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Intellectual Property Rights and Food Security in the South

Philippe CULLET*

INTRODUCTION

Food insecurity is one of the basic challenges faced by the international community and individual States. Over time, different strategies have been proposed to tackle the problem of food deprivation in developing countries. On the whole, however, meeting the food needs of each and every individual on the planet remains an unfulfilled challenge.

For a long time, all actors involved in agricultural management favoured an approach which privileged the sharing of useful biological resources and related knowledge across countries. This has rapidly given way to a strategy which favours the appropriation of genetic resources through the assertion of sovereign rights, and the appropriation of knowledge through intellectual property rights (IPRs). This rapid shift has been linked to the development of agricultural biotechnology which is proposed as a novel tool to provide a number of benefits for agricultural management. Since funding for agro-biotechnology development comes mostly from the private sector, there has been a push towards ensuring the legal protection of the products of agro-biotechnology. This is reflected in the introduction and strengthening of IPRs in agriculture.

The new paradigm, which emphasizes appropriation of resources and knowledge in agriculture, is of tremendous importance for most developing countries because agricultural management is directly linked to the meeting of food needs. It is, therefore, important to ensure that property rights introduced in agriculture broadly contribute to a reduction in food insecurity. This is an issue which warrants further analysis because existing IPRs are designed to promote technological development but not necessarily to take into account socio-economic concerns, such as food security. As a result, the introduction of IPRs—for example, patents in agriculture—does not ensure that socio-economic goals will be met.

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The special situation of agriculture as a provider of basic food needs, requires a special legal regime in developing countries to take into account the needs of local agriculture and, more broadly, of individual food security. The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS),¹ indirectly recognises this need at Article 27.3(b) by allowing Member States to devise their own form of IPR protection in the field of agriculture (the *sui generis* option). This article considers the question of *sui generis* protection from the perspective of food security. It examines the extent to which existing IPRs can fulfil the twin goals of promoting technological development and food security. It also examines further options that are open to developing countries both under and beyond the TRIPS Agreement, taking into account other treaties such as the International Treaty on Plant Genetic Resources for Food and Agriculture (International Treaty on PGRFA).² The analysis of alternative forms of protection is made necessary by the current imbalance in the overall system whereby some forms of knowledge benefit from increasing legal protection while other forms are deemed unprotectable. The tendency to allocate exclusive property rights to individual or collective actors is unlikely to be the best solution from the point of view of addressing the challenge of food security in developing countries. The system of free exchange proposed in the International Undertaking of 1983³ was probably more appropriate from a food security point of view. However, in the current context, where the system has moved so far away from the original goal of free-sharing embodied in the principle of common heritage, it appears unavoidable to ensure that all relevant actors can assert rights over their knowledge and resources.

I. FOOD SECURITY AND IPRS IN DEVELOPING COUNTRIES

Food security is a serious concern for developing countries, even though some countries classified as developing countries have virtually eradicated hunger.⁴ Food security at the individual or aggregate level is dependent not only on the availability of food but also on effective access and appropriate distribution of existing foodstuffs. At present, the overall availability of food at a global level is not a major concern since the world produces enough food for its present population.⁵ However, food availability in specific regions of the world and access to food by specific individuals remains a major concern in most parts of the South. Further, population growth in countries where

¹ Agreement on Trade-Related Aspects of Intellectual Property Rights, Marrakesh, 15 April 1994, 33 ILM 1197, 1994.

² International Treaty on Plant Genetic Resources for Food and Agriculture, Rome, 3 November 2001, Doc. Y3159/E.

³ International Undertaking for Plant Genetic Resources, Res. 8/83, *Report of the Conference of FAO*, 22nd Session, Rome, 5–23 November 1983, Doc. C83/REP.

⁴ Overall, 17 percent of the total population of developing countries remain undernourished. This figure includes countries with no or hardly any prevalence of hunger such as South Korea or Turkey. This study examines developing countries in general. However, the main focus is on countries where food insecurity is prevalent and not countries where undernourishment is virtually non-existent.

⁵ See, for example, Carl F. Jordan, *Genetic Engineering, the Farm Crisis and World Hunger*, 52 *Bioscience* 523, 526, 2002.

undernourishment is already a problem and diminishing arable land less available, makes food insecurity one of the most important policy challenges of coming years.⁶

If availability is not an immediate concern, access to food and maldistribution of foodstuffs are, at present, major problems. Thus, even in countries such as India, where overall food availability has been more than sufficient for a number of years, the numbers of undernourished keep rising.⁷ This is linked to the fact that availability of sufficient food within a country does not indicate that each and every household and every individual has access to sufficient food, the latter being the ultimate measure of food security. Food security at an individual level implies that people must have either an income sufficient to purchase food or the capacity to feed themselves directly by growing their own food. There is, therefore, a direct link between poverty and food security.⁸

One of the major debates with regard to food security today is the contribution that agro-biotechnology can make to meeting the food needs of the world's population. This happens in a context where it is expected that most of the increase in food production will continue to come from further intensification of crop production. Part of this increase is expected to come in the form of higher yields and part in the increase of multiple cropping and reduced fallow periods.⁹ It is hoped that transgenic plant varieties can contribute to at least part of this food production increase.

At present, the potential of modern biotechnology for food security in developing countries remains an open question. Firstly, plant biotechnology research is only likely to benefit poor farmers if it is applied to "well-defined social or economic objectives".¹⁰ To date, commercialized genetically modified crops in general have not focused on the needs of developing country agriculture. In fact, it is uncertain whether the large life-science companies that are responsible for most of the applied agro-biotechnology research—thanks to the incentives provided by IPRs—can ever be expected to focus their research efforts on plant varieties of specific interest to poor farmers and consumers in developing countries.¹¹ This, in effect, implies that such research is only likely to come from national public-sector research institutes or international agricultural

⁶ Jose Falck-Zepeda *et al.*, *Biotechnology and Sustainable Livelihoods—Findings and Recommendations of an International Consultation*, International Service for National Agricultural Research (ISNAR), The Hague, Briefing Paper No. 54, September 2002.

⁷ See, for example, FAO, *The State of Food Insecurity in the World 2002*, FAO, Rome, 2002.

⁸ See, for example, Mahbub ul Haq Human Development Centre, *Human Development in South Asia 2002—Agriculture and Rural Development* 96, Oxford University Press, Karachi, 2003.

⁹ The FAO estimates that 80 percent of crop production increases will come from this intensification of crop production. The 20 percent remaining will be initiated through the expansion of arable land: see FAO, *World Agriculture—Towards 2015/2030*, Earthscan, London, 2003.

¹⁰ Charles Spillane, *Agricultural Biotechnology and Developing Countries: Proprietary Knowledge and Diffusion of Benefits*, in Timothy Swanson (ed.), *Biotechnology, Agriculture and the Developing World—The Distributional Implications of Technological Change* 67, 72, Edward Elgar, Cheltenham, 2002.

¹¹ See, for example, Per Pinstrup-Andersen, Rajul Pandya-Lorch and Mark W. Rosegrant, *World Food Prospects: Critical Issues for the Early Twenty-First Century*, International Food Policy Research Institute, Washington, D.C., 1999.

research centres (IARCs). Secondly, the scale of overall benefits derived from the introduction of transgenic plant varieties remains a matter of debate when agricultural and other factors, such as environmental and socio-economic factors, are taken into account. Thirdly, according to projections showing an increase in agricultural trade in the coming years, further specialisation may occur whereby some developing countries may be led to increase the production of non-food cash crops at the expense of basic food crops.¹² This may have significant implications for local and national food security in a context where it is expected that the development of agro-biotechnology may lead to further market concentration and where access to genetically modified seeds may be hampered by their higher cost.¹³

Policy challenges concerning food security are immense. Guaranteeing access to food for each individual around the world today and in the future requires measures to create wealth in poor communities, measures to enhance the control of poor farmers over their land and productive assets, measures to conserve the natural resource base while increasing either agricultural productivity or arable land availability and measures to ensure effective distribution of existing food supplies.

