Plant Patenting And Farmers Right Under Iprs Law With Special Reference To Indian Iprs Law

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ABSTRACT
Some special rights has given to the farmers under farmers Act 2005 but it has some defects namely in the field of plant patenting and sui generis because When we look the historical advancement of the farmer’s condition, it seems that they are still in under privileges condition. Plant patenting and sui generis is a technical terminology for the protection of farmers right for the sake of economic condition as well as agricultural condition. These aspect has a very important role in the farmers right and are described briefly in this paper.

Key words: Plant protection, Patents, Farmer Right, IPR.

Introduction
A patent is a form of intellectual property. It consists of a set of exclusive rights granted by a sovereign state to an inventor or their assignee for a limited period of time in exchange for the public disclosure of an invention.

The procedure for granting patents, the requirements placed on the patentee, and the extent of the exclusive rights vary widely between countries according to national laws and international agreements. Typically, however, a patent application must include one or more claims defining the invention which must meet the relevant patentability requirements such as novelty and non-obviousness. The exclusive right granted to a patentee in most countries is the right to prevent others from making, using, selling, or distributing the patented invention without permission (WIPO, 2008).

Under the World Trade Organization’s (WTO) agreement on trade-related aspects of Intellectual Property Rights, patents should be available in WTO member states for any inventions, in all fields of technology (WIPO, 2008), and the term of protection available should be a minimum of twenty years (TRIPS Article 27.1). In many countries, certain subject areas are excluded from patents, such as business methods and computer programs.

The term patent usually refers to an exclusive right granted to anyone who invents any new, useful, and non-obvious process, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, and claims that right in a formal patent application. The additional qualification utility patent is used in the United States to distinguish it from other types of patents (e.g. design patents) but should not be confused with utility models granted by other countries.

Examples of particular species of patents for inventions include biological patents, business method patents, chemical patents and software patents.

Some other types of intellectual property rights are referred to as patents in some jurisdictions: industrial design rights are called design patents in some jurisdictions (they protect the visual design of objects that are not purely utilitarian), plant breeders’ rights are sometimes called plant patents, and utility models or Gebrauchsmuster are sometimes called petty patents or innovation patents. This article relates primarily to the patent for an invention, although so-called petty patents and utility models may also be granted for inventions.

Certain grants made by the monarch in pursuance of the royal prerogative were sometimes called letters patent, which was a government notice to the public of a grant of an exclusive right to ownership and possession. These were often grants of a patent-like monopoly and predate the modern origins of the patent system. For other uses of the term patent see notably land patents, which were land grants by early state governments in the USA, and printing patent, a precursor of modern copyright. These meanings reflect the original meaning of letters patent that had a broader scope than current usage.

Meaning of plant patenting
A plant patent is a patent issued for newly invented strains of asexually reproducing plants. Tuber propagated plants or wild uncultivated plants may not be patented. Not all countries allow plant patents. The USPTO provides for the granting of a patent to anyone who has invented or discovered and asexually reproduced any distinct and new variety of plant, including cultivated sports, mutants, hybrids, and newly found seedlings, other than a tuber-propagated plant or a plant found in an uncultivated state. Asexually propagated plants are those that are reproduced by means other than from seeds, such as by the rooting of cuttings, by layering, budding, grafting, inarching, etc. With reference to tuber-propagated plants, for which a plant patent cannot be obtained, the term “tuber” is used in its narrow horticultural sense as meaning a short, thickened portion of an underground branch. Such plants covered by the term “tuber-propagated” are the Irish potato and the Jerusalem artichoke.

Issues on farmers right under intellectual property right

India has passed legislation granting Farmers' Rights in the form of the Protection of Plant Varieties and Farmers' Rights Act, 2001. India's experience is important due to its international contribution to negotiations on Farmers' Rights, its position as a centre of biodiversity, and the complexities of agriculture in India within which the country is attempting to implement these rights. In a study written by Dr. Anitha Ramanna, University of Pune, India, and published by the Farmers' Rights Project in 2006 provides an overview of the state of Farmers' Rights, and opinions of over forty stakeholders in India including farmers, NGOs, industry and government representatives, on the prospects for the further realization of these rights. The study analyses the achievements, barriers and limitations of India's approach.

Farmers' Rights in India

The International Treaty on Plant Genetic Resources for Food and Agriculture recognizes Farmers' Rights and obliges the countries being Parties to the Treaty to protect and promote these rights. Countries, however, have not yet been able to evolve any consensus on how to define or implement Farmers' Rights. International coordination in this regard is also lacking. These are serious drawbacks that could prevent Farmers' Rights from becoming a realistic and workable mechanism. This report attempts to evolve options for the practical implementation of Farmers' Rights through a case study of India. Over forty stakeholders, including farmers, NGOs, industry and government representatives in India have been interviewed to explore methods to realize Farmers' Rights.

