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Farmers' Rights and Intellectual Property Rights – Reconciling Conflicting Concepts

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List of Abbreviations

CBD:	United Nations Convention on Biological Diversity
CGRFA:	Commission on Genetic Resources for Food and Agriculture, FAO
DC:	Developing Countries
FAO:	Food and Agriculture Organization of the United Nations
FDI:	Foreign Direct Investment
FR:	Farmers' Rights
GCI:	Genetically Coded Information
GPA:	Leipzig Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture
GRAIN:	Genetic Resource Action International
IC:	Industrialized Countries
IPGRI:	International Plant Genetic Resources Institute
IPR:	Intellectual Property Rights
IU (IUPGR):	International Undertaking on Plant Genetic Resources
LDC:	Least Developed Countries
MPGRFA:	Modern Plant Genetic Resources for Food and Agriculture
MUSE:	Multilateral System of Access, Exchange and Benefit-Sharing for PGRFA
OAPI:	Organisation Africaine de la Propriété Intellectuelle. Members: Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Cote d'Ivoire, Djibouti, Gabon, Guinea, Mali, Mauritania, Niger, Senegal and Togo
ODA:	Official Development Assistance
PVP:	Plant Variety Protection
PBR:	Plant Breeders' Rights
PGRFA:	Plant Genetic Resources for Food and Agriculture
PIC:	Prior Informed Consent
RAFI:	Rural Advancement Foundation International
SSA:	Sub-Saharan Africa
TEV:	Total Economic Value
TPGRFA:	Traditional Plant Genetic Resources for Food and Agriculture
TRIPS:	Agreement on Trade-Related Aspects of Intellectual Property Rights
UNCED:	United Nations Conference on Environment and Development
UPOV:	Union Internationale Pour La Protection Des Obtentions Végétales. (International Union for the Protection of New Varieties of Plants)
WIPO:	World Intellectual Property Organization

WTO: World Trade Organization

Abstract

The paper discusses the relation of Farmers' Rights and Intellectual Property Rights on plant genetic resources. It describes the nature and purpose of both concepts and the relevant national and international institutional frameworks. Farmers' Rights can be regarded as a counter-concept to Intellectual Property Rights that advocates the interests of developing countries and their traditional farmers and tries to remunerate conservation and informal innovation efforts with regard to plant genetic resources. It also aims at the conservation of plant genetic resources. Possible conflicts between both concepts are depicted and options for reconciliation through the parallel implementation on the national and international level are shown. It is argued that a successful conclusion of the revision of the International Undertaking on Plant Genetic Resources is crucial to the reconciliation on the international level. On the national level, many developing countries do already enact plant variety protection legislations with various provisions for the implementation of Farmers' Rights but it is still not decided if these provisions are in accordance with their obligations under the World Trade Organization.

Farmers' Rights and Intellectual Property Rights - Reconciling Conflicting Concepts[*]

Daniel Alker and Franz Heidhues

1 Introduction

During the last two decades, rapid developments in the field of agricultural biotechnology have resulted in a private sector-driven push to strengthen Intellectual Property Rights (IPR) on genetic resources worldwide. The culmination of this development has been the linkage of intellectual property issues to trade issues through the integration of the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) as one of the three constituting pillars in the World Trade Organization (WTO). All WTO member countries are now obliged to enact patent protection for plants or an "effective *sui generis*[1] system" of plant variety protection (PVP) or a "combination thereof"[2]. Plant variety protection legislation rewards the efforts of formal agricultural innovators, which is expected to lead to increased research and development (R&D) investments in the seed sector and consequently to enhanced varieties. Yet, the effects of PVP on agricultural productivity, agrobiodiversity and food security in developing countries (DC) are at present far from clear.

On the other hand, farmers see their traditional practices of replanting and exchanging seeds endangered through modern PVP. Thus Farmers' Rights were originally conceived as a counter-concept to IPR and to mirror the concerns of the developing world about the effects of globally strengthened IPR. Today they include various moral and functional aspects: They aim at balancing the potentially negative impacts of IPR on traditional farmers in developing countries, at remunerating their past efforts to conserve and improve germplasm and they shall function as an instrument to continuously entice these efforts. Traditional farmers' conservation efforts have constantly provided the basic resources for modern plant breeding and thus have been, and will continue to be, essential for global productivity increases in agriculture. However, since traditional varieties were seen as a "common heritage of mankind" (FAO Resolution 8/83, reaffirmed in FAO Resolution 4/89 and 5/89) and thus as a global public good, traditional farmers have not been able to share the benefits of their use.

The entry into force of the Convention on Biological Diversity (CBD) in 1993 has added new momentum to the discussion about Farmers' Rights and today they are at the threshold of implementation. On the international level they are likely to be incorporated in the revised

[*] This paper has been prepared for the conference on "Biotechnology, Science and Modern Agriculture: A New Industry at the Dawn of the Century", Ravello, Italy, June 15-18, 2001.

[1] *Sui generis* means unique or of its own kind. It is customarily used in law if a special circumstance is not covered by existing laws.

[2] *See* Annex 3: TRIPS Agreement Article 27.3(b).

International Undertaking on Plant Genetic Resources and on the national level they form part of various new *sui generis* PVP systems in developing countries.

The paper discusses the purposes of IPR and Farmers' Rights, their effects and their relation. It describes the current status of implementation and depicts possible options for reconciliation through parallel implementation on the national and international level.

BOX 1: PGRFA and Related Classifications

Plant Genetic Resources for Food and Agriculture (PGRFA) are the genetic material of food and agricultural plants of actual or potential value (FAO, 1997). They are arguably the most important of the earth's biological resources for humans since they are the foundation of all food production and key to further productivity increases, half of which are commonly attributed to genetic improvement (Koo and Wright, 1999). The value of crop germplasm is vastly increased by the rapid growth of the human population and the limited amount of new agricultural land. Advancements in biotechnology will help to improve PGRFA more effectively, which further increases their value. Future human welfare thus depends on improved crop conservation and breeding. Though they embody very different intentions and approaches, IPR and Farmers' Rights are central institutions for these endeavours.

Various, partly overlapping classifications of PGRFA are used subject to the goal of analysis:

- ***In Situ and ex situ PGRFA.*** The material growing in farmers' fields and its wild and weed-like relatives is termed *in situ* PGRFA, the material stored in genebanks is referred to as *ex situ* PGRFA.
- ***Modern and traditional PGRFA.*** Modern PGRFA (MPGRFA) are the result of formal plant breeding activities whereas traditional PGRFA (TPGRFA) and their wild and weed-like relatives are the plants conserved and developed by the informal plant breeding activities of traditional farmers. Landraces and traditional varieties are synonyms for TPGRFA, commercial varieties for MPGRFA. Two forms of IPR can protect modern PGRFA: patents and plant breeders' rights (PBR). Traditional PGRFA currently belong to the public domain. They are the subject matter of Farmers' Rights.
- ***Varieties vs. Genetically Coded Information.*** Another subdivision of PGRFA is needed to determine the diversity of PGRFA and its economic values. This is complex, because the diversity of PGRFA cannot simply be derived from the sole number of plant varieties. Smale (1997: 1259) found that "phenotypically similar populations of plant varieties may contain a very different set of genes while phenotypically distinct varieties may contain a very similar set of genes." Likewise, Hoisington et al. (1999: 5942) state: "Molecular dissection is much more powerful for determining the usefulness of a species than casual analysis at the morphological or physiological level. Useful alleles exist in both the related and unrelated species of all crop plants". Therefore Virchow (1999: 19) proposes the term "genetically coded information" (GCI) as the most suitable unit for economic and institutional analysis since GCI are the ultimate determinant of plant characteristics and the most precise unit of PGRFA diversity analysis. Due to the current costliness of technologies to identify GCI, varietal diversity is, however, still being used as the most practical indicator for PGRFA diversity.

2 IPR

2.1 Concept of IPR

Intellectual Property Rights are intended to prevent the commercial exploitation of intellectual goods, that is, ideas and inventions, without compensating their originators. Like other forms of property rights, IPR grant their holders a defensive right, which allows them to exclude others from using the protected intellectual good. IPR thus implicitly confer a monopoly right to their holders and thereby entice the production of new knowledge. Contrary to conventional property rights, IPR are temporary rights. IPR are grouped into copyrights (literary and artistic work) and industrial property (patents, plant breeders' rights, industrial designs, trademarks, and geographic indications of source). As an instrument of economic policy, IPR are used to direct R&D investments to knowledge creating sectors. In the case of inventions, for which patent protection can be sought, the right holder is obliged to publicly disclose his work in return for the temporary monopoly right. In doing so, new knowledge enters the public domain and allows subsequent innovators to use this knowledge for new inventions, which in turn have to meet the criteria of protection.

From a static point of view, the dissemination of new knowledge at the marginal costs of transmitting this knowledge leads to a maximization of welfare, because knowledge is non-rival in nature. From a dynamic point of view, incentives for the creation of new knowledge have to be given by granting a temporary monopoly, because without the prospect of adequate returns, risky R&D investments that produce new knowledge will not be undertaken. The World Bank (1998: 33) concludes, "IPR are a compromise between preserving the incentive to create knowledge and the desirability of disseminating knowledge at little or no cost".

IPR are national in scope and extend only to the territory of the state in which the application was filed. However, various international treaties have sought to harmonize IPR practices internationally and TRIPS has finally integrated most of these efforts by setting minimal protection criteria for WTO members. For formal innovations in relation to PGRFA, two forms of IPR are currently granted in most industrialized countries (IC): Patents and/or PBR. Developing countries have only recently begun to enact PVP laws in order to comply with their obligations under TRIPS and some of them attempt to extend IPR to landraces.

2.1.1 Trade and welfare effects of internationally strengthened IPR

IPR affect international trade flows in several ways. A firm may be deterred to export its IPR protected good into a foreign market, if potential copiers can diminish the profitability of the firm's activity in that market because of a weak IPR regime. Accordingly, a strengthening of a

country's IPR regime would tend to increase imports, as foreign firms would face increasing net demand for their products, reflecting the displacement of copiers. On the other hand, a firm may choose to reduce its sales in a foreign market as a response to stronger IPR protection because of its greater market power in an imitation safe environment. These opposing market-expansion and market-power effects imply that the overall effect of IPR protection on bilateral trade flows is theoretically ambiguous (Maskus and Penubarti, 1995).

