the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) requires all World Trade Organization (WTO) members to provide either patent or sui generis protection for plant varieties. Only a few industrialized countries use patent systems for plant varieties, and developing countries will almost certainly look towards sui generis options for plant variety protection (PVP) to meet their TRIPS obligations.

Although many developing countries have drafted legislation to address PVP requirements, relatively few have begun to implement PVP, and little guidance is available on appropriate strategies. This note looks at some of the key decisions facing agricultural policymakers in establishing a PVP regime, examines the implementation of PVP, assesses some of the impacts and limitations of PVP regimes, and identifies policy priorities that complement the establishment of IPRs for plant breeding.

This brief is based on a study on the impact of IPRs in the breeding industry in developing countries executed in 2004 for the World Bank (Louwaars et al., 2005).

### CHOICES FOR PLANT VARIETY PROTECTION

IPRs for plant breeding are meant to establish incentives for investment in research by providing the breeder a certain degree of control over the commercialization of a new variety for a specified period. PVP allows the assignment of exclusive rights for seed production and marketing to the breeder, excluding competitors from the seed market. Some IPR systems (particularly patents) also establish restrictions on the use of the variety in further breeding efforts. The other source of "competition" is farmers, who traditionally save seed and exchange or sell it among their neighbors. The degree to which PVP systems in developing countries are able to limit such practices depends on economic, administrative, and political factors. A general prohibition on saving seed of protected varieties is an unlikely strategy in most developing countries.

The most widely used systems for PVP are under the auspices of the International Union for the Protection of New Varieties of Plants (UPOV). Most Organization for Economic Co-operation and Development (OECD) countries and some developing countries are members of one of the UPOV conventions, although that is not the only sui generis option under the TRIPS Agreement. Countries wishing to join UPOV must present legislation compatible with the 1991 convention. UPOV membership offers a number of advantages, including a source of technical backstopping for variety testing and the assurance of a PVP system recognized and respected by foreign investors. On the other hand, the 1991 convention imposes potential restrictions on farmer seed management practices





**Table I. Comparison of Major IP Systems for Plant Varieties**

Criteria	UPOV 1978	UPOV 1991	Utility patents (United States)
Requirements	Novelty (in trade) Distinctness Uniformity Stability	Novelty (in trade) Distinctness Uniformity Stability	Novelty (in invention) Utility Non-obviousness Industrial application
Seed saving	Allowed for private and non-commercial use	For use on own holding only (but for listed crops only)	Not allowed without consent of patent holder
Seed exchange	Allowed when noncommercial	Not allowed without consent of right holder	Not allowed without consent of patent holder
Breeder's exemption	Use in breeding allowed	Use in breeding allowed (but sharing rights in case of essentially derived varieties (EDVs))	Not allowed without consent of patent holder

Source: Adapted from Helfer (2002), Krattiger (2004), and van Wijk et al. (2003).

that may be politically unacceptable, a threat to seed security, and impossible to enforce. Only in specific cases where seed saving might threaten a market (e.g., export markets for flowers) or seed exchange would reduce incentives for plant breeding (e.g., informal seed sale by larger farmers or sales by grain merchants in competition with the commercial seed sector) would restrictions be justified in most developing countries.

An IPR system for plant breeding must chart a careful course between providing sufficient incentives for investment in research and seed production and protecting seed security for resource-poor farmers. There is no need to establish an exceptionally rigid or comprehensive IPR regime in the early stages of seed system development. Legislation should be designed with considerable flexibility so that IPRs can be adjusted to match the evolution of the seed system. Commercial seed systems usually begin with products that are difficult for farmers to save (hybrids, vegetables) and that generally require little IP protection. As the seed industry matures and farmers recognize the value of commercial seed, companies will offer a wider range of products, some of which may require attention to IPRs. Seed industry development usually parallels the growth of agribusiness, and markets for particular commodities may demand specific attention to IPRs.

In addition, it is important to recognize that IPRs are not the only incentive for plant breeding. India, for instance, has had a thriving and diverse commercial seed sector for more than two decades but has only recently implemented PVP legislation. Much of its success has been built on hybrid seed, which offers biological protection because its inbreds can be kept from competitors (as trade secrets) and the declining yields of saved seed encourage farmers to return to the market. Even for non-hybrid varieties, companies can sell seed to farmers who recognize the quality and convenience of commercial seed, on the basis of reputation and branding as is the case for vegetable seeds in various countries. Conventional seed laws that determine what varieties may be produced and that establish regulations for seed certification and quality control can also limit the production and sale of seed by competitors and can perform some of the functions expected of PVP.

## IMPLEMENTATION ISSUES

In addition to establishing a framework for PVP legislation, there are administrative challenges for implementing PVP, including decisions on where to house the new authority, how to establish eligibility of a new variety for protection, which crops to protect first, how to recruit personnel with

requisite technical and legal capacities, and how the authority can pursue cost recovery while ensuring that small players can afford to apply for protection.