Agriculture plays a key role in India's economy both from the point of view of employment generation as well as its share in GDP. A recent economic survey expressed concern with the decline in the share of the agricultural sector's capital formation in GDP. The dismal situation in which many farmers find themselves in India today was reflected in a study sponsored by the Government of India, known as the 'Situation Assessment Survey of Farmers' (SAS), which for the first time assessed the situation of farmers in 2003. An alarming trend has been witnessed in India in recent years with rising rates of farmers committing suicide. Newspapers echoing the 'crisis in Indian agriculture' continue to report daily incidents of suicides in various parts of the country. Several different reasons have been put forward as the cause of suicides including: mounting debt of farmers, crop failures due to overuse of pesticides, imbalances of international trade, or social and psychological factors.

Agriculture was generally excluded from intellectual property protection in India and there was no legal system of Plant Breeders' Rights or Farmers' Rights for decades. The Seed Association of India, formed in 1985, has actively promoted the need for plant breeders' rights in the country. With the adoption of the WTO Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPs), bilateral and multilateral pressure was also exerted on India to establish intellectual property rights in agriculture. There was enormous protest against implementing TRIPs by non-governmental organizations and farmers' lobbies in the country. The Protection of Plant Varieties and Farmers Rights Act (PPVFR), 2001 arose amidst this controversy. The PPVFR Act initially emerged as a result of the demands of the seed industry for breeder's rights. A chapter on Farmers' Rights was added to the Act due to pressure by NGOs.

India's PPVFR Act not only upholds farmers' rights to save, use and exchange seeds and propagating material but also attempts to enable farmers to claim special forms of intellectual property rights over their varieties. The Act grants plant variety protection on new varieties (largely modeled on UPOV), extant varieties and essentially derived varieties. Extant varieties include farmers' varieties, varieties in the public domain and varieties about which there is common knowledge. Nine rights can be said to have been given to farmers under the Act including: the rights to save, exchange and (to a limited extent) sell seeds and propagating material, to register varieties, to recognition and reward for conservation of varieties, to benefit sharing, to information about expected performance of a variety, compensation for failure of variety to perform, availability of seeds of registered variety, free services for registration, conducting tests on varieties, legal claims under the Act, and protection from infringement.

The National Biodiversity Act, 2002, based on the Convention on Biological Diversity, regulates access to and use of genetic resources in India. This Act also focuses on benefit sharing, protection of traditional knowledge and prior informed consent. The Geographical Indications Act, the Patents Amendments Act and the Seed Bill also have implications for Farmers' Rights in India. The Seed Bill could restrict farmers' right to sell their seeds, and the Patent Amendment Acts could pave the way for the commercialization of traditional knowledge.
way for further extensions of patentability in agriculture that may restrict farmers' rights to save, use or exchange seeds. The Geographical Indications Act may enable farmers to claim rights for agricultural goods originating in a specific region, or it could restrict access of farmers to the protected goods depending on the way it is implemented.

A large number of diverse stakeholders influence India's policy on Farmers' Rights. The views of various stakeholders on the importance, barriers and options for implementing Farmers' Rights were compiled and analyzed in this study. Forty-two interviews were conducted among representatives from NGOs and farmer's lobbies, the government, the seed industry, experts and among farmers. Interviews were conducted in various parts of India: New Delhi, Chennai, Hyderabad, Bangalore, Pune and Uruli Kanchan. Stakeholders across various categories acknowledge the importance of Farmers' Rights nationally and globally. A majority of the respondents expressed that Farmers' Rights must incorporate rights beyond the farmer's right to save, use and exchange seeds. Various issues were addressed as important rights for farmers, such as support for inputs, access to technology and farmer's participation in decision-making. While some favoured the government as the main agency to facilitate benefit sharing, others pointed to the need for NGOs or for an independent agency to promote benefit sharing. The stakeholders place a great deal of responsibility on the Authority established to implement Farmers' Rights in India to overcome the barriers. In addition, stakeholders are looking to the Governing Body of the International Treaty to provide guidance and direction for the implementation of Farmers' Rights.

India's case holds some lessons for developing countries. Two broad approaches to defining Farmers' Rights in India reflect the options facing developing countries: 1) Farmers' Rights as a form of intellectual property rights 2) Farmers' Rights as a development right. The first approach poses Farmers' Rights as a counter to Plant Breeder's Rights and argues that if commercial breeders can acquire intellectual property over their inventions, then farmers' innovations must also be recognized and rewarded. The second encompasses a range of concerns including food security, livelihood rights, social justice and access to resources. India's policy largely adopts the first approach, but also acknowledges the second view. Many respondents to the survey felt that Farmers' Rights should move beyond ownership rights to incorporate development rights. Yet, even among NGOs, farmer leaders, and individual farmers, there were differences regarding the nature of development rights to be addressed. NGOs focused on conservation and access to seeds, while individual farmers pointed to guaranteed prices, electricity, low interest credit and reducing the role of middlemen.