The implications of tighter IPR on economic welfare are also highly complex and involve both static and dynamic effects. In a two-country model, from a static, partial-equilibrium point of view, the source country of the trade flow is likely to gain from tighter protection, because it can capture increased monopoly profits from the sale of its goods abroad. In contrast, the static effects on the welfare of the destination country are likely to be negative because increased market power by foreign title holders leads to deadweight losses (Deardorff, 1992). Thus, many small, innovation-consuming developing countries fear that increased patent protection will only lead to a rent transfer to industrialized, innovation-producing countries.

From a static, general-equilibrium point of view, tighter IPR tend to be further detrimental to the destination country of the trade flow because the reallocation of production from the previously copying destination country to the source country worsens the terms of trade in favour of the source country. From a static welfare point of view, IPR can be viewed as a rent transfer mechanism, which deteriorates the international allocation of production. Most studies conclude that the destination country loses from tighter protection whereas the source country is usually better off (Deardorff, 1992).

From a dynamic point of view, the introduction of IPR stimulates innovation in the source country and thus increases future trade flows, which is beneficial to both trading partners. Through IPR, innovation-producing countries have an incentive to develop new technologies, which in their next generation are manufactured by follower countries. This mechanism thus leads to continued technological progress and economic growth and from a dynamic point of view is beneficial for both, leaders and followers (Maskus and Penubarti, 1995). The international recognition of IPR can be seen as a mechanism, which guarantees the functioning of dynamic competition between countries. Although benefits of a dynamic nature can be identified for both trading partners, on average, it is unlikely that these dynamic benefits can compensate for the static losses in the innovation-consuming developing countries with strengthened IPR systems and it is also unclear whether tighter IPR improve world economic welfare via their impact on trade flows.

Trebilcock and Howse (1995: 251) found that "[a] country where innovation is not a major source of economic activity and growth is likely to choose, on balance, a less stringent intellectual property regime than would a country whose economy is highly dependent on innovations.". The scope and duration of protection required for under TRIPS is oriented towards the standards of the mostly innovation-producing industrialized countries and therefore hardly optimal for the mostly innovation-consuming developing countries.

Thus there is a strong case for leaving the system flexible, for requiring only minimal global standards and for allowing developing countries a learning-by-doing approach, but the obligations under TRIPS and UPOV are restricting this freedom to choose for most developing countries. Political economy considerations may explain better than economic theory why innovation-consuming developing countries are opting in favour of strengthened IPR (Primo Braga, 1996).

2.1.2 Effects of IPR on investments in the improvement of PGRFA

Strong IPR are expected to increase investment in the protected sector, but empirical evidence could not yet prove convincingly that this classical justification for IPR holds true for the modern seed sector as well (Alston and Venner, 2000; World Bank, 1998). Even if a correlation between the level of investment and the strength of IPR can be found, causality is difficult to establish because it is questionable whether strong IPR attract additional investments or whether powerful and knowledge intensive industries, such as the modern, highly integrated breeding companies lobby and push for strong IPR. The welfare effects are consequently equally difficult to determine. Other factors such as the political and economic stability of a country, the size and dynamics of the relevant market, the resource endowment and the physical and legal infrastructure often seem to have a much stronger influence on investment decisions than IPR (Maskus and Penubarti, 1995). Thus, it is still unanswered, if strong IPR for PGRFA actually entice investment in crop improvement or if they are just an instrument of marketing, advocated and employed by powerful seed companies (Alston and Venner, 2000; Fowler, 1994).

Besides, in evaluating options for IPR protection in DC, it must be recognized that virtually no empirical analyses have been conducted on the welfare impact of IPR on food and agriculture, especially in developing countries (Blakeney *et al.*, 1999).

2.2 Institutional framework for IPR on PGRFA

2.2.1 The global framework: TRIPS

WTO members are required to provide for patents "for all inventions, whether products or processes, in all fields of technology" (TRIPS Article 27.1). They may, however, exclude from patentability "plants and animals other than micro-organisms" if they "provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any combination thereof." (TRIPS Article 27.3(b)). The criteria for the patent protection of a plant variety under a TRIPS compliant law are (1) novelty, (2) non-obviousness and (3) usefulness. The duration of protection is a minimum of 20 years. Only few countries like the USA, Korea and Guatemala do currently allow patent protection for plant varieties.

Under a *sui generis* PVP system, different criteria for and periods of protection can be established but the TRIPS agreement itself does not provide any definitions thereto. Since no dispute over a *sui generis* system has been brought to the dispute settlement body of the WTO yet, it remains unclear, what the protection criteria, scope and duration of protection of an effective *sui generis* system would be. Industrialized countries deem an UPOV style protection system (*see below*) as effective and advocate its implementation for developing countries (CPGR, 1994).

Developing countries were required to implement the TRIPS provisions by 1.1.2000, least developed countries (LDC)[3] have to comply by 1.1.2006. However, Article 27.3(b) (*See* Annex 3) has a "built-in-review", which required a revision in 1999 - prior to the implementation. Due to the current political stalemate at the WTO, this revision has not taken place yet and is even unlikely to conclude in 2001. DC therefore argue that they are only obliged to implement PVP laws after the review – which could change the provisions of the Article substantially – will have taken place (WTO, 1999a).

2.2.2 The national framework: UPOV

Plant breeders' rights are IPR specifically designed to protect modern varieties. Of primary importance on the international level is the PBR system established by the International Union for the Protection of New Varieties of Plants (UPOV). UPOV seeks to harmonize legislation and to simplify the application procedure for plant breeders by requiring all member states to accept the test results produced by others as the basis for their decision on the granting of a PBR. The goals of these harmonization and simplification efforts are to

[3] Please note that we use the following WTO classification in this paper: industrialized or developed countries (IC), developing countries (DC) and least developed countries (LDC).

increase the trade in modern varieties among member states and to encourage investments in the modern commercial seed sector. Different acts of this convention are in force (1972, 1978 and 1991 act), but new members may only accede to the 1991 act.[4] As of April 2001, 47 states are members of the convention, 21 of which are DC.

The protection criteria that have to be met under UPOV 1991 for the protection of a variety are (1) novelty, (2) distinctness, (3) uniformity and (4) stability. UPOV 1991 has strengthened the PBR as compared to the 1978 version. It now requires farmers to pay a license fee for planting back their own harvested material and does not allow them to exchange it with other farmers. An exemption provided for under Article 15(2) of UPOV 1991 states that "each Contracting Party may, within reasonable limits and subject to the safeguarding of the legitimate interests of the breeder, restrict the breeders' right in relation to any variety in order to permit farmers to use for propagating purposes, on their own holdings, the product of the harvest which they have obtained by planting, on their own holdings, the protected variety."

This potentially allows to exempt small-scale and non-commercial farmers from the obligation to pay royalties, as shown e.g. by the UPOV 1991 compliant PVP legislation of the EU (Council Regulation EC No. 2100/94). Besides, Article 15(1) of UPOV 1991 also provides that "the breeder's right shall not extend to acts done privately and for non-commercial purposes", which can be interpreted as allowing subsistence and resource poor farmers to freely replant and exchange their harvest. Nevertheless, the 1991 act is restricting the so-called "Farmers' Privilege" for commercial farmers, which comprises the right to plant back the harvested seeds and the right to exchange propagating material "over the fence" from farmer to farmer.

2.2.2.1 Recent developments with regard to UPOV in Developing Countries

The UPOV system is tailored to the needs of the commercial seed sector and although commercial modern varieties are not expected to provide more than 15% of the total seed requirements in DC (Srivastava and Jaffe, 1993), many DC also regard an UPOV style protection system as appropriate for their needs and have enacted UPOV compliant PVP legislation. 20 DC have already joined UPOV since 1995 and a further 63 countries are expected to follow or to enacted UPOV based *sui generis* PVP laws in the near future, which would raise the number of nations that have UPOV style PVP laws in place to 110.[5] This is striking, especially since the newly acceding DC have to comply with the strict UPOV 1991

[4] The deadline for joining the UPOV 1978 act was 24. April 1999.
[5] Personal communication by the UPOV secretariat, 11/30/2001

convention, which limits the Farmers' Privilege and therefore the scope of action for the implementation of Farmers' Rights. These countries obviously ascribe a high value to UPOV's advantages of a simplified PBR application procedure, technical and legal cooperation and the expectation of investments in the national modern seed sector.

Prior to TRIPS, the majority of the DC did not have any PVP legislation in place at all, because most new varieties originated from public breeding efforts and were made available as public goods. It remains to be seen, if new PVP systems will attract private investments, improve the availability of enhanced varieties for traditional and modern farmers in DC and facilitate public-private partnership arrangements or if they will severely interfere with farmers' traditional practices and serve as an excuse to further cut back public spending for agricultural R&D.

2.2.2.2 PBR for landraces: Farmers' Rights as IPR?

Only modern varieties can meet the UPOV protection criteria whereas landraces fail in all of them, except for distinctness. Landraces are usually not new, but have been in use for generations. They are not uniform but show phenotypic and genotypic variability, which explains why they are not stable over time but evolve constantly. All of these characteristics are inherent of landraces and are valuable because they indicate a rich genepool, which deserves conservation and which enables them to successfully adapt to changing environmental conditions.

An IPR protection for landraces under PVP legislation is sometimes discussed as a possible measure to advance Farmers' Rights. It is argued that traditional farmers could appropriate a part of the benefits of the utilization of their landraces in cultivation and breeding, if the users had to pay a royalty. The TRIPS agreement possibly also allows parties such as indigenous and other rural communities or farmers associations to apply for IP protection if the national legal system and practice does include this kind of rights[6]. Some countries already grant community IPR on biodiversity under their *sui generis* PVP systems (*See* Annex 1).

In order to facilitate such a protection of landraces, the conventional UPOV protection criteria would need to be broadened. The criteria of (1) distinctness, (2) usefulness and (3) identifiably have been proposed, with usefulness replacing novelty and identifiably replacing uniformity and stability (IPGRI, 1999). Another approach is a "Dual System", which would

[6] Article 1(1) of the TRIPS agreement states: "Members shall be free to determine the appropriate method of implementing the provisions of this Agreement within their own legal system and practice." According to Girsberger (1999), the interpretation of this Article could be "permissive".

establish a protection system for landraces parallel to the UPOV style PVP system (Correa, 2000). The protection requirements for landraces would be less strict and accordingly the scope of the rights conferred to the traditional farmers would be less extensive.

Several problems arise, however, with respect to the advancement of Farmers' Rights through the protection of traditional PGRFA under a conventional IPR system: (1) Due to the nature of the innovation process for landraces, it is extremely complex to identify a single farming community as the informal innovator and therefore as the potential right holder (FAO, 1994). (2) Other traditional farming communities could be required to pay royalties if they use a landrace on which another community holds the right. The resulting financial transfer from resource-poor farmers to resource-poor farmers is certainly not advancing Farmers' Rights. (3) Although landraces constitute a great potential value, their current use in modern plant breeding is quite marginal (Virchow, 1999). Thus, significant royalty payments cannot be expected at all.

