

DISCUSSION PAPER

Intellectual Property Issues: A revision of the current UPOV PVP is required to support the conservation, sustainable development and benefit sharing goals of the CBD

Stephen Smith. Germplasm Security Coordinator, Research and Development, Pioneer Hi-bred International, Inc., Dupont Agriculture and Nutrition. Email: stephen.smith@pioneer.com

The issue of IPRs has mostly, if not completely, been reviewed in the context of the CBD solely in regard to how IPRs can assist in monitoring compliance. However, it is critical that the role of IPRs be looked at in a more holistic sense. Do available forms of IPR help support the goals of the CBD in regard to conservation, sustainable development and benefit-sharing? If they do not then there are more fundamental issues that need to be addressed than the more narrowly defined legal issues currently occupying centre-stage of the debate. To answer this question it is essential to review IPRs in the biological context of evaluating and utilizing plant genetic resources. Scrutiny by legal experts may lead to an excellent formulation for interacting IPRs with the CBD. All legal efforts will be for naught, however, unless the biological aspects of using plant genetic resources are also considered and taken into account. After all, the CBD is a convention that applies to *biological* diversity.

The most widely used type of legislated IPR that is used globally to encourage research and product development by plant breeders is Plant Variety Protection (PVP), under the UPOV scheme. PVP has a breeder exemption that allows immediate free access to commercialized varieties for the purposes of continuing the breeding process (provided the variety is not subject to other forms of IP). PVP and the breeder exemption make sense in the context where well-adapted varieties provide the building blocks from which even better adapted varieties can be created. PVP does not, however, provide sufficient incentives for a breeder to take extra time, to apply additional resources, and to take risks that are inherent to evaluate, adapt, and introduce new genetic diversity into a region from an exotic source. Even in the previous pre-CBD era, where plant genetic resources were considered the "common heritage of humankind", there was little to no use of exotic germplasm by the private commercial sector. The introduction of exotic germplasm into a region was largely conducted by the public sector (including national programs, public universities and International Agricultural Research Centres). However, public investments in agricultural research have not kept pace with the acknowledged needs. In developed countries, the annual growth rate of real public investment in all agricultural research fell from 2.7% during 1971-1981 to 1.7% for 1981-1991. Similarly, in developing countries, the growth rate of public investment in agricultural research fell from 6.4% in the 1970s to 3.9% in the late 1980s. Of greater concern, variety development has been a decreasing percentage of all agricultural research. Real funding for the International Agricultural Research Centres has increased, but by less than 1% per year between 1985 and 1996 (Pardey et al., 1997). On the other hand, private sector investment in agricultural research has generally increased, tempered by the IPP available.

Capabilities of the private sector to contribute to genetic diversity on farms is ultimately dependent upon the extent to which breeders can effectively source and deploy exotic germplasm. Sourcing and deploying exotic germplasm are longer-term and more high-risk activities than is breeding from already well-established and well-adapted high yielding varieties. Consequently, intellectual property regimes that encourage the high-risk activities that are required to source and deploy exotic germplasm have a key role to play in encouraging more genetic diversity in production agriculture. In contrast, current PVP regimes that allow immediate and free access by competitors to newly developed varieties undermine willingness of any one breeding program to undertake high-risk activities required to source new, initially unadapted germplasm and they will therefore lead different breeding programs to be using ever more similar germplasm pools. The private commercial sector could be an important contributor to helping achieve the goals of sustainable development and the generation and sharing of benefits foreseen by the CBD. Current PVP regimes, however, not only fail to encourage private investments into the additional time consuming and high-risk activities that are essential to find and to deploy exotic germplasm, but their confluence with new technologies and breeding approaches also conspire to provide perverse incentives that, if left unchanged, will lead private commercially funded plant breeders not to consider exploring new exotic plant genetic resources.

For example, new technologies include:

- high-throughput semi-automated molecular marker profiling;
- off-season winter nurseries giving multiple generations per year;
- high-throughput gene expression assays using DNA on silicon chips;
- high-throughput proteomics assays;
- high-throughput DNA sequencing facilities;
- ability to DNA profile both the female and male parents of hybrids without accessing either parent per se via use of maternally inherited tissue (e.g. use of pericarp tissue);
- ability to create homozygous progeny very rapidly using di-haploid genetic stocks;
- ability to conduct genome-wide gene-trait association studies involving hundred or thousands of genotypes including landraces; and
- ability to conduct genome-wide scans comparing domesticated varieties or landraces and to compare with wild relatives to identify potentially useful loci and potentially useful new genetic diversity.