The approach of defining Farmers' Rights as intellectual property rights may provide political rather than economic benefits for developing countries, whereas defining Farmers' Rights as development rights may ensure greater economic/social advantages. While defining Farmers' Rights as a kind of intellectual property rights could provide a tool for negotiating at the global level, it may not be of great utility in ensuring rights for farmers in developing countries. Legal and economic costs of establishing the system, the difficulties of legally claiming rights for farmers, and the limited returns from plant variety protection itself are some of the reasons why IPR-based Farmers' Rights approaches are unlikely to provide significant economic returns to farmers. In addition, developing countries may not gain much from seeking royalty payments for ownership of germplasm and may gain more from effectively utilizing genetic resources. Domestically, there is a need to gradually incorporate more development-oriented rights within the Farmers' Rights framework. Developing countries could attempt to forge a strategy that takes advantage of both approaches by utilizing the IPR type approach as a strategic tool to argue for Farmers' Rights globally, while domestically incorporating greater development oriented rights.

Another important lesson in defining Farmers' Rights is the need to avoid an 'anticommons tragedy'. An 'anticommons tragedy' arises when governments grant too many people rights over a resource with no one having an effective privilege of use. India's PPVFR Act is an attempt to evolve a multiple rights system that could pose several obstacles to useful utilization and exchange of resources. Developing countries need to evolve mechanisms to ensure exchange of agricultural resources as part of Farmers' Rights.

India and other developing countries could explore options to further develop the International Treaty's Multilateral System approach. The International Treaty on Plant Genetic Resources establishes a specified list of crops on which there are agreed rules for access and benefit sharing. In a sense, the Treaty attempts to redefine the principle of common heritage. India could not only support this initiative by making more crops available on the terms and conditions of the Multilateral System, but could also explore the option of developing a parallel national system which includes crops significant for India's food security. Such systems could provide the means for promoting farmers' and breeders' access to resources.

India's ability to be one of the first countries in the world to forge a national legislation on Farmers' Rights is a significant landmark. India has evolved a unique legislation, but still faces the task of implementation. This process is likely to be fraught with difficulties not only in balancing intellectual property rights with Farmers' Rights, but also in ensuring coordination between various legislations such as the PPVFR and the National Biodiversity Act. It is also evident from the study that no clear agreement exists among the various stakeholders in terms of how to implement the Act. This should serve as a signal internationally that establishing legislations is insufficient to effectively promote Farmers' Rights.

The Governing Body of the International Treaty must now take up the task of establishing clear guidelines for defining and implementing Farmers' Rights. An international movement for Farmers' Rights would have to tread carefully to...
respect the sovereignty of nations while promoting global cooperation. However, Farmers’ Rights must be promoted at the international level and cannot be left only to national governments to design. If each country, under Farmers’ Rights, sets up barriers to access of genetic resources, limits exchange of resources, and competes to stake claims over innovations, the implications would be severe for farmers.

The Farmers’ Rights movement has witnessed a long and chequered history. An international mechanism is urgently required to promote some level of consensus on defining and implementing these vital rights. If the global community does not face up to the challenge of unambiguously articulating Farmers’ Rights, what has been achieved so far in the battle to establish these rights may be lost. Such a loss would be heavy for farmers in India and other developing countries who need Farmers' Rights to protect their livelihoods, secure their access to resources, protect their rights to seed, and, above all, lift the mouth of poverty.

This study presents overall scenario of plant patenng as follows:

**Historical background of plant patenting**

Development of a new plant cultivar or variety, either by “traditional” breeding methods or by “modern” molecular modification, requires a lot of time and effort. To recover the costs of this research and development, the breeder may seek to obtain exclusive marketing rights for the new variety. Keeping it a trade secret is one way to do this, as well as obtaining either a plant patent, utility patent, or plant variety protection. The method chosen depends on the specific benefits and limitations of the protection, and the costs involved. Plant variety protection is a good choice for many breeders.

The 1930 Plant Patent Act first allowed for patenting of asexually reproduced cultivars (except tubers). By the 1960’s, some European countries enacted plant breeders’ rights laws. It was demonstrated that sexually reproduced varieties were uniform and stable enough to be included in these laws. During the 1960’s several attempts were made to enact similar protection in the United States, including a proposal to revise the Plant Patent Act to include sexually reproduced plants. These early attempts were unsuccessful.

The Plant Variety Protection (PVP) Act was enacted on December 24, 1970. Its purpose is to "encourage the development of novel varieties of sexually reproduced plants" by providing their owners with exclusive marketing rights of them in the United States. The requirements of protection are that the variety be uniform, stable, and distinct from all other varieties. Fungi, bacteria, and first generation hybrids are excluded from PVP protection. Varieties sold or used in the United States for longer than 1 year or more than 4 years in a foreign country are also ineligible for protection.