It seems unlikely that the adjustment of conventional PVP systems to accommodate traditional PGRFA could confer significant benefits to traditional farmers and advance Farmers' Rights. Since it is not possible to reconcile IPR and Farmers' Rights by merging them, non-IPR mechanisms for Farmers' Rights, which allow their parallel implementation with IPR have to be found. Moreover, it would seem illogical to make Farmers' Rights part of the IPR system because it is that very system that has created some of the problems that the concept of Farmers' Rights aims to solve.

2.3 Effects of PVP in Developing Countries

The importance of conventional PVP laws for food security in developing countries is disputed. UPOV argues that new plant varieties are an essential tool for the sustainable development of agriculture and the achievement of a country's food security (Heitz, 1998). This assertion is reaffirmed in an official communication sent to the governments of the "Organisation Africaine de la Propriété Intellectuelle" (OAPI) in June 1999 for the revision of their common IP law for the adoption of UPOV 1991 (UPOV, 1999). The principal advantages of introducing plant variety protection in Africa are listed as follows:

(1) *Food Security* by the increase in quantity, quality and diversity of foodstuffs.

(2) *Sustainable Agriculture*, e.g. by a more efficient use of available resources and inputs or by the use of pest- and disease-resistant varieties and.

(3) *Protection of the Environment and of Biodiversity*, e.g. by reducing pressure on natural ecosystems through better productivity of cultivated lands, increase in species- and varietal-diversity and increase in the interest in conservation and use of genetic resources for food and agriculture

Opponents see in the UPOV 1991 act a potential threat to food security (GRAIN, 1999a) because it restricts the Farmers' Privilege by making the free planting back of seeds contingent upon an explicit exception, because it entirely prohibits the exchange of seed "over the fence" (UPOV 1991 Article 15.2) and because it requires that old commercial varieties, which do not meet the protection criteria must be taken from the market, no matter if they are useful to farmers or not. Besides, opponents regard UPOV 1991 as a threat to agricultural biodiversity since genetic extinction has until today mainly occurred in the form of the replacement of traditional varieties through genetic uniform modern varieties, the use of which is promoted by UPOV compliant laws (FAO, 1997).

BOX 2: PVP in Developing Countries – Some Evidence from Africa

The following experiences stem from the only three African countries that have PVP in place for some time (Cullet 2001):

- Kenya adopted its PVP law in 1975. By May 1999, of the 140 PVP applications approved, only one was on a food crop: a variety of green bean, which Kenya predominantly exports to Europe. More than 90% of the PVP certificates were for flowers, while the rest went to export crops such as coffee, sugarcane and to barley for the beer industry. Though PVP seems to have benefited the capital-intensive sectors of the Kenyan agriculture, it is evident that the law did not have any effect on food security. 90% of the applications came from foreign breeders.
- In Zimbabwe, the Plant Breeders' Rights act was enacted in 1973. As of 1999, over 70% of all applications were on cash crops: ornamentals, fibres, oilseeds and tobacco. 30% of the applications were on food crops. Over two thirds of the applications came from foreign breeders.
- In South Africa, the PVP system became operational in 1977. As of the end of 1998, a total of 1435 PVP grants had been made. Half of them were for cash crops.In all three countries, it seems that the capital intensive and export oriented agriculture is the main beneficiary of PVP and the chief of FAO's Seed and Plant Genetic Resource Service acknowledges that "these [efforts to strengthen the seed industry in SSA] have had relatively little impact on the majority of resource-poor farmers." (Menini, 1998).

UPOV itself considers a size of the agricultural sector that justifies investments in plant breeding as the essential basis for a successful development of a private seed sector (Heitz, 1998). It therefore remains doubtful, if a PVP system can attract investments for food crops in countries where the potential market is small in size or purchasing power, where the physical infrastructure to distribute the seeds is inadequate and where the legal and institutional infrastructure to enforce PBR is weak. In these countries, UPOV style PVP is likely to attract investment to the seed industry for the export oriented and capital-intensive branches of the agricultural sector. This is valuable in terms of elevated FDI and export value but may have ambiguous effects in terms of food security. A WTO case study for Kenya and Argentina underlines this: It judges UPOV style PVP as conducive to the development of the Argentine agricultural sector during the last 25 years but found for Kenya that "the implementation of PBR resulted in some hardships to small scale farmers who depended on old varieties." (WTO, 2000). Moreover, UPOV 1991 has to be enacted in a way that the cost-free planting back of protected varieties is ensured for traditional farmers, if the act is not to impact negatively on food security.

Given these assessments, public sector breeding will remain essential for the development of seeds geared to the needs of resource poor farmers and to distribute them as a public good. The public breeding sector should not use UPOV laws as a justification for its retreat but explore the potential for ventures with the private sector to develop better plants. Countries with a large number of resource poor farmers and an underdeveloped legal and physical infrastructure have good reasons not to enact UPOV compliant PVP laws but to deliberately draft *sui generis* PVP laws which can be better suited to the needs of their farmers and seed sector and facilitate the advancement of Farmers' Rights.

3 Farmers' Rights

3.1 Concept of Farmers' Rights

Farmers' Rights are no conventional rights, such as property rights or IPR. They have not been conceived as such and the content of IPR, that is, the protected subject matter, the protection criteria, the right holders and the rights and obligations of these holders, can only partially capture the nature and purpose of Farmers' Rights. Farmers' Rights are rather a political concept, though by no means a homogeneous or a consensual one. It includes certain conventional rights but its overall nature and purpose is more comprehensive. Some parts of this concept – the issues of benefit-sharing, participation and technology transfer - can rather

be promoted and advanced, another can be legally protected: the Farmers' Privilege as the right of traditional farmers to freely replant and exchange farm-saved seeds.

For almost two decades of discussions on issues relating to plant genetic resources within the FAO, this concept has been the basis for recognition and remuneration of important contributions that traditional farmers have made and continue to make for the conservation and development of plant genetic resources. Though it has been interpreted by many as nothing more than a vague moral appreciation of these efforts, various versions of Farmers' Rights are presently at the threshold of being implemented at the national and international level: They are recognized in various international agreements and integrated in many newly drafted PVP laws of developing countries. Most importantly, they are recognized and made operable in a new major, legally-binding international agreement, the revised International Undertaking on Plant Genetic Resources (IU), which is expected to enter into force in 2002.

Thus the transition of Farmers' Rights from a political basis of discussion to an operable political and legal concept is currently in progress and the various forms of Farmers' Rights will have to prove their practicability and success in the years to come. Farmers' Rights complement existing forms of IPR. They are not, however, intended to compete with or replace, existing IPR (Girsberger, 1999).

Origin and evolution of Farmers' Rights

Concerns of the developing world and their advocates have been growing that strengthened IPR in agriculture are harmful to small-scale farmers and accelerate the erosion of agricultural biodiversity through the replacement of genetically diverse landraces by uniform modern varieties. Moreover, the perceived inequality in the distribution of benefits between farmers as suppliers of TPGRFA and the producers of commercial varieties that ultimately rely on such germplasm, have resulted in the quest for a counter-concept to IPR. The term "Farmers' Rights" came up in the early 1980s (Fowler, 1994) and was featured in the debates held within FAO on the inequality in the distribution of the benefits of PGRFA use: While a commercial variety generates returns to the breeder on the basis of PBR, no parallel appropriation mechanism to act as an incentive for the providers of germplasm to continue to maintain and make available these resources was existent (Esquinas-Alcazár, 1998).

The debates at FAO finally led to a negotiated compromise: the simultaneous and parallel international recognition of Plant Breeders' Rights and Farmers' Rights. This recognition is embodied in the parallel FAO Conference Resolutions 4/89 (Recognition of PBR) and 5/89 (Recognition of Farmers' Rights), which were unanimously adopted by more than 160 countries in 1989 and annexed to the current, legally non-binding IU. Until the revised IU will

enter into force as a legally binding instrument and provide a new, enforceable definition of Farmers' Rights, the definition in FAO resolution 5/89 remains the only, yet unenforceable, definition in an international agreement until today (*See* Annex 2). Its central features are the international community's appreciation of farmers past, present and future contributions to the conservation and provision of PGRFA and the acknowledgment of the need for conservation and benefit-sharing of PGRFA. Although FAO Resolution 3/91 further elaborates on the financial and institutional aspects of Farmers' Rights, the implementation, especially the provision of the financial means to realize Farmers' Rights, has proven extremely difficult and has still not been accomplished.

In the 1990s, the political and economic environment has changed significantly. The breeding sector and the biotechnology industry have undergone an unprecedented process of concentration. Meanwhile the scientific evidence about the loss of agrobiodiversity has grown (FAO, 1997) and the commercialisation of the first genetically modified plants sparked a public debate over corporate control over genetic resources, putting genetic resource policies under greater public scrutiny. The entry into force of the legally-binding CBD in December 1993 reflects this development. It has significantly changed the global legal status of genetic resources by specifying that they be under the sovereignty of the government of the state in which they developed their distinctive properties. This provision has considerably strengthened the bargaining position of gene rich developing countries on the emerging markets for genetic resources. It has also posed new questions to the global exchange of *in situ* and *ex situ* PGRFA, which previously had been regarded as the common heritage of mankind and the exchange of which was regulated in an open access regime under the IU. Furthermore, the CBD has introduced the concept of benefit-sharing for the use of genetic resources and established rules in relation to the access to genetic resources.

As a consequence of these changes, the IU went under revision in 1994, in order to bring it in line with the CBD. This revision has since then been the forum for the debate over Farmers' Rights. It is expected to conclude in 2001, resulting in a new major, legally binding instrument with the objectives of "the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use, in harmony with the Convention on Biological Diversity" (Article 1).The draft Article 9 (*See* Annex 6) of the IU explicitly deals with Farmers' Rights. It states that the responsibility for realizing Farmers' Rights rests with national governments, which is seemingly a clear departure from the current vesting of the rights in the international community. However, the draft IU further defines the right to "equitably participate in sharing

benefits arising from the utilization of PGRFA" as a "measure to protect and promote Farmers' Rights. Since some of the main provisions of the draft IU (Article 8, 11, 13, 16) elaborate on the concrete realization of benefit-sharing at the international level, a successful IU can be interpreted as protecting and promoting Farmers' Rights also at the international level. The legal status of the revised IU is likely to be a protocol to the CBD or a stand-alone international agreement.