A. *Food Security and IPRs*

A number of justifications can be offered for the introduction of IPRs with a view to fostering food security in developing countries. In general, the legal protection offered by IPRs is one of the most important incentives for private sector involvement in agro-biotechnology.¹⁴ IPRs are thus primordial in ensuring the participation of the private-sector in the development of improved plant varieties. Improvements that can be brought about by agro-biotechnology include plant varieties that produce higher yields by enhancing the capacity of the plant to absorb more photosynthetic energy into grain rather than stem or leaf, varieties that have the capacity to combat pests, and varieties modified to grow faster through enhanced efficiency in the use of inputs such as fertilisers, pesticides and water.¹⁵ From a food security point of view, another potentially interesting feature of agro-biotechnology is the possibility to modify varieties to improve their nutritional value, such as in the case of the pro-vitamin-A rice.¹⁶ Other arguments include the potential of the introduction of IPRs in developing

¹² Eugenio Díaz-Bonilla and Sherman Robinson, *Biotechnology, Trade and Hunger*, in Philip G. Pardey and Bonwoo Koo (eds.), *Biotechnology and Genetic Resource Policies*, IFPRI, Washington, D.C., 2003.

¹³ FAO, *supra*, footnote 9, at 322–327.

¹⁴ See, for example, Neil D. Hamilton, *Legal Issues Shaping Society's Acceptance of Biotechnology and Genetically Modified Organisms*, 6 Drake J. Agric. L. 81, 2001.

¹⁵ Sachin Chaturvedi, *Agricultural Biotechnology and New Trends in IPR Regimes—Challenges before Developing Countries*, 37 Econ. & Pol. Wkly 1212, 30 March 2002.

¹⁶ See, for example, R. David Kryder et al., *The Intellectual and Technical Property Components of Pro-Vitamin-A Rice (Golden Rice™): A Preliminary Freedom-to-Operate Review*, Ithaca, N.Y. ISAAA, Brief No. 20, 2000. On Vitamin-A deficiency, see, for example, World Health Organization, *Micronutrient Deficiencies—Combating Vitamin-A Deficiency*, WHO, Geneva, available at: <www.who.int/nut/vad.htm>.

countries to increase foreign direct investment, and increase technology transfers and research and development (R&D) by foreign companies while at the same time giving domestic actors incentives to be more innovative.¹⁷

The contribution of IPRS to food security in the South must be analysed not only from the point of view of the IPR system, but also from a broader perspective which takes into account a number of other variables. Firstly, the introduction of IPRS in agriculture has important links with other forms of property rights directly relevant to agriculture, such as land rights and rights over biological resources.¹⁸ In fact, the question of access to biological and genetic resources for food and agriculture has been at the centre of significant debates at the international level for a number of years.¹⁹ Control by individual farmers, private companies and States over the genetic and biological resources they hold and the related knowledge, has become increasingly contentious with the progressive introduction of IPRS over certain types of plant varieties for instance. While the sharing of resources and knowledge was emphasized up until the 1980s, the new framework which promotes individual appropriation has led to the formulation of a new set of rules concerning control over knowledge and resources. At the international level, while private individual appropriation of inventions through IPRS has been condoned, State control over primary resources, at least in principle, has been reinforced. The only possible exception to this trend is the International Treaty on PGRFA which seeks to maintain a level of openness for crops listed in its Annex I which are covered by the Multilateral System.²⁰ At the national level, the role of farmers in conserving and enhancing agro-biodiversity has generally been recognised but this is not necessarily translated into specific claims over resources or knowledge.

Secondly, the introduction of IPRS in agriculture raises specific concerns with regard to farmers' control over their resources and knowledge. In general, IPRS tend to facilitate control over seeds and related knowledge by agri-businesses, at the expense of small and subsistence farmers. This is linked, in part, to the royalties that farmers must pay to acquire protected seeds together with the associated restrictions on saving, re-planting and selling saved seeds. In principle, it appears essential that farmers should retain some control over plant varieties so that they may continue to improve and adapt varieties to suit changing needs and conditions.²¹ At present, even when IPRS are introduced in the South, it is unlikely that IPR holders will be able to control farmers' ability to save and re-plant seeds as much as in countries such as the United States, where

¹⁷ See, for example, concerning India, Anitha Ramanna, *Policy Implications of India's Patent Reforms—Patent Applications in the Post-1995 Era*, 37 *Econ. & Pol. Wkly* 2065, 2002.

¹⁸ Land rights are of central importance in the overall management of agricultural systems. This dimension is, however, not considered in this study in so far as it can be considered separately from IPR issues.

¹⁹ As, for instance, reflected in the lengthy process for the re-negotiation of the International Undertaking, *supra*, footnote 3, leading to the adoption of the International Treaty on PGRFA, *supra*, footnote 2.

²⁰ See Part IV of the International Treaty on PGRFA, *ibid*.

²¹ See, for example, Objectives 3(1) and 3(4)(d) of the World Food Summit, *Plan of Action*, Rome, 17 November 1996.

IPR protection is often enhanced with contractual obligations.²² However, the introduction of genetic use-restriction technologies would constitute a specific challenge in this context since this would provide a tool for patent holders to ensure that farmers fully respect patent rights.²³ The progressive introduction and strengthening of IPRs in agriculture poses significant challenges for actors involved in agricultural research, such as the Consultative Group on International Agricultural Research (CGIAR). Faced with the complete overhaul of the international agricultural system which is taking place, the IARCs have specifically indicated that:

“There is some concern that even the Right to Food, as defined by various governments, could be compromised by certain interpretations of intellectual property and other agreements.”²⁴

Thirdly, the introduction and strengthening of IPRs in agriculture fosters two kinds of concerns linked to R&D. There are concerns that “over-patentability” in the biotechnology industry may have the potential to stifle innovation in the private and public sector rather than promote it.²⁵ This is linked to the scope of the claims that can be made in the field of agro-biotechnology. The perception is often that broad claims are necessary to provide the industry with sufficient incentives to innovate, but that IPR claims should not extend to the primary material for research because this tends to stifle scientific and technological innovation. This constitutes a difficult debate in the present environment. In general, scientific innovation benefits from free access to all primary materials for research. However, current scientific research often requires access to patented technologies beyond the primary biological material. Further, the products of scientific research increasingly are patented. From a policy-making point of view, it is necessary to determine whether the primary holders of biological material and knowledge should make available their resources and knowledge free to the whole of humankind for the greater common good. It is noteworthy in this context that the introduction of plant breeders’ rights, as distinguished from patents, was partly based on the premise that innovations by breeders could only be sustained if the primary and protected material remained freely available for further research. Another point concerns the extent to which it is reasonable to expect the research agenda to be geared towards the needs of individuals below the poverty line, as long as most of the research is carried out with a view to develop commercially valuable products.²⁶ In fact, on the

²² See, for example, Hamilton, *supra*, footnote 14. The far-reaching consequences of the system currently in place in North America for farmers is well illustrated in the case of the dispute between Monsanto and Percy Schmeiser, see, *Monsanto Canada Inc. v. Schmeiser (C.A.)*, Federal Court of Canada, 4 September 2002, [2003] 2 F.C. 165; leave to appeal to the Supreme Court granted in May 2003.

²³ Cf. Derek Byerlee and Ken Fischer, *Accessing Modern Science: Policy and Institutional Options for Agricultural Biotechnology in Developing Countries*, 30 *World Dev.* 931, 2002.

²⁴ *Centre Directors Committee Statement to ICW 2000 on the Need to Resolve Outstanding Issues Concerning Intellectual Property Protection Relating to Plant Genetic Resources*, CGIAR International Centres Week, October 2000.

²⁵ John H. Barton and Peter Berger, *Patenting Agriculture*, Issues in Science and Technology Online, Summer 2001, available at: www.nap.edu/issues/17.4/p_barton.htm.