A Certificate of Protection remains in effect for 18 years from the date of issuance. The owner may specify that the variety be sold by variety name only as a class of certified seed, as defined in the Federal Seed Act. Once so specified, the designation cannot be reversed. There are two exemptions to the rights granted. One exists to allow farmers to save seed for use on their own farm or to sell it to their neighbors. Recent court decisions have defined who is a "farmer" and how much seed can be saved. Another exemption allows research to be conducted using the variety. This allows for the free exchange of germplasm within the research community.

**Plant patenting and farmers right**

The subject of plant patents may sound like a boring one, but it affects every single one of us and the food we eat. The resurgence of interest in plant patents stems from the fact that "new and improved," genetically modified crops are eligible for patents, and these plants’ patents have a significant impact on farming practices and the future of traditional, independent farmers across the country.

Developments related to protection of plant variety date back to the 1920s and 1930s. Compulsory uniform standards for the protection of the plant varieties is been set up by Article 27.3(b) of the TRIPS Agreement called the “Biotechnology clause”, which imposes, a compulsion on all member countries of the WTO to protect plant varieties either by patents or by a sui generis regime or by a combination of both. Plant variety protection is significant to provide an incentive to commercial breeders for developing new plant varieties; and for linking the protection of the plant variety directly with the rights of the farmers who have traditionally been breeding plant varieties. As an important role has been played by the farmers towards the conservation of PGR, they have an important role in any legal framework on plant variety protection and their interests and concerns should be taken into account.

India is not a member to UPOV and has come up with its own legislation for the protection of the farmers rights. But the Government recently had given a thought over joining UPOV knowing the consequences very well. As we know that Indian farmers are mainly dependent on agriculture the problem now here is will it be a correct decision to follow such a model which is not farmer friendly and gives extra protection to the breeders which leads India to take a 100 steps backward from the path of progress.

India explored the sui generis option, known as the Protection of Plant Varieties and Farmer’s Rights Act, 2001 (PPVFRA) which is a unique legislation as it involves both breeders and farmers, in a comprehensive manner. This research paper looks at the interplay between the PPFVR Act, and India’s proposed membership of the UPOV.
Plant patenting and sui generis

What is Sui Generis

Sui generis is a Latin word. It means “unique” or “special”, leaving the sui generis system open to interpretation. Sui generis offers a unique type of intellectual property right (IPR), which is different from the classical IPR, as is the case with the patent. All sui generis models that could be tailored to the specific needs and circumstances of the Members are legally recognized systems. The plant varieties constitute the principal means of production and growth in agricultural productivity. It is also recognized that the specific needs and circumstances of agriculture in each country vary and in this respect the differences between the developing and the developed countries are very wide in several aspects. Therefore, it is obvious that a sui generis system of protection appropriate for a developing country may require certain modifications in another developing country and these systems may not be even relevant to a developed country. These differences in ground realities and perceptions have made major contribution to the raging controversy on sui generis system.

The question of sui generis intellectual property right protection for plant varieties has become a matter of great importance following the adoption of the TRIPS Agreement. As a result of a negotiating compromise, TRIPS requires the introduction of plant variety protection in all member states but it does not impose the introduction of patents. Article 27.3.b specifically requires all member states to ‘provide for the protection of plant varieties either by patents or by an effective sui generis system or by any combination thereof’. The introduction of the sui generis concept reflects two broad elements. First, a number of countries in the North and the South rejected the compulsory introduction of plant patents. Second, negotiators did not manage to agree on one specific alternative to patents. As a result, TRIPS gives member states a wide margin of appreciation in determining how to implement their obligation to introduce plant variety protection.

The question of the introduction of plant variety protection is one that concerns mostly developing countries. Indeed, most developed countries had already introduced either plant patents or PBRs before the adoption of TRIPS. Developing countries that are member of WTO were left with the choice of either adopting the existing regime proposed in UPOV or to devise their own plant variety protection system adapted to their specific situation. A few countries have joined UPOV since 1994 but the majority has decided to adopt their own plant variety protection laws. In a number of cases, these laws draw directly and significantly from the UPOV regime and generally most existing proposals introduce PBRs. In cases where PBRs are adopted only as part of the regime, the regime is completed by the introduction of a form of farmers’ rights. In fact, existing sui generis options can be generally defined as regimes introducing both PBRs and farmers’ rights.

The prominence of the UPOV Convention in the debates concerning sui generis plant variety protection is in part linked to the fact that the interpretation of the concept of ‘effective’ sui generis system in Article 27.3.b TRIPS remains problematic. The only generally agreed upon interpretation is that UPOV is an effective sui generis protection regime under TRIPS. This has led some countries like the member states of the African Intellectual Property Organization to simply adopt a regime modeled after UPOV-1991 and at the same time to commit them to join the UPOV Convention.