BOX 3: Recognition of Farmers' Rights in other International Agreements

Besides the original recognition in the IU, Farmers' Rights have been recognized in the following international instruments (Correa, 2000):

- Chapter 14.60(a) of the UNCED Agenda 21 states that the appropriate United Nations agencies and regional organizations should "strengthen the Global System on the Conservation and Sustainable Use of PGRFA by ... taking further steps to realize Farmers' Rights".
- The Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture (GPA) included the realization of Farmers' Rights at the national, regional and international level, as one of the long-term objectives of the Plan, in the context of *in situ* conservation (para. 32).
- Resolution 3 of the Nairobi Conference for the Adoption of an Agreed Text of the UN Convention on Biological Diversity identified the realization of Farmers' Rights as one of the "outstanding issues" for further negotiation.
- A June 1999 study by the UN Economic and Social Council (ECOSOC) on the Right to Food, submitted to the Commission on Human Rights, urged that Farmers' Rights be promoted as part of the "Right to Food", especially since "our future food supply and its sustainability may depend on such rights being established on a firm footing" (UN Commission on Human Rights, 1999).

3.2 Nature and purpose of Farmers' Rights

The nature and purpose of Farmers' Rights is usually derived from three lines of reasoning, which are not always clear-cut but often interdependent (Girsberger, 1999; Correa, 2000):

(1) *Equity* reflected in the "right to equitably participate in sharing the benefits arising from the utilization of PGRFA" (Draft Article 9 of the revised IU).

(2) *Protection* of traditional farmers from potentially restrictive effects of IPR by ensuring the Farmers' Privilege to save, exchange and sell seeds.

(3) *Conservation* of traditional PGRFA.

The protection of the Farmers' Privilege is the part of Farmers' Rights that can be protected as a right in the conventional sense, whereas equity and conservation goals can rather be promoted or advanced.

While conservation is a functional objective of Farmers' Rights to the benefit of all humans, equity considerations are based on moral considerations, which largely derive their legitimation from traditional farmers' past contributions in conserving and making available PGRFA. Equity and conservation goals are highly interlinked: The implementation of benefit-sharing mechanisms to advance equity goals can be achieved in a way that conservation goals are also reached, e.g. through planned *in situ* conservation.

The protection of traditional farmers from potentially harmful effects of IPR has both moral and functional aspects.

Further elements of Farmers' Rights as defined by the draft Article 9 of the IU are the protection of traditional knowledge and the right to participate in decisions in relation to PGRFA.

3.2.1 Equity

Equity can be defined as consideration of fairness, reasonableness and good faith and is as such used in international law (Girsberger, 1999). Equity considerations are mirrored in the IU's recognition of farmers' past contributions in the conservation and development of PGRFA as a central legitimation of Farmers' Rights. The question of equity has also gained strong momentum in the debate over genetic resources and Farmers' Rights with the coming into force of the CBD in 1993, which for the first time introduced the concept of "benefit-sharing" (Article 8(j)) in a legally binding international instrument as a means of promoting equity. Equity is also referred to in other international instruments, *inter alia* in the Preamble of the Rio Declaration (UNCED), in the Agenda 21 (Chapter 15.5e) and in the CBD itself (Article 1). However, since none of these instruments defines the term equity and all make its implementation contingent upon "necessity"[7] and "appropriateness"[8], Girsberger (1999) concludes that states are not required to take specific legal action. Nevertheless, equity can serve as a moral basis for the realization of Farmers' Rights.

Another dimension of equity is the question of intergenerational equity, which focuses on the relation of present and future generations in relation to the use of the world's natural and cultural resources. In the context of PGRFA, intergenerational equity can be achieved through conservation and Farmers' Rights can be employed as an instrument to facilitate this.

[7] Article 15.7 of the CBD
[8] Chapter 15.5e of Agenda, Article 8(j) of the CBD

3.2.2 Protection of the Farmers' Privilege

Protecting traditional farmers from potentially restrictive effects of IPR by ensuring the Farmers' Privilege is another element of Farmers' Rights. Its moral basis is the consideration that any form of IPR imposed restriction on resource poor farmers would mean a further hardship and a danger to food security. Its functional aspect is that *in situ* conservation and informal breeding is only feasible if the Farmers' Privilege is protected, because the swapping of PGRFA in between farming communities is essential for its *in situ* conservation and development. A granting of IPR for landraces possibly also conflicts with this goal (*See* Chapter 2.2.2).

The right of farmers to save, use, exchange and sell their seeds is a part of the proposed version of Farmers' Rights in the revised IU (*See* Annex 6). This comprehensive protection of farmers' practices exceeds the Farmers' Privilege because it also extends to the right to sell propagating material. Yet, this extended Farmers' Privilege has also already been incorporated in various national PVP laws. Although this principally conflicts with UPOV 1991, exemptions may be granted under such laws to ensure this extended Farmers' Privilege only for resource poor farmers and thus to make them compatible with Farmers' Rights.

3.2.3 Conservation of PGRFA, its economics and institutions

Conservation of PGRFA is the most consensual legitimation of Farmers' Rights, since conservation activities benefit all humans and their implementation can be designed in a manner that the development of traditional farmers as the key actors of *in situ* conservation is furthered.
A rapid loss of PGRFA and the consequent need to conserve it by means of complementary *in situ* and *ex situ* conservation strategies are widely acknowledged (Brush, 1994; FAO, 1997). This loss is to a large extent caused by the replacement of traditional through modern varieties (FAO, 1997). The discussions circle around the extent of conservation in general, the emphasis on each strategy and the methods for *in situ* conservation.

Traditional farmers are the actors of *in situ* conservation. Their past, present and future efforts in *in situ* conservation are recognized through Farmers' Rights but the question today is, how they can be encouraged to conserve the global socially optimal amount of PGRFA and how Farmers' Rights can be implemented to achieve this.

3.2.3.1 Economic valuation of PGRFA

Traditional PGRFA have to be economically valued in order to determine the global socially optimal amount of conservation and to adequately compensate traditional farmers as the suppliers. Yet, no market mechanism exists today to accomplish this and it is unlikely that this will change in the foreseeable future because the transaction costs of a market solution in the

form of institutional and informational hindrances are very high and so are the opportunity costs. The economic value of PGRFA can only be estimated.

Since PGRFA loss is irreversible, losing PGRFA always implies losing future options. On the other hand, the conservation of PGRFA requires resources. Consequently, a rational decision about the right amount of conservation needs to analyse the costs and benefits of conservation as far as possible (Evenson *et al.*, 1998). The costs of *in situ* and *ex situ* conservation can be quantified quite reliably (Virchow, 1999), but the estimation of the benefits of PGRFA conservation involves considerable uncertainty:

The benefits of PGRFA conservation can be estimated using the total economic value (TEV), which is composed of direct and non-direct use values (Virchow, 1999). The direct use value of PGRFA diversity is a static concept. It can be determined with some certainty by quantifying its contribution to crop improvements and its current insurance function against yield fluctuations and unforeseeable events (breeding and insurance value). Evenson *et al.* (1998) introduced techniques to estimate the breeding value.

The estimation of PGRFA's non-direct use value is a dynamic task, which is severely hindered by incomplete information about the future. The non-direct use value is comprised of two values: the existence and the heritable value. The existence value is the intrinsic value of life and as such subject to changing ethical assessments, which are obviously difficult to predict and to measure. The heritable value is the value of the known and unknown GCI for future utilization. In order to estimate the heritable value, presumptions on future technologies to use the presently known and unknown GCI as well as on future environmental and market conditions, in which GCI could be of value, have to be made. This is highly speculative. Since the heritable value of PGRFA constitutes a large share of the TEV, the estimation of the latter is thus severely handicapped.

3.2.3.2 Current Obstacles to a Market Solution for PGRFA exchange

The demand for traditional PGRFA is quite marginal today and it is not expected to increase significantly in the future, because conventional breeding increasingly focuses on crosses among elite materials from the breeders' own collections and advanced lines developed in public institutions (Wright, 1998). Therefore it would be unrealistic to think that substantial value may be derived from gene flows of landraces held in *in situ* conditions (Gollin, 1998). Nonetheless, with the advancement of biotechnology, traditional varieties can be screened more efficiently for agronomically interesting traits, which is likely to increase their value for agronomic improvement, especially in the regions of their predominant origin, where this improvement is most needed. Today however, any economic measure directly linked to such

gene flows, which reflect the current demand, would grossly underestimate the global values generated by the conservation of traditional varieties over time.

On the supply side, traditional PGRFA is provided as a positive externality of the low-input farming systems of traditional farmers. Until today, no mechanism has been established to enable farmers to appropriate a part of these benefits. This and the public good characteristics of PGRFA accelerate the loss and cause a potential future undersupply of PGRFA. PGRFA have been regarded as a "common heritage of mankind", which legitimates their status as a global public good. A public good is characterized as follows:

- No legal or technical possibility to exclude others from the utilization of the good. Hence the provision of the good cannot be made contingent on payments of the users.
- No use-rivalry, which means that the use of the good by one individual does not affect the use of the good by any other individual. Due to the characteristics of hereditary information, PGRFA can be reproduced infinitely without depleting the genetic substance.

PGRFA also show the characteristics of an environmental good such as intergenerational existence and irreversibility of extinction.

All these characteristics prevent an efficient allocation of PGRFA by the market mechanism because they enable today's users to "free ride" on PGRFA at the expense of today's suppliers and of future generations: Users benefit from PGRFA without having to pay the costs of its supply. Thus, as with all public goods, a collective decision about the right amount of supply is required. The benefits of PGRFA are of concern to all humans and this might explain why it is particularly difficult to come to a collective decision over the desired amount of conservation. Until today, conservation is conducted almost exclusively *ex situ* by more or less coordinated efforts in national and international genebanks (Virchow, 1999). Since virtually no planned activities for *in situ* conservation exist, it is presently only carried out as a positive external effect of low-input farming.

3.2.3.3 Internalisation or compensation? Finding the right mechanism for the optimal long term supply of TPGRFA and the promotion of Farmers' Rights

Basically two options exist to prevent the further erosion of traditional *in situ* PGRFA and to facilitate its conservation and development: a collective political decision over the right level of conservation by compensating traditional farmers as the suppliers of TPGRFA ("compensation solution") or the creation of a market mechanism that enables traditional farmers to directly appropriate the benefits derived from its use ("internalisation solution").