²⁶ In practice, up until now the private sector, which is a major player in biotechnology research globally, has only invested a small share of its R&D in products directly aimed at developing countries. This has occurred mainly through direct investment by global life-science companies, acquisition by these companies of seed companies in developing countries and through alliances between global and local companies: see, for example, Byerlee and Fischer, *supra*, footnote 23.

whole, the first generation of genetically modified crops have not been bred for raising yield potential, and any gains in yields and production have come primarily from reduced losses to pests.²⁷ This tends to indicate that the introduction of IPRs in agriculture in developing countries should be accompanied by further measures to ensure that research, is also geared towards the needs of the poor. National public-sector research as well as IARCs, will have a strong role to play, in particular with regard to the need to raise the productivity of the poor in the agro-ecological and socio-economic environments where they practise agriculture and earn their living.²⁸

Fourthly, the introduction of IPRs in agriculture must be examined in its broader context which includes, for instance, the impacts of IPRs in agriculture on biodiversity management. Biodiversity, and agro-biodiversity in particular, is of primary importance for the sustainability of agricultural systems in the long term. Agro-biodiversity is of special importance because it directly contributes to feeding people.²⁹ Agriculture and biodiversity management are inextricably intertwined because biological resources constitute a primary input to agricultural production systems and the majority of existing agricultural products have evolved through selection and collection of plant and animal species.³⁰ In this context, land races—which are geographically or ecologically distinct crops or animals selected by farmers for their overall economic value—are of special importance.³¹ IPRs in agriculture have a tendency to displace land races because protected varieties generally offer higher yields than local counterparts. This process of displacement tends to promote homogenization in agricultural fields (or, in other words, monocultures) which leads to a loss in diversity and generally reduces crops' resilience to pests and diseases.³² Other elements that must be taken into account include problems related to the development of resistance by pests to bio-pesticides. Further, there are some specific concerns with regard to the potential harmful impacts of transgenic plant varieties on specific species.³³ While a number of the impacts of the introduction of transgenic plant varieties can be compared from an environmental point of view to the impacts of the introduction of Green Revolution varieties and may not be specific to the context of this study, they should nevertheless be fully considered.

B. *The Evolution of IPR Policies in Agriculture*

The legal regime for food security in the context of IPRs has evolved in different

²⁷ FAO, *supra*, footnote 9.

²⁸ *Id.*

²⁹ See, for example, Lori Ann Thrupp, *Linking Agricultural Biodiversity and Food Security: The Valuable Role of Agro-biodiversity for Sustainable Agriculture*, 76 *Int'l Aff.* 265, 2000.

³⁰ See, for example, J.I. Cohen and C.S. Potter, *Conservation of Biodiversity in Natural Habitats and the Concept of Genetic Potential*, in Christopher S. Potter *et al.* (eds.), *Perspectives on Biodiversity—Case Studies of Genetic Resource Conservation and Development*, xix AAAS, Washington, D.C., 1993.

³¹ Cf. Thrupp, *supra*, footnote 29.

³² See, for example, M.S. Swaminathan, *Ethics and Equity in the Collection and Use of Plant Genetic Resources: Some Issues and Approaches*, in *Ethics and Equity in Conservation and Use of Genetic Resources for Sustainable Food Security*, 7, International Plant Genetic Resources Institute, Rome, 1997.

³³ See, for example, Hamilton, *supra*, footnote 14.

ways in response to different demands. Firstly, the legal framework has evolved with regard to States' claims over their resources. On paper, the basic principle of State sovereignty over natural resources has been consistently upheld in relevant treaties. However, the scope of this principle has been qualified over time. Thus, while the Convention on Biological Diversity (CBD)³⁴ reiterates the basic assertion of sovereignty, it qualifies it by conceding that biological resources are a "common concern of humankind"—a notion which implies that sovereignty is maintained but with a duty of States to participate in the formulation and implementation of international legal instruments to foster the sustainable conservation and use of biological resources. While States, for several decades, have claimed absolute rights over their natural and biological resources, the situation was different in the case of PGRFA. In the latter case, the international community traditionally worked on the basis of the principle of the "common heritage of humankind". This was enshrined in the 1983 International Undertaking.³⁵ In the last twenty years, there has been a swift movement towards the assertion of claims over PGRFA which have resulted in the International Treaty on PGRFA conceding "common concern" status to PGRFA. In other words, biological resources and genetic resources have the same status under international law—that of a common concern of humankind which gives full control to the State of origin but with an associated duty to participate in international law-making processes aiming for the sustainable conservation and use for the benefit of the whole of humankind.

Secondly, the legal framework has also evolved rapidly with regard to the protection of human inventions. Over time, there has been a shift away from the original position which clearly distinguished products of nature and human inventions and only protected human creativity in law. Progressively, the protection of plant varieties through IPRs became acceptable in the United States and in Western Europe.³⁶ The advent of genetic engineering led to a further shift towards the patentability of life forms, and eventually the patentability of transgenic animals.³⁷ These recent changes, which first occurred mainly in the United States, to a large extent have been mirrored at the international level. While intellectual property treaties viewed life patents with reluctance up until the 1980s, the adoption of the TRIPS Agreement has seen the introduction of a requirement for all WTO Member States to introduce life patents, for instance, on micro-organisms. Concurrently, the plant breeders' rights regime defined in the International Convention for the Protection of New Varieties of Plants (UPOV Convention) has been strengthened to provide stronger incentives to commercial breeders. Among the important changes

³⁴ Convention on Biological Diversity, Rio de Janeiro, 5 June 1992, 31 ILM 818, 1992.

³⁵ International Undertaking, *supra*, footnote 3.

³⁶ For the United States, see Plant Patent Act of 1930, 35 U.S.C. 161 *et seq.*, and Plant Variety Protection Act of 1970, 7 U.S.C. 2321 *et seq.* For European countries, see International Convention for the Protection of New Varieties of Plants, UPOV Convention, Paris, 2 December 1961, as revised at Geneva on 19 March 1991 (UPOV Doc. 221(E), 1996).

³⁷ See, for example, *Diamond v. Chakrabarty*, 16 June 1980, Supreme Court, 447 U.S. 303, and U.S. Patent No. 4,736,866. Transgenic Non-Human Mammals, 12 April 1988.

introduced in the 1991 version of the UPOV Convention is the removal of the provision barring the protection of a given variety by more than one type of IPR.³⁸ The progressive introduction of IPRS in the field of agriculture has had important implications for international organizations working in this field, as well as for developing countries which have to adapt themselves to the new legal regime. At the international level, the CGIAR has been among the institutions directly affected by recent law and policy changes. In the process of adapting itself to the increasing importance of IPRS in agricultural research, the CGIAR has strived to strike a balance which is as favourable as possible for developing countries. As a result, while generally attempting to carry on promoting the free exchange of germplasm to foster food security, IARCs have also determined that there may be situations where they should protect the product of their own research so as to make sure that nobody appropriates the results. This is meant to foster access to research products, to avoid patents blocking further research and to facilitate the transfer of benefits to developing countries.³⁹ However, the efforts of the CGIAR to operate at the same time in two different systems is causing significant difficulties for both itself and for developing countries. Thus, IARCs are likely to be increasingly wary of using technologies patented in donor nations for use in developing countries, even if the patents are not operative in developing countries.⁴⁰

The evolving international legal framework has had an important impact in developing countries. Firstly, for countries where no form of intellectual property protection in agro-biotechnology had been introduced before 1994, the TRIPS Agreement has been one of the triggers for the introduction of life patents.⁴¹ Secondly, the TRIPS Agreement imposes plant variety protection but specifically allows Member States to devise a *sui generis* system, or in other words an alternative to patents. Thirdly, the plant breeders' rights model developed in the UPOV Convention has been seen as an acceptable *sui generis* system that fulfils the requirements of the TRIPS Agreement in this field. There have been attempts to interpret the *sui generis* option as being limited to the UPOV model, but this is not the case and developing countries have the possibility to devise an alternative model which, for instance, takes into account their other treaty obligations in this field as well as Articles 7 and 8 of the TRIPS Agreement which, to a certain extent, grant developing countries the possibility to implement the TRIPS Agreement in a manner which fits their specific situation and needs. Fourthly, most developing country World Trade Organization (WTO) Member States have other international obligations in related fields. In the field of agriculture these include the

³⁸ For the 1978 status, see Article 2 of the UPOV Convention, Geneva, 23 October 1978.

³⁹ See, for example, Policy on Intellectual Property of the International Maize and Wheat Improvement Center, 2001.

⁴⁰ Barton and Berger, *supra*, footnote 25.

⁴¹ Note, however, that while international law is one important factor influencing developing country policy-making in these areas, it is by no means the only important trigger for change. Concerning plant variety protection in India see, for example, Shaila Seshia, *Plant Variety Protection and Farmers' Rights—Law-Making and Cultivation of Varietal Control*, 37 *Econ. & Pol. Wkly* 2741, 6 July 2002.

International Treaty on PGRFA, which does not directly deal with IPRs but provides certain guidelines for their application and provides a relatively strict framework for benefit-sharing. In the environmental field, these include a number of obligations arising from the CBD regarding the management of agro-biodiversity and the overall clause concerning the relationship between IPRs and sustainable biodiversity management. Finally, WTO Member States also have treaty and customary obligations concerning the protection of fundamental human rights.