Some countries like India have decided to implement plant variety protection regimes which seek to provide protection to commercial plant breeders and to farmers. Thus, the Indian plant variety protection regime introduces both PBRs and farmers’ rights. While a number of countries have attempted to draw up their own sui generis plant variety protection regimes, the member states of the Organization of African Unity have taken a unique initiative in adopting a Model Legislation for the Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources. The model legislation is premised on the rejection of patents on life or the exclusive appropriation of any life form, including derivatives. Its provisions on access to biological resources make it clear that the recipients of biological resources or related knowledge cannot apply for any intellectual property right of exclusionary nature. The model legislation focuses mainly on the definition of the rights of communities, farmers and breeders. Community rights recognized include rights over their biological resources and the right to collectively benefit from their use, rights to their innovations, practices, knowledge and technology and the right to collectively benefit from their utilization. In practice, these rights allow communities the right to prohibit access to their resources and knowledge but only in cases where access would be detrimental to the integrity of their natural or cultural heritage. Further, the state is to ensure that at least fifty per cent of the benefits derived from the utilization of their resources or knowledge is channeled back to the communities. The rights of farmers are to a certain extent more precisely defined. These include the protection of their traditional knowledge relevant to plant and animal genetic resources, the right to an equitable share of benefits arising from the use of plant and animal genetic resources, the right to participate in decision making on matters related to the conservation and sustainable use of plant and animal genetic resources, the right to save, use, exchange and sell farm-saved seed or propagating material, and the right to use a commercial breeder’s variety to develop other varieties. The breeders’ rights defined under the model legislation generally follow the definition given in the UPOV convention and the duration of the rights is modeled after UPOV 1991. One specificity of the plant breeders’ rights regime under the model legislation is the rather broad scope of the exemptions granted. Exemptions to the rights of breeders include the right to use a protected variety for purposes other than commerce, the right to sell plant or propagating material as food, the right to sell within the place where the variety is grown and the use of the variety as an initial source of variation for developing another variety.
The development of sui generis plant variety protection is still in its infancy. Until now, efforts have been made by developing countries to balance their obligations under Article 27.3.b of TRIPS with their specific needs and conditions. Since UPOV is the only model which is generally recognized as fulfilling the criteria of an ‘effective’ sui generis plant variety protection regime, a number of states that have not had the time or resources to devise a completely separate sui generis protection regime have decided to take PBRs as a basis for a plant variety protection regime. In addition to the PBR system, there seems to be a growing trend towards recognizing farmers’ rights alongside and to provide for different compensation mechanisms (benefit-sharing). Other sui generis protection regime s will probably be developed in years to come, in particular by least developed countries which still have until 2005 to implement their plant variety protection regimes. Further, even countries classified as developing countries may amend their legislations over time as further sui generis models evolve. Sui generis protection is evolving and significant innovations can be expected in years to come

A sui generis system (India)

Many developing countries have an agricultural economy that is geared towards the domestic as opposed to the export market. Such an economy is dependent upon farmer-produced seed of varieties that are both maintained and further adapted to their local growing conditions by small-scale farmers. Developing countries with such an economy want to acknowledge the rights of farmers arising from their contribution to crop conservation and development and the sharing of their knowledge on adaptive traits. They also want to encourage farmer-to-farmer exchange of new crop/plant varieties that are adapted to the local growing conditions. As a result, some developing countries have chosen a sui generis system of plant protection that is not compliant with UPOV in that it allows farmers to improve and adapt the seed in order to make it more successful in the local conditions.

Under the Indian Protection of Plant Varieties and Farmers’ Rights Act 2001, plants are divided into four main classes: new varieties, extant varieties, essentially derived varieties and farmers’ varieties. The regime for plant protection is similar to that set out by UPOV and the requirements for protection are novelty, distinctness, uniformity and stability. Under Article 39(iv) the farmer is entitled to save use, sow, reshow, exchange, share or sell his farm produce including seed of a protected variety. However he is unable to sell seed that has been branded with the Breeders name. In this way the breeder has control of the commercial marketplace without threatening the farmers’ ability to practice his livelihood. The Indian Act also contains provisions for “benefit sharing” whereby the local communities are acknowledged as contributors of land races and farmer varieties in the breeding of “new” plant varieties. It is these extra provisions granting rights to both breeders and farmers which makes the Indian system a sui generis method of protection. China and Thailand are other examples of countries that do not implement a UPOV style protection system

Plant patenting and its economic benefits

Patents are techno legal documents intended to encourage innovation by providing a limited monopoly right to the inventor (or their assignee) in return for the disclosure of the invention (www.uspto.gov). The underlying assumption being innovation is encouraged because an inventor can secure exclusive rights, and therefore a higher probability of financial rewards in the market place. The publication of the invention is mandatory to get a patent.

Microeconomic perspective

The patent system has an impact on the economy as a whole. The benefits of new results, once the research is in public domain, are available to the whole economy in the relevant field, thereby bringing advantages to all parties in that field, though reducing the direct return to the party performing the pioneering research. This reduces economic incentive for a party to conduct research and innovate. The effects of patents on a given market may vary widely according to the type of market, and whether there are other barriers to entry (e.g., business methods versus regulated medications). Even in socialist monopolie economies, the adherence to international patent laws was or becomes strict, as the effect is reciprocal for public economy, as soon as the level of technology development in these economies creates comparable advantage.