Some argue that the lack of market institutions is the cause for the decline of PGRFA and argue for an internalisation solution (Virchow, 1999). The rationale behind this argument is that if farmers can appropriate the external benefits they create through TPGRFA conservation, they will have an incentive to keep traditional varieties instead of replacing them by modern ones. Others regard the open access to PGRFA and its status as a global public good combined with a politically defined level of compensation for farmers as essential for the conservation and ongoing development of traditional PGRFA (Brush, 1992). The opportunities of and hindrances to both approaches will be shortly outlined below:

Internalisation: Transforming the public good traditional PGRFA into a private good

A public good can be transformed into a private good if one or both of the above mentioned characteristics of public goods are changed. While the characteristic of "no use-rivalry", which is intrinsic of the hereditary information of TPGRFA, cannot be altered[9], a legal option to exclude others from the use of PGRFA has been opened through FAO Resolution 3/91 and the CBD. Both acknowledge the sovereignty of states over their genetic resources. TPGRFA could now theoretically be turned into a private good, with states, communities or individuals as the holders of the property rights on these resources.

In theory, a complete internalisation of the external benefits of conservation and production of TPGRFA would lead to a global socially optimal amount of PGRFA supply and would eliminate the current equity distortions which affect the suppliers of TPGRFA. The obstacles that a market solution with such an internalisation encounters are to a great extent owed to the environmental good characteristics of PGRFA (Hampicke, 1991) and the difficulties to assign a total economic value to an environmental good have been described.

A large share of the value of PGRFA lies in the potential use of its largely unknown genetic information (heritable value), which is obviously of no direct use to today's individual demander. The private market demand will thus not reflect the intertemporal global socially optimal demand. Conventional market mechanisms are not able to incorporate intergenerational aspects of PGRFA conservation and the irreversibility of extinction. Therefore, the state or the global community has to appear as a demander and the amount of its demand should be guided by the estimation of the TEV. The level of public demand is

[9] There are two exceptions in which the genetic information in a plant loses its agronomic value when it is reproduced: (1) Hybrid seeds and (2) genetically modified organisms (GMOs) with genetic use restriction technology (GURT). The former lose general agronomic value when being replanted, whereas GURTs are genetic technologies that either render the harvested seeds sterile ("Varietal GURTs", popularly dubbed "Terminator technology") or that "turn off" certain agronomically valuable traits in a plant when it is replanted ("Trait-related GURTs"). As of April 2001, GMOs that contain GURTs are not yet on the market and several

necessarily a political decision, and the estimation of TEV of different environmental goods or of different ways to conserve PGRFA can help to direct public financial resources to the most efficient allocation.

Besides these difficulties to internalise the external benefits of PGRFA conservation, a further fundamental problem in a market solution is to determine the property right holder on PGRFA. While the CBD confers states the right over their genetic resources, indigenous communities and individual farmers have been brought up in the discussion about Farmers' Rights as potential right holders as well (Girsberger, 1999). Since an intrinsic feature of landraces is their development in a communal and intertemporal effort, it seems inappropriate to confer certain individuals the property right on a specific landrace. Moreover, the market value of GCI cannot be determined a priori but only be observed a posteriori as a result of their performance on the market (Virchow, 1999). Due to the intergenerative structure of GCI benefits, the accruement of the total benefits may often exceed the life span of the individual farmers, which speaks in favour of communities or states as the potential property right holders.

It seems appropriate to try to identify certain communities as the "inventors" of landraces, or at least as the place where landraces have developed their distinctive characteristics. However, it could be shown that the high interdependence of PGRFA makes the pedigree of landraces almost impossible to track (Gollin, 1998). A single landrace has typically been developed over centuries in various communities and often in various countries so that granting a specific community the ownership right on a landrace would be highly arbitrary. Defining nation states as the owners of PGRFA decreases this problem to a certain extent, but states have also been highly interdependent on PGRFA and it is by no means easy to identify the territories in which PGRFA have developed their distinctive properties, as demanded by the CBD. The global interdependence of PGRFA is much higher than for other genetic resources because plants of agricultural value have been traded, exchanged and bred globally for centuries.

large seed companies have agreed not to commercialize seed sterilizing GURTs. However, GURTs could be a powerful tool for companies to appropriate value in environments without enforceable IPR.

Although states seem to be the most apt property right holders in a market solution, they may not ensure that the benefits of PGRFA are passed on to the supplying farming communities. In many countries, the farmers who are involved in the conservation of particularly diverse PGRFA are economically and technologically isolated and members of marginalized ethnic minorities. The national government is unlikely to be a strong advocate of these groups. Examples include the Kurds of Southwest Asia (Wheat), the Quechua speaking indigenous groups in Peru (Potatoes), Mayans in Mexico (Maize), the Naga of India, the Ifugao of the Phillipines and the Karen of Thailand in the case of rice (Brush, 1992).

If states use their newly awarded market power on the emerging markets for genetic resources - the market for PGRFA potentially being one of them - for rent seeking activities, neither conservation nor equity goals will be promoted.

Internalisation and the advancement Farmers' Rights

Leaving the allocation of PGRFA solely up to the market will neither lead to a global socially optimal amount of conservation and thus supply of PGRFA nor will it allow traditional farmers to equitably share the benefits of its use because these benefits are to a great extent intertemporal (Virchow, 1999). In an internalisation solution, states are best qualified as potential property right holders and to advance Farmers' Rights, but only if they act in the interest of traditional farmers and only if they complement the market demand with an additional demand that takes into account the intertemporal-benefits of PGRFA. Benefit-sharing as an element of equity in Farmers' Rights includes the participation of traditional farmers in the benefits derived from the R&D activities in relation to PGRFA, such as the engineering of genetically modified plants to their needs as well as other forms of technology transfer, information transfer and capacity building. This is a development task, which is largely political, and the market alone will not be capable of achieving this. Additionally, Farmers' Rights have a historical dimension since they partly arise from farmers' past efforts to conserve and make available PGRFA (*See* Annex 2 and 6). A market solution cannot accomplish a compensation of these past efforts.

In sum, a market solution, which assigns property rights on traditional PGRFA to states, communities or farmers, is presently not able to contribute significantly to the objectives of Farmers' Rights. In the future, this situation could change, however, because the advancement of biotechnology will allow identifying, utilizing and assessing the potential value of the GCI of landraces more efficiently, thereby lowering the transaction costs in a potential market of PGRFA. Enhanced information combined with enforceable property rights are prerequisites for a functioning of the market mechanism, which would enable the suppliers to internalise a

larger share of the currently external benefits of traditional PGRFA. Likewise, the incentives to conserve traditional PGRFA would be improved. Conservation and equity as two main purposes of Farmers' Rights could therefore in the future possibly be achieved by a market solution with enforceable property rights on traditional PGRFA. Today, however, extremely high transaction costs make it necessary to find a political solution to the tasks of conservation and equity. Farmers' Rights as envisioned under the IU are such a political solution and can therefore be regarded as a temporary political instrument against market failure for PGRFA exchange and conservation (*See* Chapter 3.3).

Compensation: Establishing a multilateral system of access and benefit-sharing

The alternative to the market solution for the exchange and conservation of PGRFA is the compensation solution. A possible institutional framework for this is a multilateral system of access, exchange and benefit-sharing of PGRFA (MUSE), which is currently practised under the current IU, although due to voluntary nature of this agreement, enforceable benefit-sharing provisions could not be implemented yet. A compensation approach tries to accomplish a politically defined level of conservation of PGRFA and a politically defined level of equity through benefit-sharing.

Unlike a market solution, a compensation solution does not assign property rights on PGRFA but leaves them in the public domain by not restricting the access. The rationale for this before the background of the high interdependence of PGRFA is that each member of such an open access regime gains access to more genetic resources then he himself contributes and is therefore a net beneficiary (Crucible II Group, 2000). Transaction costs are greatly reduced in comparison to a market system because the informational deficits, which prevent the finding of an adequate price, do not matter. However, if no price is paid for the use of PGRFA, no incentives exist for their conservation. Thus conservation activities have to be politically devised. Although principally all members gain from such an open access regime, technology rich countries usually have a stronger breeding sector than others and will therefore demand considerably more PGRFA and benefit more from the open access.

Yet, PGRFA and technology rich technology countries are especially suspicious towards a free access regime since they give away their resources for free without being able to derive much benefits from the access to the resources and to the technology of other countries. They are highly independent, because they dispose over the technological capacities to conserve and improve PGRFA for their needs within their borders and they could reap additional benefits by selling these resources on a potential market. Thus, if the benefits are not satisfactorily shared within the MUSE, technology and gene rich countries are most likely to

be the first to exit the system and opt for a market solution, in the hope of being able to appropriate a larger share of the value of their PGRFA. However, the often cited divide between the technology rich and gene poor North and the gene rich and technology poor South seems to oversimplify the situation since "[d]eveloping countries are by no means a homogeneous group when it comes to the fundamental controversy over internalisation versus compensation." (von Braun and Virchow, 1997: 24). PGRFA and technology rich countries like Brazil, China or India are examples of such potentially weak advocates of a MUSE. PGRFA and technology poor countries like the Central African Republic are likely to be the strongest advocates of a MUSE because they can expect to "free ride" on access to technology and PGRFA in a MUSE. Technology rich and gene poor countries and gene rich but technology poor countries have a reasonably strong interest in a MUSE.

In the long run, further technological development will improve the assessment of the value of PGRFA, lower the transaction costs and facilitate the assignment of property rights on PGRFA, which will increase the attractiveness of a market solution. Countries will then reconsider the decision for an internalisation or a compensation solution. In the medium run, however, in order to encourage the sustainable participation of as many countries as possible, mechanisms have to be established that oblige the countries that benefit most from a MUSE to share these benefits. A concrete measure of benefit-sharing is the financing of *in situ* conservation activities in PGRFA rich countries. Others include the exchange of information on and the transfer of technology relevant to the use and development of PGRFA, as well as capacity building. Until today, benefit-sharing mechanisms have been envisioned but not been implemented due to a lack of political will. The current revision of the IU includes all of the above-mentioned forms of benefit-sharing (FAO, 2001) and a successful conclusion of the negotiations would result in a legally-binding and enforceable multilateral system of access, exchange and benefit-sharing.

In a MUSE, the global socially optimal amount of traditional PGRFA supply has to be determined, using the valuation techniques for PGRFA mentioned above. The demand side then has to provide the necessary financial resources to facilitate the conservation of this level of TPGRFA. Various options to provide these financial resources have been discussed during the revision of the IU: (1) State contributions (in accordance to the UN scale of assessment or depending on the area planted with IPR protected crops in its territory), (2) the private seed industry should pay "an equitable royalty in line with commercial practice" (Article 13.(d).(ii); *See* Annex 5) for each crop that is developed by the use of PGRFA accessed under

the MUSE and for which IPR are granted that restrict the further free use in research and breeding or (3) a tax on consumers as the ultimate beneficiaries of PGRFA conservation.