Most developing countries that are WTO Member States are also parties to the most important treaties in the field of agriculture, environment and human rights. This has two important consequences. Firstly, they must implement all their international obligations in a coherent manner at the national level, even if coherence is not provided by a largely decentralized international legal regime.⁴² Secondly, the TRIPS Agreement is not the most important agreement in the context of food-security-related intellectual property issues. It is only one of several important treaties which must be concurrently implemented with all others. Where there may be conflicts between different treaties, the best strategy in practice is to try and use the broadest possible interpretation to provide a coherent law and policy framework at the national level which suits the needs and the specific situation of each country. If, in specific cases, a conflict cannot be solved in this way, general trends in international law indicate that more weight should be given to human rights, even though they have not attained the status of peremptory rules of international law that prevail in all cases over other international rules and obligations.

II. IPRS FOR FOOD SECURITY IN DEVELOPING COUNTRIES

The current international legal regime imposes a significant burden of adjustment on developing countries which, for the most part, had not introduced IPRs in agriculture before 1994 and generally managed their agriculture in ways that were different, if not opposed, to the system proposed at the international level. The introduction of IPRs in agriculture is an important question because it touches directly on questions of economic development, agricultural management, environmental management and the fulfilment of basic food needs. As a result, significant attention should be given to the development of legal frameworks that take into account all these dimensions together.

The international legal system, in particular the TRIPS Agreement, gives significant guidance to States on the ways in which they must re-orient their IPR policies in the field of agriculture. However, in some areas that are of more importance to developing countries, such as farmers' rights and the protection of traditional knowledge, the

⁴² At most, some recent treaties, such as the Cartagena Protocol on Biosafety to the Convention on Biological Diversity, Montreal, 20 January 2000, 39 ILM 1027, 2000, and the International Treaty on PGRFA, *supra*, footnote 2, provide specific acknowledgements in their preambles that the question of their relationship with other international treaties is problematic but do not provide clear guidance on ways to solve potential conflicts.

international legal framework remains dramatically underdeveloped. As a result, developing countries have the twin burdens of adapting themselves to their existing international obligations and to adopt legal frameworks in areas that are of special interest to them even where international law is underdeveloped.

This Section first considers some of the options that developing countries have within the context of the TRIPS Agreement to adopt legal frameworks suited to their needs. It then moves on to consider further options which may or may not be deemed acceptable under TRIPS but which may constitute reasonable options if all the relevant aspects of the food-security issue are taken into account. This article does not examine the situation of countries which are not bound by the TRIPS Agreement. This is due to the fact that there are increasingly fewer States that have not joined the WTO. Further, from a broader perspective, it is apparent that, in practice, States do not seem to have the option to avoid the consequences of commodification in agriculture. In other words, even for States that are not bound by the TRIPS Agreement, it has become difficult to envisage basing agricultural policies on the principle of the free-sharing of knowledge and resources (common heritage of humankind) because, throughout the world, there is a firm trend towards commodification in the form of sovereign appropriation over biological and plant genetic resources, and private appropriation in the form of IPRs. As noted above, the only partial exception is the International Treaty on PGRFA. As a result, even countries that may benefit from an open system whereby exchange is favoured, need to consider the introduction of property rights frameworks.

Before turning to the specific analysis of options, it is appropriate to briefly consider basic premises that inform the implementation of food security and IPR legal frameworks. Firstly, the progressive commodification taking place in this field is not limited to IPRs. In fact, the assertion of property claims over knowledge has been matched in recent years by the (re)assertion of States' sovereign claims over biological and genetic resources.

Secondly, the introduction of IPRs in agriculture is intended to foster development-related goals. These include, at the domestic level, the strengthening of private-sector seed industries and stronger incentives for researchers to foster the development of R&D in the field of agro-biotechnology. From a North-South perspective, the introduction of IPRs in developing countries is premised on the need to provide an appropriate framework for technology transfer in cases where technologies are protected by IPRs in developed countries.⁴³

Thirdly, today's IPR system is highly developed in areas such as patent rights. However, other areas, such as farmers' rights and the protection of traditional knowledge, are comparatively underdeveloped, partly because the IPR system only

⁴³ The need for the transfer of technologies appropriate to the food-security needs of developing countries is, for instance, recognised by the Rome *Plan of Action*, see *supra*, footnote 21.

protects state-of-the-art inventions and partly because these areas have been politically controversial. The lack of consensus at the international level concerning farmers' rights and traditional knowledge has meant that the International Treaty on PGRFA does not include an internationally agreed definition of farmers' rights and delegates the task of defining and implementing such rights to Member States. With regard to traditional knowledge, the World Intellectual Property Organization (WIPO) has started considering some of the relevant issues; but an international legal framework is yet to emerge.

In implementing legal and policy frameworks in the context of food security and IPRs, developing countries face a number of legal and other constraints. An easy route to compliance with international obligations is to follow existing and proposed models but these may not be adapted to the specific needs and conditions of individual countries. In attempting to devise a regime which is tailored to this, developing countries should consider at least the following elements which, in general, have not been given much emphasis:

- the interests and rights of farmers;
- the conservation and sustainable use of biological and genetic resources;
- the prevention of biopiracy;
- the protection of traditional knowledge;
- the fair and equitable sharing of benefits arising from the exploitation of resources; and
- the realisation of the human right to food.

A. *Fostering Food Security under TRIPS*

The TRIPS Agreement provides a legal framework for IPRs which provides rather strict obligations for Member States but at the same time affords certain exceptions and flexibilities. In principle, the TRIPS Agreement requires the implementation of similar minimum standards of intellectual property protection in all Member States. In this sense, the implementation of the Agreement for most developing countries implies significant changes in their domestic legal regime, especially in cases where these countries did not provide any form of IPR protection in the field of agro-biotechnology before 1994. The full implementation of the TRIPS Agreement generally puts developing countries' legal frameworks on a par with the average position of most Organisation for Economic Co-operation and Development (OECD) countries. Given that their socio-economic conditions are significantly different from that of OECD countries, it is not surprising that most developing countries feel the need to explore avenues to avoid some of the consequences that the TRIPS Agreement can impose on less economically developed countries.

The TRIPS Agreement differs from a number of other international treaties, in particular in the fields of environment, agriculture or human rights, in so far as the latter treaties tend to provide broad obligations while TRIPS includes much more focused commitments. As a result, Member States have less freedom to interpret the Treaty to fit their needs while implementing it at the local level than is the case of many other international treaties. The general qualifying clauses of the TRIPS Agreement are, therefore, of great importance since they provide an important avenue for countries to bring in flexibility at the level of the implementation of the Agreement. The first important provision is Article 7 (Objectives), which seeks to provide a balance between the rights provided to IPR holders and broader social welfare. This indicates that a balance must be found between the gains brought about by technological innovation to some parts of the world or some segments of a given population, and the need for technological innovation to trickle down and have positive impacts for the majority of the population. In situations where IPRs are introduced in fields which contribute to the fulfilment of basic needs, such as food needs, the balancing act concerning the introduction of IPRs in agriculture must include not only aggregate food security at the national level but also individual food security. Article 8 (Principles) provides a more specific acknowledgement that, in implementing the TRIPS Agreement, Member States can take measures to protect nutrition and to promote the public interest in sectors of vital importance to their socio-economic and technological development. This provision recognises the special case of basic needs. However, the measures which can be taken under this provision are strictly limited since they must be consistent with the provisions of the Treaty.

Together, Articles 7 and 8 authorize Member States to take a broad view of substantive provisions. In fact, under Article 7, it might be argued that a lesser duration for patents in fields concerned with the fulfilment of basic needs could be based on the need to achieve a broader balance between the interests of different actors in the field.⁴⁴ This runs directly contrary to the text of Article 33 but might constitute an acceptable broader interpretation of this provision in the light of Article 7 in the context of concerns over food security in specific developing countries.⁴⁵

Another avenue to create scope for broader interpretations of the TRIPS Agreement is to follow the same route that was adopted with regard to health. The Doha Public Health Declaration, while not changing the Agreement, provided the basis for the

⁴⁴ See, for example, Parliament of India, *The Patents (Second Amendment) Bill, 1999—Report of the Joint Committee*, Notes of Dissent, 2001.