The economics surrounding a single patent, or group of patents, revolves around the balance between the expense of obtaining and maintaining the patent(s), and the income derived from owning that/those patents.

The grant of a patent provides the inventor temporarily with an exclusive legal right, thereby securing a means to redeem the costs of research (by charging a higher price for its invention or by license fees from others who wish to practice it). An invention should be slightly advanced as people are encouraged to research and invent by the individual financial rewards of doing so.

A patent is an exclusionary right - preventing others from entering the market - and so its effect may be to increase the patent proprietor’s income from that market. The major economic effect is the exclusivity period of the patent rights, when exploitation pays back for the enterprise that funded research and development. However, patenting alone does not guarantee for marketing success.
The right to exclude others from entering market with copies is, however, potentially extremely valuable as it can mean total exclusivity in that market for the duration of the patent (generally 20 years from filing). For example, worldwide sales of a patented pharmaceutical can be millions of dollars per day, whereas the generic equivalent sells for less than half the price. Income improvement from a patent is difficult to measure. One may attempt to measure the difference in price of an "improved" product patent, or compare with the price of the product in markets where (or when) it were not patented. More directly measurable income is that which is received from the licensing or sale of patent rights, or from successful litigation of infringement.

Patent valuation

Patents are not intrinsically valuable. Rather, a patent claiming an invention with market demand would likely have economic value because the patent holder can exclude others from making, importing, using, and offering for sale, or selling that invention throughout the jurisdiction and sell the product at a monopoly price. Without alternative suppliers for the patented good or technology, the price the patentee is able to charge would likely be greater than the competitive price. This portion of incremental profit would only be attributable to the patent and would therefore be the value of the patent.

Patent value, like value of other property, may fluctuate over time, as markets change. What was once a pioneering invention may be soon outsold by an unpatented (and non-infringing) competitor catering to fringe adopters with products having features even more desirable than the invention? Contrarily, a strong patent grip could stagnate a narrow market as innovation is no longer justified, eventually resulting in reduced demand (for outmoded and over-priced products), and thus reduced patent value, as the market moves away.

A particularly difficult question of value arises where inventors/owners use their patents to extract other advantages without actually marketing the invention (e.g., cross-licensing of related patents to avoid litigation, or suppressing a technology that could compete with the owner's other products). How can one determine the value of a patented product (and the underlying patent) that has not actually been produced, let alone sold in any quantity? Furthermore, many products incorporate numerous patented inventions (owned or licensed), and may carry exclusive trademarks, making it difficult to attribute a specific value to an individual patent.

In 2005, the European Commission published a comprehensive study of the value of patents for patent owners as well as for the European economy (European commission, 2005). The study was in part based on a survey of 20,000 patent owners who filed EPO patents between 1993 and 1997. The survey was performed in 2003. 9000 patent owners responded. The patent owners were asked how much effort was required to produce their inventions and how much monetary value their patents had been worth. The median effort to create the patentable invention was 1 person-year, with 10% of the patent owners requiring 2 or more person-years. The median value of the patents produced was €300,000, with 10% of patent owners reporting values of €10 million Euros or more.

Plant patenting and national policies

One essential function of a technology transfer office (TTO) is the proactive management of intellectual property related to crops and germplasm. A crop variety can be protected by more than one form of IP protection, and often two or more forms of protection can be used simultaneously. These chapters provide an overview of the different types of IP protection available for plants: patents, plant variety rights, trade secrets, copyrights, and trademarks. These chapters give the reader a working knowledge of the guidelines established by relevant international treaties, how these guidelines are reflected in certain national legislation, and how they can be incorporated into a system of best practices in IP management for plants, germplasm, and other types of plant materials. These chapters also offer practical guidelines for setting up a national PVP office.

International treaties on plants

Under guidelines established by the International Convention for the Protection of New Plant Varieties (Union pour la Protection des Obtentions Végétales, commonly known as UPOV), in order to be worthy of protection, a plant variety must be new and distinct from pre-existing varieties and sufficiently uniform and stable in its essential characteristics. UPOV established guidelines for dedicated or “sui generis” systems of IP rights that provide for plant variety protection (PVP). UPOV is the only international treaty focused on PVPs. Its most recent revisions obligate member states to provide IP protection to all plant genera and species, so long as they fulfill the necessary criteria. Furthermore, UPOV grants breeders’ rights to all seed production of protected varieties (though individual governments can ignore this stipulation if they so choose). UPOV also grants commercial breeders the rights to the harvested material of the variety in some cases.