The PVP authority is usually established in the Ministry of Agriculture (although the patent office is also an option). Administering a PVP system requires staff with legal and botanical knowledge and a good understanding of plant breeding and the seed industry; in many countries such expertise may be in short supply. PVP involves the careful testing of applicant varieties to ensure that they are distinct, uniform, stable (DUS), and new. In most implementation models the examination of applicant varieties requires testing stations to be established as efficiently as possible and to offer independent, transparent assessment. National research institutes may have the best human resources and facilities for this task, but as their plant breeders will want to apply for protection, it often makes sense to use the facilities of the seed certification agency.

The expense of DUS testing may be considerable. Careful thought is required for establishing a fee structure for PVP. Cost recovery is certainly a worthwhile goal, but it must be balanced against the dangers of excluding applicants for crops with relatively small seed markets or varieties from companies or institutes that may not be able to afford large fees. Many PVP systems establish a uniform fee schedule, including an application and testing fee, for all crops and then yearly, sometimes escalating, charges for maintaining protection. More differentiated fee structures might be based on the actual cost of evaluation (which may vary significantly between crops), the value of the protection (higher fees for crops with larger commercial seed markets), or the type of applicant (with discounts for resource-poor farmers). Subsidies could be considered at least initially in order for PVP to promote plant breeding. Regional collaboration (as in the European Union) and the use of foreign DUS reports can significantly reduce costs.

Not all crops need to be covered by PVP initially, and choices should be made about which crop-breeding efforts would benefit most from IPRs. With respect to public plant-breeding efforts, policymakers must distinguish between situations in which PVP will help stimulate the deployment of crop varieties developed by public institutes and those in which PVP may turn national research institutes away from their public mandate. A further deci-

sion involves the protection afforded to extant (usually public) varieties. Given that the rationale for IPRs is to provide incentives for future breeding, rather than to reward past achievement, it seems reasonable to limit the protection periods for extant varieties.



## EXTENSION AND ENFORCEMENT

A PVP system will not meet its goals unless it is supported by the full range of stakeholders. Breeders, seed producers, traders, and farmers need to understand the objectives of the system in order to comply with it. The development of a PVP system should thus include an extensive information campaign involving all stakeholders, including the legal profession. One of the major challenges for a PVP system is providing effective enforcement. Establishing elaborate restrictions on seed use is counterproductive if there is no enforcement capacity. Private companies and public institutes that lobby for the establishment of PVP must be made aware that most enforcement responsibilities will fall on their shoulders. Likewise, identifying offenders is of little use if the court system is unable to understand or interpret PVP legislation. Developing judicial experience in PVP may take some time.

## IMPACTS AND LIMITATIONS OF IPR REGIMES FOR PLANT BREEDING

There is limited experience from developing countries on the impact of PVP, but a few cases can be cited. In countries where a domestic private seed industry develops new varieties of nonhybrid crops (such as rice in Colombia or wheat in Argentina), PVP ensures that varieties developed by small companies will not be reproduced by competitors. In countries such as India and China, where it is difficult to ensure the physical security of inbred lines (because seed production plots of competing enterprises are often close to each other), PVP is also welcomed for protecting hybrid varieties. Where the farming sector comprises mostly larger farmers, PVP can also help control large-scale informal seed sale of protected varieties and perhaps impose some restrictions on seed saving. A well-run PVP system can also provide public research institutes with tools for guiding the deployment of their varieties, attract foreign companies to share more of their germplasm with local business partners, and provide additional security for contracting specialty export crops.

However, there is little evidence that simply establishing a PVP regime is sufficient to stimulate major investments in plant breeding in developing countries. Decisions about PVP should be taken in conjunction with broader policy support to ensure a diverse and competitive private seed sector and a responsive public agricultural research system. They depend on a well-functioning legal system that allows enforceable contracts with seed growers and merchants, the promotion of responsible business practices, and the encouragement of professional associations in agribusiness. The effective establishment and implementation of conventional seed regulations is also important. It includes a transparent and efficient mechanism for providing release and approval for domestic and foreign varieties; a system of seed quality control that places increasing responsibility on seed producers themselves; and consumer education and protection so that farmers play a more prominent role in regulating the seed industry.

Finally, farmers' demand for seed depends critically on a dynamic domestic agricultural economy. Policies should promote efficient agricultural output markets, seek opportunities to extend the value chain by promoting processing industries and related activities, ensure that farmers have access to good information and transportation links, and support agricultural research to provide a continuing stream of innovations.

## OPPORTUNITIES FOR DEVELOPMENT AGENCIES

Development agencies may assist policymakers in developing a protection system that is tailored to the needs and capacities of the country's seed systems, which may vary considerably among export crops, domestic commercial commodities, and subsistence crops. Agencies must realize that although the design of a regulatory framework is important, it is only one element in supporting commercial breeding and seed supply. Finally, countries need to develop the administrative, technical, and especially human resources to implement the systems with active involvement of all stakeholders.

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