⁴⁵ In the context of *Canada—Patent Protection of Pharmaceutical Products*, WTO Doc. WT/DS114/R, 2000, § 7(26), the Panel argued that Article 30 should be read as providing in itself a recognition that the rights provided in Article 28 might need adjustments. The Panel argued that this should not be construed as granting States the right to effect what could be seen as a re-negotiation of the basic balance of rights and obligations under TRIPS. This seems to severely constrain the possibilities offered by Articles 7 and 8. However, Articles 7 and 8 also have a specific dimension of differential treatment which was not taken into account in the Canada case because no developing country was involved. It is to be expected that the Panel would interpret Articles 7 and 8 in a broader way in the case of a dispute involving developing countries.

adoption of negotiated broader interpretations that would strengthen the hand of countries trying to lessen the impact of medical patents on access to drugs within their borders.⁴⁶ In effect it offers developing countries a framework for interpretations of the TRIPS Agreement that tip the balance in favour of public health goals. While this is, in principle, an interesting opportunity to take into account developing countries' socio-economic needs, in practice this is limited by the narrow scope of the Declaration which, for instance, does not provide any basis for limiting the scope of patentability in the field of health. Further, the General Council Decision adopted in pursuance of Paragraph 6 of the Doha Public Health Declaration, indicates that WTO Member States are not ready to give developing countries significant leeway under the TRIPS Agreement to fulfil public health goals.⁴⁷

At the level of specific sections of the TRIPS Agreement, flexibility is also available. These include clear-cut cases like Article 27.2 which provide for specific exceptions to obligations under Article 27.1. Similarly, Article 27.3 authorizes Member States to exclude the patentability of plants and animals. At the level of the implementation of patent rights, a number of limited exceptions are also available. These include the narrowly drafted Article 30 which provides that limited exceptions may be proposed as long as they do not "unreasonably conflict" with the normal exploitation of the patent. The TRIPS Agreement also offers States a limited framework for compulsory licences which provide, for instance, a way to increase the manufacture of a given invention should the patent holder be unable or unwilling to produce bigger quantities of the product.⁴⁸ Food security concerns constitute a valid ground under the TRIPS Agreement for the compulsory licensing of an invention.

In the context of food security, one of the most interesting provisions is Article 27.3(b) which imposes the introduction of a form of intellectual property protection for plant varieties but does not impose the introduction of a specific rights framework (*sui generis* option). As a result, Member States have significant flexibility in implementing their obligations and can take advantage of this provision to introduce a regime which takes into account their different international commitments in this field and their specific needs. In practice, developing countries have been rather conservative in their approach to the introduction of *sui generis* protection regimes. This is in part due to the fact that the development of a *sui generis* regime constitutes a cumbersome procedure whose immediate benefits may not necessarily be apparent, in particular where the adoption of the UPOV regime constitutes an existing alternative that is not contentious.⁴⁹

⁴⁶ See Paragraph 6 of the *Declaration on the TRIPS Agreement and Public Health*, WTO, Ministerial Conference, Fourth Session, WTO Doc. WT/MIN(01)/DEC/2, 20 November 2001.

⁴⁷ *Implementation of Paragraph 6 of the Doha Declaration on the TRIPS Agreement and Public Health*, General Council Decision of 30 August 2003, WTO Doc. WT/L/540, 2 September 2003.

⁴⁸ Article 31 of the TRIPS Agreement, *supra*, footnote 1.

⁴⁹ The conservative position of developing countries towards the development of *sui generis* legal frameworks is also explained in part by the fact that the WTO system does not reward regulatory innovation in this field. On this "chilling effect" see, for example, Urs P. Thomas, *The CBD, the WTO, and the FAO: The Emergence of Phytogenetic Governance*, in Philippe G. Le Prestre (ed.), *Governing Global Biodiversity—The Evolution and Implementation of the Convention on Biological Diversity*, 177, Aldershot, Ashgate, 2002.

In practice, the *sui generis* option is an important provision which could provide a model for other areas where the interests and needs of developed and developing countries significantly differ. It gives developing countries the possibility not to implement legal frameworks developed by other countries for their own interests and instead develop frameworks which, while in compliance with their different legal obligations, are geared towards their own needs. In other words, developing countries get an opportunity within the TRIPS framework to develop new forms of intellectual property protection which also take into account food-security objectives as well as other social and environmental objectives, something that the existing patent system is ill equipped to achieve. A number of alternative approaches can be envisaged, some of which are outlined in the next Section.

Overall, the TRIPS Agreement provides a number of general and specific exceptions to the standards it sets. These provide developing countries with limited scope to implement this Treaty in a manner which fits their needs and priorities. Some provisions, such as Article 7 and Article 27.3(b) concerning plant variety protection, also provide a framework allowing developing countries to take into account their other international obligations in implementing IPR commitments. The scope provided by the TRIPS Agreement can be further exploited in different ways. Firstly, some modifications of existing IPRS could be proposed to alleviate some specific issues concerning food security. Secondly, the flexibility provided constitutes an opportunity to go slightly beyond the TRIPS Agreement by bringing in other important issues, such as the protection of farmers' rights and the protection of traditional knowledge—elements which do not directly fall within the scope of the TRIPS Agreement but are part of other treaties in the field.

With regard to specific modifications to existing IPRS, some possible changes can be suggested at this juncture. One of the problems that some developing countries have been facing is the patenting of knowledge available in the public domain in foreign jurisdictions. A requirement to examine prior art in all parts of the world would constitute an important step towards eliminating this specific form of biopiracy. One of the ways to stop biopiracy is to improve access to data concerning public-domain knowledge, something which can be solved relatively easily through the documentation of such knowledge in forms and formats that are accessible to patent offices around the world.⁵⁰ A related and more intricate problem surfaces in cases where existing knowledge is used as the source or inspiration for an invention, the holder of which seeks protection through IPRS. In this situation, if the transformation is sufficient to satisfy a patent office of the novelty of the claim, the issue that concerns developing countries directly is the acknowledgement of the source of the knowledge and biological/genetic material used. This acknowledgement can, in turn, form the

⁵⁰ An effort in this direction has, for instance, been initiated by the WIPO. For further information, see, *WIPO, Intellectual Property and Genetic Resources, Traditional Knowledge, and Folklore—Traditional Knowledge Databases and Prior Art*, available at: www.wipo.int/globalissues/databases/tk/index.html.

basis for benefit-sharing claims. Individual countries can, and have, introduced provisions concerning prior informed consent and disclosure.⁵¹ A disclosure requirement in patent applications has the advantage of forcing patent applicants to double-check prior art in their field before applying for a patent. It also provides an avenue for claims of benefit-sharing or for claims of joint ownership as well as a mechanism through which patent applicants can show that the resources or knowledge used as a basis for the invention were acquired with the consent of the individual or group concerned. A disclosure requirement can even shift the burden of proof from the party opposing the grant of a patent to the patent applicant. Should an international patent regime be developed as proposed through the development of the Substantive Patent Law Treaty, the most effective way to ensure that these provisions are effective where resources or knowledge are transferred between countries would be to introduce these requirements at the international level.⁵²

Developing countries can explore further avenues to make use of TRIPS flexibility. Firstly, in the context of the introduction or revision of patent laws, developing country governments could attempt to favour their own research communities by providing broad exemptions for the use of a patented invention for experimental purposes.⁵³

Secondly, as noted above, one of the important problems that developing countries face is the overall lack of R&D in areas that are of specific interest to them, with the result that there are, for the time being, few genetically modified crops that have been engineered with the needs of poor people in developing countries in mind. Governments should therefore endeavour to make sure that the introduction of IPRs, in agriculture at least, contributes to the socio-economic goals promoted by IPR treaties themselves. The introduction of IPRs in agriculture should, for instance, contribute to increasing technology transfers from developed countries, one of the recognised goals of the TRIPS Agreement.⁵⁴ Governments should also make sure that the introduction of IPRs leads to stronger incentives for researchers to foster the development of R&D in the field of agro-biotechnology. This could be done, among other ways, by specifically promoting research in crops that are not usually the focus of attention of the private sector even though they are important crops, for instance, from a nutritional point of view. This has, in fact, already been attempted in some developed countries through incentives for the development of orphan drugs.⁵⁵ The orphan drug model

⁵¹ See, for example, Costa Rica, Biodiversity Law, 1998; India, Patents Act, 1970 as amended by the Patents (Amendment) Act, 2002; and the Philippines, The Indigenous Peoples' Rights Act of 1997.

⁵² See Draft Substantive Patent Law Treaty, WIPO Doc. SCP/10/2, 2003.

⁵³ See, for example, John H. Barton, *International Intellectual Property and Genetic Resource Issues Affecting Agricultural Biotechnology*, in C.L. Ives and B.M. Bedford (eds.), *Agricultural Biotechnology in International Development*, 273, CAB International, Wallingford, 1998.