The UPOV guidelines have been twice revised, once in 1972 and again in 1991; each revision required the approval of member countries. In 1972, the guidelines were amended to permit member countries to allow the protection of plant varieties under both a national patent system and a UPOV-style sui generis system. The 1991 revisions expanded the scope of protections to include second-generation varieties that are “essentially derived” from the variety in question and discarded the list of “allowable” plant genera, thereby ensuring that any and all plant genera could be protected under the UPOV aegis. The
1991 revisions gave national systems the right to limit farmers’ rights and require that they save only as many seeds as they need to replant their own land.

The TRIPS agreement, signed in 1994, establishes standards for IP protection in WTO member countries and addresses the relationship between plant variety protection and patent systems. According to TRIPS, WTO members must grant some kind of IP protection for plant varieties, whether through patents, “an effective sui generis system,” or both. TRIPS does not define what constitutes an “effective” sui generis system. Proponents of the UPOV guidelines have declared that their system is the most workable example of a sui generis plant variety protection system. Be this as it may, it surely meets the standards of TRIPS.

What sort of sui generis system would satisfy the TRIPS requirement? More than 50 countries have embraced UPOV. However, it has been argued that some of the terms of the Convention on Biological Diversity (CBD), particularly the provisions concerning informed consent to biological materials and equitable benefit-sharing following that access, may be in tension with the TRIPS requirement. The truth is that no single type of sui generis system is guaranteed to work in all contexts, thanks to local variations in agricultural conditions, seed-producing industries, and biodiversity.

An initiative known as the International Undertaking on Plant Genetic Resources was first launched at the FAO conference in 1983. It was modified several times to incorporate the terms of UPOV, the CBD, and TRIPS, and was consummated as the International Treaty on Plant Genetic Resources for Food and Agriculture (known familiarly as “the Treaty”) in 1994. The Treaty entered into force in 2004. It established a multilateral system that allows member states to exchange the germplasm of major crop varieties; in other words, a kind of “genetic commons.” The Treaty limits the rights of recipients to seek IP rights for donated material; it also supports the rights of donors to share in the recipients’ profits. The centers of the Consultative Group for International Agricultural Research (CGIAR) placed their germplasm collections under the trusteeship of the FAO, and agreements allow the provisions of the Treaty to govern access to those collections.

The Treaty recognizes that agro biodiversity depends on the contributions of traditional farmers and indigenous peoples. Agro biodiversity can only be maintained by developing and conserving landraces, primitive cultivars developed to deal with the local climate and diseases and cater to local tastes, by interbreeding locally occurring undomesticated plants with cultivated plants, as well as exchanging different genotypes among farmers and farms. The Treaty makes national governments responsible for acknowledging the rights of their own farmers. It requires countries to pass legislation that protects traditional agricultural knowledge, requires recipients to share the benefits that are derived from the use of plant genetic resources, and includes farmers in national decisions on conservation and the sustainable use of plant genetic resources. The Treaty does not specify how farmers’ rights must be protected. Most Treaty members have passed national legislation on farmers’ rights that combine one of the versions of UPOV with some of the access principles of the CBD.

**IP protection of plants**

For innovators developing new plant varieties, patent systems offer two advantages over PVPs. Patent laws, unlike PVP laws, do not allow farmers to save seeds or breeders to use a plant variety as parental stock for breeding new varieties. Patents also cover more inventions and discoveries than do PVPs (plants, seeds, genetic constructs, and enabling technologies). There is no conflict between U.S. patent law and plant variety protection under the PVP Act. Both patents and PVPs can be used to protect plant varieties. In Canada, the courts have determined that plant varieties can be patented. However, the European Patent Convention (EPC) has determined that plant varieties and “essentially biological processes” are not patentable. Some have protested the patenting of plants on ethical grounds. One argument states that it is immoral to appropriate or “own” plant breeding stocks or genetic resources that are the common heritage of humankind. Others argue that private ownership is dangerous because it means that key enabling technologies (and therefore possible solutions to problems of public health and food security) are withheld from public research institutions.

PVP is a statutory mechanism for the IP protection of plants. PVP gives the breeder exclusive rights to exploit a new and distinct plant variety. PVP is a form of IP rights protection that has potentially broad global applications and can help meet some of the unique needs of developing countries.

PVP regimes are implemented in order to:

Give breeders (in both the public and private sectors) a reasonable return on their investments;

Provide breeders with an incentive for continuing to invest (and hopefully increasing their investment) in breeding research;

Recognize the legal right of the innovator to be recognized as such; and

Acknowledge that breeders have the right to be remunerated for their efforts.

In general, there are two exemptions to the protection provided by a PVP: 1) research exemptions and 2) farmers’ exemptions. A research exemption allows breeders to use the variety as breeding stock to develop new varieties. A farmers’ exemption allows farmers to save seed of a protected variety for the sole purpose of replanting their own land.
Other options for IP protection of plants include trade secrets (to protect in-house breeding materials such as proprietary parental inbred lines), trademarks (to protect valuable variety brand names) and copyrights (increasingly used to protect databases that hold information about plant genes).