Since the benefits of such a system are a public good and of a very long-term nature, strong tendencies to "free ride" for all actors will always be inherent to the system and a continuous political effort to reach consensus over its goals and benefits will be necessary in order to overcome these instabilities.

Compensation and the advancement of Farmers' Rights

It is argued that a compensation solution should provide financial means for the *in situ* conservation of traditional PGRFA. Only *in situ* conservation can maintain the dynamic adoption of landraces to changing agroecological conditions (Brush, 1994). Yet, the effect of planned *in situ* conservation on traditional farmers is disputed, because if they are encouraged to keep their landraces, they will not be able to participate in agricultural development through the use of modern varieties. *In situ* conservation is therefore potentially conflicting with development and productivity goals. Farmers who are encouraged to continue to grow traditional varieties must benefit from this decision at least as much as they would if they had chosen to grow modern varieties. This can be achieved through complementary measures to improve the livelihood of traditional farmers.

Today, large areas are still grown under traditional varieties and agricultural conservation and development policies must simultaneously strive to replace a large share of this area with modern varieties while conserving all currently existing traditional varieties on a much smaller area. If *in situ* conservation strategies can be found - and are sufficiently financed - that reconcile conservation with development goals, Farmers' Rights are advanced. Theoretically, a mere 1% of the 1.4 billion ha of the world's arable land would suffice to conserve today's 3 million varieties in *in situ* conditions (Virchow, 1999), while the rest of the land could be used for agronomic goals other than conservation. Only a globally planned and coordinated conservation effort could reach such a minimization of the conservation area without sacrificing diversity and thereby largely resolve the tension between conservation and development goals.

The Leipzig Global Plan of Action (GPA) introduces such a global strategy to implement *in situ* conservation and is generally regarded as the most appropriate instrument to allocate the financial resources of the MUSE and also as a concrete means of realizing Farmers' Rights (Girsberger, 1999). Likewise, the draft Article 8 of the revised IU states, "[t]he implementation of the GPA contributes to the realization of Farmers' Rights." Accordingly,

the protection and promotion of Farmers' Rights and the *in situ* conservation of PGRFA could be designed in a mutually supportive way.

If the different forms of benefit-sharing are implemented in a way that they are conducive to the development of traditional farmers, they can also be interpreted as an ex-post compensation of traditional farmers' past efforts to conserve and make available PGRFA. This can also be interpreted as a promotion of Farmers' Rights.

In conclusion, a multilateral system of access and benefit-sharing for PGRFA with a sustainable funding strategy is currently more apt to achieve the global socially optimal amount of conservation than an internalisation solution, which entails the assignment of property rights on traditional PGRFA. Additionally, if a MUSE is designed in a way that the livelihoods of traditional farmers are improved, Farmers' Rights are also better advanced by the MUSE than by the alternative assignment of property rights on traditional PGRFA.

3.3 Farmers' Rights: A temporary instrument against market failure?

The revised IU intends a multilateral approach to benefit-sharing, in which the distribution of the resources of the common fund is not linked to the amount of genetic resources provided by a country, but implemented through plans and programmes in areas of high conservation priority in accordance with the GPA. A country, which provides profitable germplasm, does thus not necessarily participate in its benefits. Nevertheless, as laid out above, the benefits of a MUSE for any country are higher than under a market arrangement. In the future, however, this situation could change substantially[10]: Some countries will reach a high degree of national independence in the supply and development of PGRFA and will encounter an elevated international demand for PGRFA. They will tend towards a market solution. As a preparation for this development, Virchow (1999: 175) proposes the establishment of national "Conservation and Service Centers" to coordinate the conservation and prospecting of GCI and to act as a supplier of GCI on the national and international market for PGRFA. Once such a development has started and with the further advancement of biotechnology, more and more countries can be expected to leave the multilateral system of access and exchange and to opt for a market solution instead, depending on their national cost-benefit analysis.

These dynamics will put a constant pressure on the IU, which is therefore not an inherently stable institutional arrangement. A transitory step from a compensation to a market

[10] For genetic resources other than PGRFA, markets are already in the making. Again, the starting point for this development was the granting of national sovereignty over genetic resources by the CBD in 1993. A prominent example for this development is the agreement of the pharmaceutical company Merck and the Costa Rican conservation agency InBio over the prospecting, use and benefit-sharing of Costa Rican Biodiversity.

solution would be to guide the benefit-sharing mechanism in a more bilateral direction and to include more market-based elements of PGRFA exchange in the MUSE.

As discussed above, a market solution cannot compensate for the past efforts of farmers to conserve PGRFA and therefore not promote Farmers' Rights in a way that a compensation solution can. This justification of Farmers' Rights will, however, lose its legitimation after a compensation for these past efforts will have been provided for for a lapse of time because it is not reasonable that these past efforts justify an eternal compensation but rather one for a limited time.

It could thus be argued that Farmers' Rights as discussed today are a transitory solution to conservation and equity questions until the informational and institutional hindrances, which lead to market failure, are eliminated. It should be stressed again that only states qualify as actors on these international markets since other possible actors have no facilities to internalise the intertemporal benefits of PGRFA diversity. A market that is capable of internalizing most of these external benefits promotes conservation and equity and renders the concept of Farmers' Rights needless.

4 Options for reconciliation of Farmers' Rights and IPR at the international level

4.1 International Undertaking on Plant Genetic Resources

The IU came into force in 1983 and since then it regulates the access to *ex situ* and *in situ* germplasm, which is *de facto* still free today because more than 160 countries adhere to the IU's principle of multilateral and open access to PGRFA. As a legally non-binding agreement, the current IU has failed in implementing Farmers' Rights and benefit-sharing provisions, but the revised IU is expected to become a legally binding agreement and thus to be more in this regard. Historically, the IU has provided the ground for reconciliation by respecting the parallel legitimacy of IPR and Farmers' Rights in the FAO resolutions 4/89 and 5/89 (Cooper, 1994). Since then, however, no agreement has been reached to transform this acknowledgment into concrete policies. Yet, with the revision of the IU to bring it in line with the CBD, which has been underway since 1994 and is expected to conclude in 2001, globally enforceable commitments relating to the conservation of PGRFA, Farmers' Rights and IPR are being drafted (FAO, 1994).

The conceptualisation of the MUSE in the draft revised IU does not restrict the rights of states to grant IPR on modern PGRFA in accordance with their national PVP law, but it links the issue of IPR directly to the issue of Farmers' Rights because it requires right holders of IPR on modern varieties to pay royalties into an international fund. These royalties are used to

support the implementation of Farmers' Rights worldwide. Thus, a successful conclusion of the revision of the IU with such a provision, as envisioned in Article 13.2.(d)(ii) (*See* Annex 5), would clearly reconcile Farmers' Rights and IPR at the global level (Crucible Group, 2000). Since the royalty payments of the seed industry would be used for the conservation of traditional PGRFA and related benefit-sharing measures, not only traditional farmers would benefit, but ultimately also the breeding sector itself because such a mechanism ensures the long-term availability of its resources. In the negotiations of the revised IU, the representatives of the breeding sector also partly acknowledged this and did not generally object to such a benefit-sharing provision, although it involves additional taxation. The seeming paradox of financing a fund for Farmers' Rights by taxing the seed sector is that ultimately farmers themselves finance the fund as seed producers will pass on those taxes to the demanders of seed via the pricing mechanism. However, firstly it will depend on the market structure, how much of these additional costs will be passed on to farmers and secondly, such a mechanism redistributes funds from modern to traditional farmers and does therefore not infringe Farmers' Rights, if they are interpreted as only pertaining to traditional farmers.

On the side of DC governments as the advocates of traditional farmers, the choice not to expand the current IPR system to accommodate landraces but to leave them in the public domain and share the benefits of the use rather through multilateral benefit-sharing arrangements than through internalisation is also vital for the reconciliation of FR and IPR. However, in order to comply with the CBD's recognition of national sovereignty over genetic resources, the revised IU abolishes the current practice of open access and replaces it through "facilitated" access in compliance with national access legislation (*See* Annex 4). This could impose certain access restrictions on the demanders of PGRFA in comparison to the open access case and lead to the establishment of bilateral and domestic benefit-sharing provisions - a step towards internalisation. National PVP and access legislation could therefore be in accordance with the IU but not promote its goal to establish an "efficient, effective and transparent" multilateral system and "to minimize transaction costs, obviate the need to track individual accessions, and ensure expeditious access" (FAO, 2001).

The revised IU does not explicitly define the right holder of Farmers' Rights, but it recognizes "the enormous contribution that the local and indigenous communities and farmers of all regions of the world, particularly those in the centres of origin and crop diversity, have made and will continue to make for the conservation and development of plant genetic resources." (Article 9). Yet, it leaves the responsibility for realizing Farmers' Rights with

national governments, "in accordance with their needs and priorities" and "subject to its national legislation". Governments could therefore interpret Farmers' Rights as only belonging to resource-poor farmers.

The IU is the political forum where all multilateral policies and commitments will be made and through which they will be enforced and implemented. As a consequence, a legally binding IU that obliges the beneficiaries of traditional PGRFA to provide the financing for the implementation of the GPA is the principal instrument for the reconciliation of IPR and Farmers' Rights at the international level.

4.2 Agreement on Trade Related Aspects of Intellectual Property Rights

The TRIPS agreement aims at the global promotion and harmonization of IPR. Consequently, it has no provisions for the advancement of Farmers' Rights. Girsberger (1999) has suggested using the revision of Article 27.3(b) to include Farmers' Rights in TRIPS and thereby to bring it in explicit harmony with the IU and the CBD. This would oblige all WTO members to implement Farmers' Rights and non-compliance could be sanctioned by retaliation measures. This position is also adopted by the African Group in the WTO (WTO, 1999a). India argues that the TRIPS agreement conflicts with the CBD, and that the two must be reconciled before they can be properly implemented at the national level. This position is widely supported by governments across the South (WTO, 1999b). The CBD promotes the objectives of equity, benefit-sharing and conservation in relation to biodiversity in general and has mandated the IU to solve these problems for the subgroup of PGRFA, including the question of Farmers' Rights. The U.S. argue that TRIPS and the CBD are sufficiently flexible to carry out their parallel implementation on the national level in a non-conflicting manner and that an explicit harmonization is therefore unnecessary (WTO, 2000b).