⁵⁴ Note also that the need for the transfer of technologies appropriate to the food-security needs of developing countries is, for instance, recognised by the Rome *Plan of Action*, *supra*, footnote 21.

⁵⁵ For the United States, see 21 U.S.C. 360 bb.

constitutes an attempt by governments to give the private sector specific incentives to invest in the development of drugs for diseases that are not particularly common or attractive from a commercial point of view. The model developed in the United States offers attractive incentives such as grants, tax credits, regulatory assistance, subsidies, preferential access to public-sector research funding and fast-track regulatory trials.⁵⁶ While the orphan drugs model is not a panacea for all IPR-related problems, it could be usefully adapted to the case of orphan crops to draw attention to the need to provide specific incentives to the private sector, the public sector and relevant international organizations such as IARCs, to undertake more research in crops and traits that are of specific relevance to small farmers and the poor in general.

Thirdly, developing countries can, to varying degrees, exploit the territoriality of the patent system to their own advantage. Since TRIPS only requires minimum levels of protection, some countries may go further than the required minimums. This implies that even after all developing countries implement all of their TRIPS obligations, there may remain differences in the scope of patentability in different countries. Developing countries can take advantage of the fact that some inventions that may be patentable in some developed countries are not patentable in their own jurisdiction. These inventions can, therefore, be used at the national level without infringing the patent holder's rights. Similarly, there may be situations where a given invention is patentable in all countries but the patent holder decides not to seek protection in certain countries which are not important enough markets to warrant the expense. Least-developed or other countries where specific patents are not requested should take advantage of the opportunities that this gives them. One of the levels at which this freedom to operate may have implications is in the context of relations between IARCs and specific developing countries. While IARCs may feel constrained to uphold patents granted only in developed countries, developing countries could lobby IARCs to adapt their attitude to IPRs to the specific legal provisions in force in developing countries that seek access to plant varieties that may, for instance, include patented genes.

Fourthly, developing countries should use IPR frameworks and other relevant tools to promote the development of biotechnology industries at the national level that genuinely contribute to national development and food security. Developing countries could, for example, decide only to promote and allow "appropriate biotechnologies". The concept of appropriate biotechnologies implies that biotechnology must be environmentally safe as well as socio-economically and culturally acceptable. Interestingly, this concept was already adopted a decade ago in the Preliminary Draft International Code of Conduct on Plant Biotechnology as it Affects the Conservation and Utilization of Plant Generic Resources, which defines appropriate biotechnologies as technologies which promote the development of a sustainable agriculture through the rational use of plant genetic resources while properly considering local culture and

⁵⁶ See, for example, Spillane, *supra*, footnote 10.

techniques.⁵⁷ To achieve the goal of promoting appropriate biotechnology, measures must be taken not only in different fields, including laws on biotechnology and biosafety but also at the level of the incentives that are given for the development of biotechnology, among which IPRs figure prominently.

B. *Fostering Food Security through Alternative Property Rights Framework*

As noted above, WTO Member States can use existing TRIPS flexibility to foster food security, for instance, through the adoption of a *sui generis* plant variety protection regime. However, it is necessary to look beyond the TRIPS Agreement to address broader issues linked to the introduction of IPRs in agriculture and its impacts on food security. This is due to the fact that there are other relevant treaties in this field which must be taken into account, as well as specific issues such as the protection of traditional knowledge, farmers' rights and benefit-sharing regimes. This calls for a broader perspective on IPRs which is not bound by the narrow framework of the TRIPS Agreement. One of the main challenges that developing countries face in coming years is the development of protection regimes for all traditional knowledge. This Section focuses on the protection of traditional knowledge directly relevant in meeting the challenge of food security.

In general, a number of objectives can be pursued through the development of protection regimes for traditional agricultural knowledge. Firstly, this offers an opportunity to focus not only on the benefits that can be derived from the commercialization of new plants but also on more important goals such as the fulfilment of food security at the individual, local and national levels through an increase in food production and diversity where necessary, and improvements in food distribution systems where required. Secondly, traditional agricultural knowledge protection regimes provide an opportunity to integrate concerns and commitments under different treaties such as the CBD, the International Treaty on PGRFA and the UN Convention on Desertification. These include, for instance, the promotion of plant varieties adapted to local climatic conditions, soils and local tastes. Thirdly, traditional agricultural knowledge protection regimes provide an opportunity to go beyond the patent and plant breeders' rights model. Even though the latter provides certain exceptions not available under patent law, it does not go far enough from a food security point of view.⁵⁸ The two main directions that traditional agricultural knowledge protection

⁵⁷ See, Article 3 of the *Preliminary Draft International Code of Conduct on Plant Biotechnology as it Affects the Conservation and Utilization of Plant Genetic Resources*, in Commission on Genetic Resources for Food and Agriculture, *Towards a Code of Conduct for Plant Biotechnology as it Affects the Conservation and Utilization of Plant Genetic Resources*, Ninth Session, Rome, 14–18 October 2002, Doc CGRFA-9/02/18/Annex.

⁵⁸ This is exemplified, for instance, in the case of Kenya, where the introduction of plant breeders' rights has been used to a large extent to protect varieties such as flower varieties which have no impact on meeting food needs. See, for example, Hannington Odame *et al.*, *Innovation and Policy Process: Case of Transgenic Sweet Potato in Kenya*, 37/27 *Econ. & Pol. Wkly* 2770, 2002; and World Trade Organization, *The Relationship between the Convention on Biological Diversity (CBD) and the Agreement on the Trade-Related Aspects of Intellectual Property Rights (TRIPS), with a Focus on Article 27.3(b)*, WTO Doc. IP/C/W/175, 2000.

regimes can take are the introduction of farmers' rights or, more generally, the introduction of rights' frameworks to protect traditional knowledge.

On the whole, the development of traditional agricultural knowledge protection regimes is considered as an extension of States' obligations under the TRIPS Agreement, which allows them to fulfil not only their IPR commitments but also their agriculture, environment and human rights commitments in a way which takes into account their specific needs. A traditional agricultural knowledge protection regime is therefore envisaged as one which includes the protection of commercially relevant knowledge; the conservation and management of biological resources and plant genetic resources; the protection through property rights of traditional knowledge; and the recognition that plant variety management and protection is intrinsically linked to the fundamental human right to food.⁵⁹ In other words, a legal regime concerning plant varieties should not stop at what is commercially useful today but should incorporate, for instance, human rights considerations linked to food security.

Different options for traditional agricultural knowledge protection exist. Options range from extensive protection of farmers' rights and traditional knowledge which may include, as in the case of the African Model Legislation, a complete prohibition on life patenting,⁶⁰ to much more modest proposals which focus only on defensive mechanisms to avoid undue appropriation by foreign actors. The main task for developing countries is to develop legal frameworks for farmers' rights and the protection of traditional knowledge because the international system does not provide useful models. As a result, the task is more challenging but also affords more leeway to introduce legal frameworks specifically devised by the South for the South. Given that the emphasis at the international level has in general been on defining and strengthening the rights of commercially minded actors through patents and plant breeders' rights, the definition of a broader regime need not add much to existing and well-developed rights. It should, rather, focus on farmers' rights and the mainstreaming of biodiversity management and traditional knowledge protection. One of the starting points for this effort should be the International Treaty on PGRFA, as while the TRIPS Agreement makes no mention of the necessity to protect farmers' rights, the International Treaty indicates a few of the substantive elements that make up such rights.⁶¹ These include the protection of traditional knowledge, equitable benefit-sharing and the right to participate in decisions concerning the management of plant genetic resources. In other words, the Treaty steers countries towards the recognition of the need to give farmers control over their

⁵⁹ Note that the Desertification Convention includes most of these elements in a direct or indirect way. See, in particular, Article 18 of the *Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa*, Paris, 17 June 1994, 33 ILM 1328, 1994.

⁶⁰ The provisions on access to biological resources highlight that the recipients of biological resources or related knowledge cannot apply for any intellectual property right of exclusionary nature. See Article 8(5), Organization of African Unity, *African Model Legislation for the Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources*, 2000.

⁶¹ Article 9(2) of the International Treaty on PGRFA, *supra*, footnote 2.

knowledge for reasons of justice, as well as to foster sustainable use and conservation of plant genetic resources. However, it leaves Member States free to decide on the most appropriate framework for the same.