Establishing a PVP office
An office or subsection of the TTO should be devoted to plant IP management. This office is responsible for devising IP-protection strategies and effectively managing IP assets. It should also have a good understanding of gene bank management (for example, issues related to in-house, incoming and outgoing germplasm and related materials). A standardized Plant Variety Protection regime used by several different countries would be ideal: such a system would significantly lower users’ costs, increase returns on plant-breeding investments, and give farmers more choices.

Key Implications and Best Practices
Given that IP management is heavily context specific, these Key Implications and Best Practices are intended as starting points to be adapted to specific needs and circumstances.

For Government Policymakers
Innovation and breeding are encouraged if there is a national system in place whereby innovators can obtain government-granted IP rights to biological materials (particularly plant varieties). The various international treaties offer several models for national IP-protection systems.

Under the Convention on Biological Diversity (CBD), countries have the sovereign right to restrict access to genetic resources. Some countries have chosen to provide exceptions, from the multilateral system to be set up under the FAO International Treaty, for certain categories of plant genetic resources they consider strategically important.

According to TRIPs Article 27, plant varieties can either be patented or excluded from patentability as long as another “effective sui generis” form of protection is implemented. A standardized plant variety protection (PVP) regime adopted by several different countries would be an optimal setup, as such a regime would significantly lower users’ costs and increase returns on plant-breeding investments.

In order to reinforce national policy initiatives, training is recommended to establish a Plant Variety Protection system. A standardized Plant Variety Protection system, adopted region-wide, would increase regional co-operation and harmony.

IP-protection mechanisms are useless unless they are effectively and fairly enforced by national governments.

For Senior Management (university president, R&D manager, etc)
Many institutions have both IP offices and plant variety protection (PVP) offices. The PVP office can be located where plant breeding activities take place. Similarly, many countries have a national patent and trademark office, as well as a national PVP office.

The international exchange of biological materials is governed by national laws that implement a country’s obligations pursuant to the interlocking terms and requirements of at least four major international conventions.

In order to support national PVP efforts, institutions can serve as centers for test-growing new varieties, or they can contract others to conduct those tests; furthermore, they can maintain germplasm collections.

Be aware that research exemptions for the use of patented methods and materials may be quite restrictive. For example, in the U.S., a university undertaking commercial research contracts cannot avail itself of this exemption.

Workshops may be helpful tools for exposing management staff to areas of conflict and teaching them about the strategic uses of PVPs. Also helpful might be an internship program in which selected individuals could collaborate with public and private institutions based in countries with well-established PVP systems.

For Scientists
Most of the guidelines formulated by international conventions allow research exemptions or “breeders’ rights” exemptions, which allow public institutions to use biological materials for research or breeding programs. For this reason, large germplasm collections are available for research and breeding purposes. Remember that there are international obligations, such as for benefit sharing.

If a biological invention cannot be patented in your own country, it may be patentable in another country. The U.S. and Canada tend to have the most unrestricted laws regarding the patenting of organisms and biological materials.

For Technology Transfer Officers
The international standardization of plant variety protection under UPOV means that a fairly uniform class of IP is available for you to make foreign filings to broadly protect valuable germplasm developed in your institution’s breeding program.
Plant variety protection can be an effective way to commercialize new plant varieties that are developed at public institutions.

Different countries interpret the TRIPS requirements in different ways. Therefore, not all countries grant patents for certain classes of biological materials, particularly plant varieties. Be familiar with foreign laws before attempting to file a foreign patent.

Most of the guidelines formulated by international conventions allow research exemptions or “breeders’ rights” exemptions, which allow public institutions to use biological materials for research or breeding programs. For this reason, large germplasm collections are available for research and breeding purposes. Remember that there are international obligations, such as for benefit sharing.

Gene bank management can be difficult. With good documentation, acquisition, and distribution procedures, most disputes over the ownership about genetic resources can be avoided.

An office or subsection of the technology transfer office should be devoted to PVP management.

**Conclusion**

India is among the first countries in the world to have passed legislation granting Farmers’ Rights in the form of the Protection of Plant Varieties and Farmers’ Rights Act, 2001. India’s law is unique not only because of its far-reaching rights for farmers, but also in that it simultaneously aims to protect both breeders and farmers. India has framed a unique legislation, but still faces the task of implementation. This should serve as a signal internationally that establishing legislation is insufficient to effectively promote Farmers’ Rights. Failing to implement Farmers’ Rights in India would be a heavy loss for all the farmers who need Farmers’ Rights to protect their livelihoods, secure their access to resources, protect their rights to seeds, and, above all, lift them out of poverty. The Governing Body of the International Treaty must now take up the task of establishing clear guidelines for defining and implementing Farmers’ Rights.

**References**

Article 27.1. of the TRIPs Agreement.


http://www.uspto.gov/web/menu/intro.html. Article 1, Section 8 of the United States Constitution