Developing countries had to implement the provisions of Article 27.3(b) by 1.1.2000, LDC have to implement them by 1.1.2006. Only 21 of the 68 DC members of WTO had complied with this obligation, not counting the 29 LDC members (GRAIN, 2000). This is not surprising, since the "built in review" of the article, which was scheduled prior to implementation, had not taken place yet. This review could bring a substantial change to the provisions and a definition of an "effective *sui generis*" system. It seems, however, that some DC find Article 27.3(b) not particularly limiting and make already use of the *sui generis* provision to draft PVP laws that include Farmers' Rights and special provisions for access to their PGRFA (*See* Annex 1). For these countries PVP is apparently rather a national objective than an international obligation. However, since an "effective *sui generis*" is not defined by TRIPS, the compliance of many of these laws with TRIPS is not yet decided upon. If the

review does not bring a clarification to this question, it will, according to WTO rules, ultimately be defined by the rulings of the WTO dispute settlement body. Only then it can finally be judged, if TRIPS obstructs a reconciliation of Farmers' Rights and IPR, for example by abolishing the *sui generis* option (as proposed by the U.S.) or by restricting the scope of action for *sui generis* laws in a way that only UPOV style laws are judged to be effective protection systems. Yet, the growing awareness of developing countries about the issues of conservation and valuation of their genetic resources and the legal and institutional support for these tasks through the CBD and the IU make it improbable that the WTO would pose a hindrance to the reconciliation of Farmers' Rights and IPR through parallel implementation in a *sui generis* PVP system.

5 Options for reconciliation of Farmers' Rights and IPR at the national level through s*ui generis* PVP legislation

The national *sui generis* PVP and access legislation is the key instrument for the reconciliation of Farmers' Rights and IPR at the national level. The time pressure exercised upon DC by the TRIPS agreement has brought these issues on an elevated position in the national policy agenda so that many DC have recently drafted and enacted new PVP laws (*See* Annex 1).

PVP laws primarily aim at creating conditions of IP protection with the objective to attract investments in the breeding sector and to facilitate national and international seed trade. However, DC also seek to include elements of Farmers' Rights in these laws such as the conservation of PGRFA, the equitable sharing of benefits from PGRFA use and the protection of traditional farmers' practices. If these goals can be reached in a non-conflicting manner through parallel implementation, Farmers' Rights and IPR are reconciled. The integration of PGRFA conservation provisions and Farmers' Rights in PVP systems is an unprecedented undertaking because the PVP laws prior to TRIPS were in force almost exclusively in technology rich but biodiversity poor industrialized countries in which the issues of PGRFA conservation and Farmers' Rights are of minor importance. While countries gain experiences with different approaches, it is desirable that the international framework allows some flexibility to adjust the national laws to a changing socio-economic and natural environment.

5.1 Farmers' Privilege

A suitable instrument to reconcile FR and IPR on the national level is the granting of the Farmers' Privilege only for certain disadvantaged groups of farmers in a *sui generis* system. Arrangements with plant breeders are conceivable that exempt farmers below certain prosperity

levels – determined e.g. on the basis of income, volume of output, size of landholdings, species planted etc.- from the requirement to pay a license fee for a UPOV 1991 or a patent protected variety. Plant breeders who make available their varieties for free to these resource-poor farmers could be compensated in turn by reduced tax payments to the global and national compensation funds. This kind of market segmentation could either be achieved through legislation to protect disadvantaged farmers or through voluntary cooperation arrangements between the state, the public and the private breeding sector. It is, however, difficult to control and enforce market segmentation for a homogeneous good such as a seeds. Severe leakage problems may arise, depending on the legal and physical infrastructure of a country.

In addition to the royalty exemption, further thinkable measures to protect the Farmers' Privilege for resource poor farmers are to exempt exchanges of seed that take place within the same community or with neighbours, and between farming communities and to allow certain sales of seeds as propagating materials, for instance, those that take place within the farmers' customary market area (Correa, 2000). Such legislation conflicts, however, with UPOV 1991 if it extends to acts other than those done "privately and for non-commercial purposes" (Article 14.1).

A concrete example of a voluntary public-private cooperation arrangement is currently under discussion in the case of the so-called "Golden Rice", a GMO with high beta-carotene content. "Golden Rice" was developed by public breeders, who used privately owned and patent protected technologies. The private-sector right holders now propose that Asian rice farmers who earn less than 10.000 US$/a will be exempted from paying a license fee (Potrykus, 2000).

Legislative provisions to explicitly protect the Farmers' Privilege were also chosen already by various DC, e.g. India and Nicaragua (*See* Annex 1).

5.2 National benefit-sharing and access legislation

In addition to the benefit-sharing mechanism of the IU, national governments may implement benefit-sharing through a variety of modalities to promote Farmers' Rights. A concrete approach is the creation of a national conservation fund, which directs a share of the benefits of PGRFA use to traditional farmers via *in situ* conservation plans and programmes. The financing of this fund may arise from sources similar to those discussed under the revised IU, or from remuneration payments in accordance to the use of TPGRFA by breeders.

For this purpose national PVP laws may establish the obligation to reveal the source of genetic material used for the creation of a new variety and, if appropriate in the particular case, to prove that the applicant has complied with rules relating to access and sharing of benefits, e.g. through a "certificate of origin" (Correa, 2000). They could further be obliged to reach "prior

informed consent" with farming communities when collecting *in situ* PGRFA. This type of "facilitated access" as envisioned under the IU, would not be inconsistent with the TRIPS Agreement, which does not limit the states' rights to make the granting of IP protection conditional on complying with certain obligations. In contrast to the multilateral benefit-sharing of the IU, these elements intend to share the benefits bilaterally, which is also in the spirit of the CBD, but which necessarily imposes access restrictions on the demanders in order to identify the origin of the genetic material. Additionally, breeders could be doubly taxed by the IU and by national PVP legislation. Though this would signify a comprehensive benefit-sharing, it would also deter investments and slow down the rate of innovation in the breeding sector. Consequently, if these financial or administrative obligations burden the breeders inappropriately, they have to be interpreted as obstructing the reconciliation of FR and IPR.

Examples of benefit-sharing through a national conservation fund in PVP laws of DC include Thailand, India, Bangladesh and Pakistan. PVP laws which require the breeders to disclose the origin of the PGRFA used in breeding and to share the benefits with the providers are being drafted or in place for example in Nicaragua, Bangladesh, Thailand and India (where the proof rests with the claimant). Various DC, e.g. Thailand and Costa Rica, also seek to enable their traditional farmers a sharing in the benefits of PGRFA by granting various forms of community IPR on traditional PGRFA and the related traditional knowledge (*See* Annex 1).

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7 Annex

Annex 1: Status of selected PVP Laws & Drafts (January 2001)

Sources: Kuyek, 2001 and GRAIN, 1999b

Bangladesh

***Title*:** Plant Variety Protection Act of Bangladesh

***Status*:** Draft. Has been approved by relevant ministries and is under public discussion.

***IPR*:**
- Based on UPOV 1978, Bangladesh is not member and has not formally approached UPOV. However, in early 2001, the European Union approved a development cooperation package for Bangladesh under which the country must accede to UPOV (1991) by 2006.[11]
- Criteria for protection: novelty, consistency, distinctness, and stability. In addition, varieties must demonstrate "immediate, direct and substantial benefit to the people of Bangladesh". Hybrids only protected if parents are available as public domain.
- Short duration of breeders' right (e.g. 7 years for annuals).
- GMOs can be protected subject to further legislation.

***Farmers' Rights*:**
- Country of origin of materials used to develop protected varieties shall be disclosed.
- Where community varieties, wild materials or indigenous varieties are used in the development of a protected variety, 25% of the revenue from its commercialisation will be redistributed.
- Any variety that may lead to genetic or cultural erosion shall not be protected.
- Any variety developed by public institutes, or by farmers/NGOs using public funds, shall be considered common property of the people of Bangladesh and shall receive Citation of Award rather than PVP certificate.
- Strong provisions for community rights and farmers' rights, which will be supported through a Plant Variety Development Fund
- Protection is restricted to nationals of CBD member states, which have to obey to the principles of national sovereignty over genetic resources and

[11] "Cooperation Agreement between the European Community and the People's Republic of Bangladesh in Partnership and Development", *Official Journal of the European Communities*, Luxembourg, C143/9, 21 May 1999, approved by the European Parliament under Consultation Procedure on 17 January 2001.

benefit-sharing. Thus the obligations under the CBD are given priority over the obligations under TRIPS.

Costa Rica

Farmers'* *Rights:

- PVP law will be subordinate to the country's compliance with the CBD, which was formalised through the enactment of Law No. 7788 entitled "Biodiversity Law" in May 1998.
- Protection of traditional knowledge via a *sui generis* system of community intellectual property rights, which extend to "the knowledge, practices and innovations of the indigenous peoples and the local communities, related to the use of the components of biodiversity and associated knowledge".
- The community intellectual property rights shall not be affected by Plant Breeders' Rights, patents or any other form of intellectual property applied to biodiversity and associated knowledge.
- Any application for PBR in Costa Rica must receive clearance from the Technical Office of the Commission administering the Biodiversity Law to ensure that the application does not contravene community intellectual rights, even though these need not be formally registered.
- The recognition of community intellectual rights in Costa Rica "oblige[s] the Technical Office to answer negatively any consultation related to the recognition of intellectual or industrial rights over the same component [of biodiversity] or knowledge" (Article 84).

India

***Title*:** The Protection of Plant Varieties and Farmers' Rights Bill. Bill No. 123 of 1999.

***Status*:** Draft. Undergoing parliamentary examination.

***IPR*:**

- Based on UPOV 1978 and 1991. India has initiated the accession procedure.
- GMOs can be protected by PVP subject to further legislation.

***Farmers'* *Rights*:**

- Farmers may sell the harvest of any protected variety, but not as reproductive material under commercial marketing arrangements.
- Foresees benefit-sharing arrangements between breeders and those, including farmers and communities, who claim to have contributed genetic material to

a protected variety. The burden of proof rests with the claimant, not with the holder of the PVP certificate.

- A National Gene Fund will be built up with royalty fees from plant variety right holders, national and international contributions, etc., meant to be used for benefit-sharing and compensation to farming communities, and for conservation and sustainable use of genetic resources.
- Specific and detailed provisions for communities to register collective rights.
- Farmers' Rights are formalized in the following terms (Article 31): "Nothing contained in this act shall affect a farmer's traditional right to save, use, exchange, share or sell his farm produce of a variety protected under this act except where a sale is for the purpose of reproduction under a commercial marketing arrangement."