Some indications of the possible shape of a comprehensive farmers' rights regime at the domestic level can be given, but the actual regime should be determined according to the specific needs of individual countries. Firstly, farmers' rights can be conceived as either a "defensive" or a "positive" mechanism. Under the defensive role, farmers' rights help farmers and their governments fight the appropriation of their resources and knowledge with legal tools. Today, within the context of the existing IPR system, traditional knowledge is deemed to be in the public domain because it cannot be assigned through patents or plant breeders' rights. As a result, defensive avenues include secrecy or documentation. In cases where traditional knowledge is not known to outsiders, holders still have the choice to protect their knowledge through trade secrets. In cases where traditional knowledge is already in the public domain, holders can only work towards ensuring that their knowledge is sufficiently well documented to prevent its patentability in their jurisdiction or in a foreign jurisdiction.⁶² Some countries have adopted both strategies at the same time. Thus, in Venezuela, a traditional knowledge database has been developed, but the government has decided to keep it secret until an international legal framework for the protection of traditional knowledge is developed.⁶³ Similarly, the development of benefit-sharing schemes constitutes a defensive use of farmers' rights. Benefit-sharing is the logical extension of traditional knowledge documentation and constitutes an attempt to provide some form of compensation to traditional knowledge holders for the loss of control over their knowledge they suffer when this knowledge is transferred and used outside of its original context.⁶⁴ Defensive strategies can also be used in conjunction with the introduction of disclosure and prior informed consent requirements which provide further avenues to ensure that knowledge is not unduly integrated in patented inventions.⁶⁵

The other conception of farmers' rights focuses on positive characteristics, or in other words on the definition of property rights for traditional knowledge holders that give them control over their knowledge. The introduction of property rights can be justified by the need to give farmers the right to commercialize their own knowledge rather than simply to stop others from commercializing it. In this sense, farmers' rights

⁶² An example of current efforts at documenting traditional knowledge at the international level is the World Bank's IK Practices Database Search. For further information, visit: www4.worldbank.org/afr/ikdb/search.cfm.

⁶³ Nuno Pires de Carvalho, *From the Shaman's Hut to the Patent Office—In Search of Effective Protection for Traditional Knowledge*, 2003, available at: <http://law.wustl.edu/centeris/Confpapers/PDFWrdDoc/Fromshaman2.pdf>.

⁶⁴ While the international legal regime remains quite underdeveloped in this area, some countries have adopted rather strict frameworks. Thus, the Thai Plant Varieties Protection Act, B.E. 2542 (1999) provides that 20 percent of the profits derived from authorizing another person to use the rights in a local domestic plant variety must be allocated to the persons who conserve or develop the plant variety, and 60 percent thereof to the community as its common revenue and 20 percent thereof to the local government organization, the farmers' group or the co-operative that makes the agreement (Section 49).

⁶⁵ For further details on prior informed consent and the disclosure requirement, see Section II.A, *supra*, text at footnote 51.

are based on the recognition that all economic actors should have commercial rights over their knowledge. The introduction of such farmers' rights is also justified by the role that property rights play in fostering the sustainable use and the conservation of resources due to the intrinsic link between the knowledge and the resource and the requirement of ownership of both to foster their conservation. In other words, farmers' rights can play multiple roles in granting full property rights to farmers which allow commercialization if desired, in contributing to agro-biodiversity conservation, and simultaneously in fostering food security at the local level. The introduction of farmers' rights is a challenge from a technical point of view because the identification of specific land races or farmer varieties can be problematic. A rights framework nevertheless needs to be introduced to re-balance the currently imbalanced system.

The introduction of positive farmers' rights is likely to have impacts on the scope of other IPRs. This is linked to the fact that the delimitation of farmers' rights may imply limitations on patents or plant breeders' rights. Reasons of public interest, food security or environmental conservation constitute possible grounds for restricting the rights of existing IPR holders with a view to strengthening farmers' control over their knowledge. Some countries have already introduced provisions along these lines. In Thailand, for instance, the maintenance of public welfare and the protection of the environment constitute grounds which empower the Minister in charge to prohibit the commercial breeder from exercising the rights granted under the Plant Variety Act.⁶⁶ Countries can also try to favour farmers by attempting to regulate access to traditional knowledge and genetic resources that are used in inventions protected by IPRs abroad, even if they cannot influence the legal system abroad. Possibilities include the already-mentioned disclosure and prior informed consent requirement as well as the possibility to restrict access in situations where it can be foreseen that this will lead to adverse impacts from a public-interest perspective or from the perspective of the protection of the environment.

The rights that can be conferred include the right to develop, produce, sell and export the protected variety.⁶⁷ While these rights closely mirror rights obtained under IPR treaties, one of the major distinguishing features of farmers' rights could be their non-exclusivity.⁶⁸ In other words, while farmers' rights seek to give control to individuals and local communities over their knowledge and resources, these rights do not exclude similar rights elsewhere.⁶⁹ This is due to the close link between food

⁶⁶ *Supra*, footnote 64, Section 36. The African Model Legislation is even more specific and provides that where food security or nutritional or health needs are adversely affected, governments are allowed, in the public interest, to restrict the realisation of the rights of breeders. See Article 45 of the African Model Legislation, *supra*, footnote 60.

⁶⁷ Note that Thailand has, for instance, adopted a farmers' rights regime which entitles the local legal entity to "have the exclusive right to develop, study, conduct an experiment or research in, produce, sell, export or distribute by any means the propagating material thereof": see Section 47 of the Plant Varieties Protection Act, *supra*, footnote 60.

⁶⁸ This is similar to the solution found by Panama with regard to the grant of licences for the use of collective rights. See Article 21, Panama, *Ministerio Comercio e Industrias, Decreto ejecutivo No. 12 Por la cual se Reglamenta la Ley No. 20 de 26 de junio de 2000*, 20 March 2001.

⁶⁹ Cf. Article 5(2) of the Draft Traditional Knowledge (Preservation and Protection) Bill, 2000 (proposed by Dr N.S. Gopalakrishnan, School of Legal Studies, Cochin) providing that if traditional knowledge has been used in more than one *panchayat*, the rights to manage this traditional knowledge vest at the District level.

security and plant variety protection as well as to the fact that exclusivity in this context may be inappropriate where varieties exist in similar forms in different localities within the same country or in different countries. In practice, this implies that in terms of commercialization, all rights holders are entitled to separately produce and commercialize their own products. Another possibility is to provide for market segmentation whereby different rights holders have exclusive or dominant rights in specific markets. The concept of non-exclusivity constitutes one way to deal with the problem of exhaustion of rights. While monopoly rights theoretically grant a farmer or a CGIAR centre the right to stop others from seeking IPRs on the material or knowledge transferred, it would be much more difficult for them to impose conditions and control what happens in subsequent transactions. In fact, in the context of the International Treaty on PGRFA, this has now been officially recognised.⁷⁰ With regard to the duration of the right, given that innovation in farming communities can take place over long periods of time, it does not seem appropriate to impose *a priori* a temporal limitation on the scope of the rights granted.⁷¹

Secondly, in the context of the introduction of farmers' rights, the determination of the rights holders is an important issue. IPRs such as patents are often conceived as purely individual rights even though, in practice, they can be shared among several individuals or entities. However, IPRs lend themselves less easily to shared management in the case of an unidentifiable number of rights holders. Farmers' rights present specific problems in this field. In some instances, specific individuals may make individual contributions to the development of a new or improved plant variety. In this situation, the model provided by individual rights can be applied in the case of farmers' rights.⁷² This case is, however, likely to be, at most, infrequent, given that novelty is often the product of direct or indirect collaboration between different individuals and/or communities. Farmers' rights are thus likely to be of a communal nature. The usual IPR model is not well suited to the recognition of common property rights over knowledge because it generally seeks to individualize contributions to the development of science and technology. As a result, it is necessary to develop new tools to take into account the special nature of knowledge pertaining to plant genetic resources. This may include the vesting of property rights in legal entities, such as democratically elected local bodies.⁷³ Even in cases where contributions by specific individuals can be identified, it may not be appropriate to assign rights to specific individuals because the subject-matter of farmers' rights is closely linked to food

⁷⁰ See Article 12.3(d) of the International Treaty on PGRFA, *supra*, footnote 2.

⁷¹ Cf. Article 7(3), Panama, *Ley No. 20 (del régimen especial de propiedad intelectual sobre los derechos colectivos de los pueblos indígenas)*, 26 June 2000.