The endeavour of plant breeding exhibits “path-dependence”. Progress along a new path (e.g. using exotic germplasm) places initial costs and risks on the breeder, though all entities eventually benefit. The issue of access to exotic germplasm therefore becomes of paramount importance. One potential application of the technologies listed above is to reduce the time taken to breed a new inbred line from a commercial hybrid by about 10 years; from 12 years down to 2 years. The level of incentives for the private sector to engage in research to identify and to introduce new exotic germplasm from one region and to introduce it into an improved adapted variety in another region of the world has therefore further diminished to the point of essential non-existence (in an environment where competitors have free immediate access to that new variety). Commercially funded plant breeding organizations cannot afford to make long-term high risk investments to introduce new genetic resources into a region, if those varieties are then immediately available to competitors in their breeding programs. Yet, it is critical that incentives are in place to introduce new genetic

III. Specific Issues for consideration in the elaboration of the IR:
Interface with Existing IP Systems & Limits and Opportunities for Existing IP Rights

resources into a region to add new useful diversity, to counter the narrowing of the genetic pool that occurs when adapted varieties of that region are the sole genetic base, and to contribute to benefit-sharing that can accrue to providers of exotic genetic resources (as envisioned as a key basis of the CBD).

The current forms of UPOV allow immediate and free access by other breeders to commercial varieties for further breeding. Consequently, investment incentives by the private sector to conduct innovative and high-risk research and development of new and improved germplasm will decline under the current UPOV system, if that form of protection is the only IP available to the breeder. Allowing free and immediate access to commercial varieties actually provides perverse incentives for breeders not to invest in high-risk innovative research and product development because the results of their research and product development are immediately placed in the public domain for others, including those breeders who make no investments in such risky or innovative breeding strategies. Consequently, under the research environment provided for by the current UPOV scheme, economic incentives encourage breeders to make relatively low risk investments in product development by utilizing already adapted starting materials. As such, in the current UPOV environment, commercially funded plant breeders have no incentives to utilize exotic germplasm. No demand for exotic germplasm means there can be no market for the use of those resources, no benefits to potential providers of those resources, and no benefits that could otherwise accrue to consumers. Current forms of UPOV style protection do not support the goals of the CBD. PVP as it is currently practised undermines the capacity of the private sector to access exotic germplasm.

Nonetheless, the general concept of a PVP-type system is appropriate and still has importance to provide affordable IP for plant breeders whilst retaining the availability of germplasm as an initial source of variation in breeding. However, it is time to update the provisions of UPOV to accommodate advances in technology that have occurred since 1991, in order to encourage continued infusions of new germplasm into breeding pools, and also to help support the goals of the CBD. Updates to UPOV might include a new option for a PVP with a revision of the breeders' exemption. This revision might include a period of "x" years from the date of a PVP application during which the breeders' exemption would not be available for UPOV-protected material including commercialized varieties or it could provide for licensed use in breeding. Perhaps such a revised UPOV could be available at a higher fee to applicants, thereby supporting genetic resource conservation (e.g. via the FAO International Treaty and/or the FAO Global Plan of Action) and also including additional benefit provisions to providers of genetic resources via bilateral PIC arrangements. Perhaps a revised PVP scheme could co-exist with current forms of PVP as an additional option or plant breeders to consider using.

A revised UPOV would contribute to an improved solution. IPP, as applied to plant breeding, must be improved on a global basis to attract research investments and to encourage use of a broader base of genetic resources. There are numerous dependencies upon crop germplasm that cut across country and continental boundaries. Therefore, increasing incentives to invest in breeding on a global basis are required to encourage both access and benefits. More effective IP can encourage access to germplasm and can ensure benefits flow to providers of germplasm. Changes in UPOV are required on a worldwide basis to achieve the twin goals of increased, more sustainable and reliable food production and improved environmental quality. A revised UPOV system could facilitate achievement of the goals of the IT and CBD by providing increased opportunities for benefit sharing to germplasm providers through increased incentives to holders of germplasm to conserve and to evaluate those resources and

III. Specific Issues for consideration in the elaboration of the IR:
Interface with Existing IP Systems & Limits and Opportunities for Existing IP Rights

increased incentives to commercially funded plant breeders to access and to provide benefits from the use of those resources. If a new UPOV system is not made available, one that supports commercial breeding using exotic germplasm, then the private commercial sector will be seriously hampered in its ability to contribute to the generation of benefits and the sharing of those benefits that are envisioned in the CBD.