Nicaragua

***Status*:** Draft

***IPR*:**

- Discoveries may not be protected.
- A plant variety shall be eligible for protection if it differs from another variety in several characteristics (not just one).
- Transgenic material shall be subject to separate biosafety legislation.
- It sets PVP apart from industrial property and therefore seeks to comply with UPOV 1978 which expressly prohibits double protection.
- Protection extends to the following acts: direct sowing, preparation for reproduction or multiplication as certified seed, repetitive use for the production of another variety. It does not offer protection for marketing, import or export.
- Criteria for protection are: novelty, distinction, uniformity or variability, stability or evolutionary capacity, plus the variety must carry a denomination.
- The provision regarding essential derivation shall be applied in cases whether the "new" variety is at least 20% dependent on an earlier variety.

***Farmers' Rights*:**

- The definition of breeder and breeding is wide in scope: it covers anyone making use of techniques of crop improvement.

- Plant breeders' rights shall not extend to the variety when it is used for consumption or sowing directly by farmers or when it is used by tenants, cooperatives or other non landholding entities.
- A variety shall be deemed variable if its characteristics are adapted to different climatic and soil conditions of the country.
- A variety shall be deemed to have evolutionary capacity if it contains genes or genetic complexes which are expressed under environmental change.
- Registration requires: proof of compliance with CBD Art 8j and 15 (especially compensation to countries and communities of origin) and scientific proof of the variety's superiority to cultivars grown in the country through at least two production cycles of comparative tests.
- Wide compulsory licensing.
- The law is subordinate to the rights and obligations acquired through the Convention on Biological Diversity.

Pakistan

UPOV 1991 with Farmers' Privilege. Portion of royalties will flow to National gene fund for genetic conservation. Draft.

Thailand

***Title*:** Plant Varieties Protection Act, B.E. 2542 (1999)

***Status*:** Adopted by parliament but not yet in force. National PVP Committee is now being established.

***IPR*:**
- Based on UPOV 78. Thailand has consulted UPOV on the conformity of its act with the UPOV Convention.
- Covers four kinds of plants: new varieties, local domestic varieties, general domestic varieties and wild species.
- Rights will be granted for 12 years in the case of registered annual species.

***Farmers'*:**
- Wild species need not express uniformity to be protected.

Rights
- General domestic plant varieties and wild species shall be protected automatically, without registration. There are special provisions for farmer's and community rights over local domestic plant varieties, which must be unique to a particular locality within the Kingdom.

- Revenue accruing from the procurement and use of general domestic varieties and wild species will be on a profit-sharing basis through a Plant Variety Protection Fund. The Fund will benefit local communities and government units involved in conservation, research and development of plant varieties.

Zambia

The Zambian government has made it clear that in order to fulfil its rights and obligations under CBD, its *sui generis* PVP system must recognise and reward the innovation of indigenous peoples and local communities. For this, their law, which is being drawn up with full stakeholder participation, defines innovation to include "any inventive input done collectively, accretionary, inter-generationally and over a period of time, in relation to genetic resources."

Africa/OAPI

The 15 francophone member states of the Organisation Africaine de la Propriété Intellectuelle (OAPI) revised the Bangui Agreement which governs their common intellectual property regime. The new Agreement establishes, in Annex X, a common PVP system and foresees that the OAPI member states will join UPOV by depositing an instrument of accession to the 1991 act.

Africa/SADC

The Southern African Development Community, with the support of the International Plant Genetic Resources Institute, has examined whether alignment with UPOV would be appropriate for compliance with the *sui generis* principle of TRIPS. The conclusion was that UPOV is mainly appropriate to protect the interests of exporters of horticultural and ornamental varieties, but not for southern Africa. As a result, SADC is currently drafting a common legislative framework for *sui generis* rights that protects the gamut of plant biodiversity as well as traditional knowledge of the local communities, in cooperation with the OAU.

Annex 2: FAO Resolutions 5/89 on Farmers' Rights

The Conference,

Recognizing that:

(a) Plant genetic resources are a common heritage of mankind to be preserved, and to be freely available for use, for the benefit of present and future generations,
(b) Full advantage can be derived from plant genetic resources through an effective programme of plant breeding, and that, while most such resources, in the form of wild plants and old landraces, are to be found in developing countries, training and facilities for plant survey and identification, and plant breeding, are insufficient, or even not available in many of those countries,
(c) Plant genetic resources are indispensable for the genetic improvement of cultivated plants, but have been insufficiently explored, and in danger of erosion and loss,

Considering that:

(a) In the history of mankind, unnumbered generations of farmers have conserved, improved and made available plant genetic resources,
(b) The majority of these plant genetic resources come from developing countries, the contribution of whose farmers has not been sufficiently recognized or rewarded,
(c) The farmers, especially those in developing countries, should benefit fully from the improved and increased use of the natural resources they have preserved.
(d) There is a need to continue the conservation (*in situ* and *ex situ*), development and use of the plant genetic resources in all countries, and to strengthen the capabilities of developing countries in these areas.

Endorses the concept of Farmers' Rights (Farmers' Rights mean rights arising from the past, present and future contributions of farmers in conserving, improving, and making available plant genetic resources, particularly those in the centres of origin/diversity. These rights are vested in the International Community, as trustee for present and future generations of farmers, for the purpose of ensuring full benefits to farmers, and supporting the continuation

of their contributions, as well as the attainment of the overall purposes of the International Undertaking) in order to:

(a) ensure that the need for conservation is globally recognized and that sufficient funds for these purposes will be available;
(b) assist farmers and farming communities, in all regions of the world, but especially in the areas of origin/diversity of plant genetic resources, in the protection and conservation of their plant genetic resources, and of the natural biosphere.
(c) allow farmers, their communities, and countries in all regions, to participate fully in the benefits derived, at present and in the future, from the improved use of plant genetic resources, through plant breeding and other scientific methods.

(Adopted on 29 November 1989)

Annex 3: TRIPS Article 27.3 (b)

Article 27: Patentable Subject Matter

3. Members may also exclude from patentability: (b) plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes. However, Members shall provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any combination thereof. The provisions of this subparagraph shall be reviewed four years after the date of entry into force of the WTO Agreement.

Annex 4: Article 12.2 of the draft revised International Undertaking (May 2001)

Article 12 – Facilitated access to plant genetic resources for food and agriculture within the Multilateral System

12.2 Parties agree to provide such access to other Parties, in accordance with the conditions below:

(a) Access shall be provided solely for the purpose of and utilization in research, breeding and training for food and agriculture, provided that such purpose does not include chemical, pharmaceutical and/or other non-food/feed industrial uses. In the case of multiple-use crops (food and non-food), their importance for food security should be the determinant for their inclusion in the Multilateral System and availability for facilitated access.

(b) Access shall be accorded expeditiously, without the need to track individual accessions and free of charge, or, when a fee is charged, it shall not exceed the minimal cost involved;

(c) All available passport data and, subject to applicable law, any other associated available non-confidential descriptive information, shall be made available with the PGRFA provided;

(d) Recipients shall not claim any intellectual property or other rights that limit the facilitated access to the PGRFA, or their genetic parts or components, in the form received from the Multilateral System;

(e) Access to PGRFA, including material being developed by farmers, shall be at the discretion of its developer, during the period of its development;

(f) Access to PGRFA protected by intellectual and other property rights shall be consistent with relevant international agreements, and subject to national legislation.

(g) Plant genetic resources for food and agriculture accessed under the Multilateral System and conserved shall continue to be available to the Multilateral System by the recipients of those PGRFA, under the terms of this Undertaking;

(h) Without prejudice to the other provisions under this Article, the Contracting Parties agree that access to plant genetic resources for food and agriculture found in *in situ* conditions will be provided according to national legislation or, in the absence of such legislation, in accordance with such standards as may be set by the Governing Body.

FAO Document CGRFA/EX-6/01/2 (FAO, 2001)

Annex 5: Article 13.2(d)(ii),(iii),(iv) of the draft revised International Undertaking (May 2001).

Article 13: Benefit-Sharing in the Multilateral-System

13.2 (d): Sharing of monetary benefits on commercialisation

(ii): Whenever the use of plant genetic resources for food and agriculture accessed under the Multilateral System results in a product that is a plant genetic resource covered by any form of intellectual property right that restricts utilization of the product for research and plant breeding, the rights-holder shall pay an equitable royalty in line with commercial practice on the commercial exploitation of the product into a mechanism referred to in Article 19.2(g), as a contribution to the implementation of agreed plans and programmes as established under this Undertaking.

(iii) Whenever the use of plant genetic resources for food and agriculture accessed under the Multilateral System results in a product that is a plant genetic resource covered by any form of intellectual property right that does not restrict utilization of that product for research and plant breeding, the Contracting Parties shall take measures, as appropriate, to encourage the rights-holder to pay into the above mechanism a royalty on the commercial exploitation of that product, taking into account the need to exempt farmers in developing countries, especially in least developed countries, from this provision.

(iv) The Governing Body shall review the provisions of Article 13.2(d)(ii) and 13.2 (d)(iii) within a period of five years of the entry into force of the International Undertaking, with a view to optimising benefits accruing from these provisions, and shall in particular assess the possibility of establishing a mandatory scheme in regard to the above paragraph. Following this review, any proposed amendment shall be addressed in accordance with Article 22.

FAO Document CGRFA/EX-6/01/2 (FAO, 2001)

Annex 6: Article 9 of the draft revised International Undertaking (May 2001)

Article 9: Farmers' Rights

(As negotiated during the Eighth Regular Session of the Commission on Plant Genetic Resources, April 1999)

9.1 The Parties recognize the enormous contribution that the local and indigenous communities and farmers of all regions of the world, particularly those in the centres of origin and crop diversity, have made and will continue to make for the conservation and development of plant genetic resources which constitute the basis of food and agriculture production throughout the world.

9.2 The Parties agree that the responsibility for realizing Farmers' Rights, as they relate to Plant Genetic Resources for Food and Agriculture, rests with national governments. In accordance with their needs and priorities, each Party should, as appropriate, and subject to its national legislation, take measures to protect and promote Farmers' Rights, including:

(a) Protection of traditional knowledge relevant to plant genetic resources for food and agriculture;

(b) The right to equitably participate in sharing benefits arising from the utilization of plant genetic resources for food and agriculture;

(c) The right to participate in making decisions, at the national level, on matters related to the conservation and sustainable use of plant genetic resources for food and agriculture.

9.3 Nothing in this Article shall be interpreted to limit any rights that farmers have to save, use, exchange and sell farm-saved seed/propagating material; subject to national law and as appropriate.

FAO Document CGRFA/EX-6/01/2 (FAO, 2001)