⁷² The identification of eligible farmers should not be unduly cumbersome. As identified by the Crucible Group, farmers' rights could be restricted to small-scale farmers defined according to criteria which include the percentage of their annual harvest in a particular crop which is consumed, the number of acres of land cultivated and the tonnes of agricultural goods produced. See Crucible II Group, *Seeding Solutions—Volume 2*, International Development Research Centre, Ottawa, 2001.

⁷³ Cf. Section 5 of the Draft Traditional Knowledge (Preservation and Protection) Bill, *supra*, footnote 69 which proposes the setting up of a Traditional Knowledge Trust in each *panchayat* in India.

security which is of direct interest to each and every individual in the local community and beyond, whether landowners, farmers, manual labourers and individuals not directly involved in agricultural production. In practice, farmers' rights can be linked to a registration system. However, while registering claims fosters better clarity, the recognition of farmers' rights should not be conditional upon registration. In other words, registration may act as a tool to ascertain existing claims but it should not constitute a condition for the recognition of the rights.⁷⁴

Thirdly, the introduction of farmers' rights constitutes an appropriate entry point to consider issues beyond the field of intellectual property. In fact, farmers' rights cannot be dissociated from concerns over agro-biodiversity management and biosafety. The management of agro-biodiversity presents specific difficulties in so far as diversity has historically been conserved and enhanced by farmers. The contribution of farmers in this context will, therefore, remain fundamental in the future, as widely acknowledged in legal and policy documents.⁷⁵ In the context of property rights, the question of agro-biodiversity management must be understood in a broader context. While farmers directly benefit from agro-biodiversity conservation, national governments and the global community also benefit in both direct and indirect ways. This calls for a sharing of conservation obligations on an equitable basis between all actors benefiting from the exploitation of agro-biodiversity. This burden should not only be imposed on farmers and local firms marketing seeds, foodstuffs and other crops, but also shared with international actors such as States, research institutions and private seed companies that benefit from these conservation activities. This has impacts on farmers' rights and farmers' agricultural management in so far as farmers cannot be expected, at the same time, to carry the burden of conserving diversity, enhancing agro-biodiversity and producing more food by adopting transgenic plant varieties.⁷⁶ This tends to reinforce the importance of farmers' rights, giving farmers control over their resources and knowledge with added incentives to conserve and enhance agro-biodiversity.

Another environmental dimension to farmers' rights is the biosafety angle. In a situation where the potential impacts of transgenic plant varieties is not fully ascertained, the international community and a number of States have promoted reliance on the precautionary principle with regard to the introduction of genetically modified plant varieties.⁷⁷ This indicates that there may be some environmental reasons, whether linked to concerns over loss of diversity in general or biosafety specifically, which may require the introduction of supplementary conditions to the

⁷⁴ This is the approach taken by the Costa Rica Biodiversity Law, 1998, at Section 82.

⁷⁵ See, for example, Article 9 of the International Treaty on PGRFA, *supra*, footnote 2. See also, Martin A. Girsberger, *Biodiversity and the Concept of Farmers' Rights in International Law—Factual Background and Legal Analysis*, 233, Peter Lang, Bern, 1999.

⁷⁶ Cf. FAO Commission on Plant Genetic Resources, *Revision of the International Undertaking—Analysis of Some Technical, Economic and Legal Aspects For Consideration in Stage II: Access to Plant Genetic Resources, and Farmers' Rights*, Doc. CPGR-6/95/8 Supp., 1995.

⁷⁷ See, for example, the Cartagena Biosafety Protocol, *supra*, footnote 42.

granting of IPRs on genetically modified plant varieties, or specific restrictions with regard to their use in specific localities or environments.⁷⁸

Fourthly, while farmers' rights and the protection of traditional knowledge remain new areas that the current IPR system has not previously explored, some specific links between the two can be found. One of the most interesting aspects of the existing IPR system in this context is the protection of geographical indications (GIs).⁷⁹ In the context of farmers' rights and traditional knowledge, GIs are of interest because they differ from other types of IPRs in so far as they are collective in scope. GIs offer an exclusive protection against outsiders to an indeterminate number of people within the region of protection. Protection through GIs may, therefore, provide an interesting avenue to foster protection for products manufactured within a specific area, while not restricting the number of rights holders within the area. Further, GIs do not impose any novelty tests, as in the patent system. In fact, they can specifically be used to protect traditional products as long as the particular characteristics of these products can be attributed to a specific geographical origin.⁸⁰ Another advantage of GIs is that they are not limited to a given method of production for a given product. This allows not only for different production methods to be covered under a given indication, but also for changes in production methods over time.⁸¹

CONCLUSION

The challenge of enhancing food security for each individual and each country around the world will require tremendous efforts on the part of all actors involved if malnutrition is to be eradicated. Food insecurity in developing countries has long been a concern, and is associated with a number of general and specific policy challenges. The development of genetically modified plant varieties and the introduction of IPRs in agriculture constitute two related and significant changes in the policy environment for addressing food security.

The actual implications of the introduction of IPRs in the agricultural sector in developing countries are yet to be ascertained given that legal frameworks are, in many cases, still in the process of being adopted and implemented. However, a number of points can already be made in the context of food security. Potential benefits of agro-biotechnology include the development of plant varieties that help to meet some of the challenges linked to existing food insecurity. Potential concerns include a number of socio-economic impacts as well as some environmental impacts, in particular with regard to the loss of agro-biodiversity and biosafety.

⁷⁸ Cf. Section 36 of the Thai Plant Varieties Protection Act, *supra*, footnote 64.

⁷⁹ See Part II, Section 3, of the TRIPS Agreement, *supra*, footnote 1.

⁸⁰ See, for example, Commission on Intellectual Property Rights, *Integrating Intellectual Property Rights and Development Policy*, CIPR, London, 2002.

⁸¹ David R. Downes, *How Intellectual Property could be a Tool to Protect Traditional Knowledge*, 25 Colum. J. Envtl. L. 253, 2000.

In practice, the TRIPS Agreement does not give developing countries the possibility to avoid the introduction of plant variety protection. However, the *sui generis* option constitutes an opportunity that developing countries can use to develop an IPR regime which suits their specific needs and which takes into account all their international obligations, such as commitments in environmental treaties, in agricultural treaties and in human rights treaties. The main challenge for developing countries is to adopt legal frameworks for the protection of knowledge which ensure that the introduction of IPRs in new areas of technology does not have negative impacts on the realisation of basic needs, such as basic food needs. In practice, developing countries are under significant pressure—both within and outside the WTO—to introduce forms of IPRs generally modelled on existing models developed in the North. Thus, the UPOV Convention has been promoted as an appropriate model for a *sui generis* plant variety protection regime. Even if a UPOV-style system is adopted, as has been the case in a number of countries during the past few years, developing countries cannot stop there. The protection of traditional knowledge in general—and in this specific case, traditional agricultural knowledge—must be enshrined in legal instruments. This constitutes a significant challenge because there is little by way of models that can be used to develop such frameworks; but the protection of traditional knowledge is probably the most important part of a plant variety regime for most developing countries.

Overall, the need to develop a legal framework that goes beyond traditionally recognised IPR regimes is based on a number of reasons. At a basic level, the introduction of IPRs in agriculture can only be justified if they foster food security, or in other words the realisation of the human right to food. There are a number of ways to foster food security. One of them includes the appropriation of knowledge related to plant varieties through property rights. In this scheme, which is promoted today at the international level, control over knowledge is only offered to state-of-the-art inventions. In fact, the introduction of property rights in agriculture should benefit all actors involved in agricultural management. This is the gap that developing countries must fill, given that their agricultural systems are often overwhelmingly dependent on the contributions of a significant number of small individual farmers, local farming communities and public-sector institutions, rather than private actors. In this situation, the development of farmers' rights is necessary not only for the benefit of farmers but also their countries. In fact, appropriately designed farmers' rights should provide benefits to farmers and farming communities, should foster sustainable agro-biodiversity management, should provide tools for governments to fight biopiracy and, overall, should provide a set of incentives to tackle food insecurity.

Such farmers' rights need not be envisaged as opposed to existing IPRs. They should be complementary, possibly overlapping forms of property rights, and, on the whole, they should foster—as do patents and plant breeders' rights—further incentives towards

the realisation of the human right to food. They should also avoid foreclosing opportunities for maintaining and enhancing what is left of the system of free exchange of germplasm at the international level which forms the basis of the work of the CGIAR, and finds its most recent expression in the setting up of the Multilateral System under the International Treaty on PGRFA.