
Environmental justice in the use, knowledge and exploitation of genetic resources

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1 Introduction

Access to and use of genetic resources have become increasingly contentious at the national and international levels over the past couple of decades. The importance of genetic resources in law and policy debates in recent years has largely been linked to their new-found economic importance in the context of the development of agricultural and pharmaceutical biotechnology. As a result, questions concerning transfers of and trade in genetic resources as well as questions concerning the protection of knowledge related to genetic resources have been given a lot of attention by policy-makers.

This has resulted in a flurry of new rules and regulations fostering the use of genetic resources, for instance, as a raw material for biotechnology products. In particular, the use of genetic resources in transgenic products has been encouraged by the progressive introduction in most countries of patents on life forms in the context of the implementation of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).¹

While legal incentives for the use of genetic resources in industrial applications have rapidly developed over the past couple of decades, much less has been done with regard to the protection of the rights and interests of the holders of genetic resources and associated knowledge concerning their useful characteristics. Nevertheless, a number of initiatives have been taken in different contexts. The 1992 Convention on Biological Diversity ('Biodiversity Convention') has been one of the focal points for addressing some of the concerns related to access to and use of genetic resources.² Rules and principles, such as prior informed consent concerning transboundary movement of genetic resources, have been introduced. Further, in the context of Article 8(j) of the Convention, concerns of indigenous peoples with regard to genetic resources have been debated, such as the *sui generis* protection of individuals' and groups' knowledge

¹ Agreement on Trade-Related Aspects of Intellectual Property Rights, Marrakech, 15 April 1994, 33 *International Legal Materials* (ILM) (1994) 197 (hereafter TRIPS Agreement).

² Convention on Biological Diversity, Rio de Janeiro, 5 June 1992, 31 ILM (1992) 818.

related to genetic resources.³ Finally, the Convention has been one of the most active frameworks where the question of benefit sharing has been debated leading to the decision to prepare the first binding legal instrument on access and benefit sharing by 2010.⁴

The development of rules concerning access to genetic resources, the sharing of associated benefits and the asymmetrical protection of knowledge all raise questions concerning the equity of existing legal frameworks. Two main issues arise in this context. First, the legal protection of knowledge as well as compensation mechanisms such as benefit sharing raise distributive justice concerns.⁵ Indeed, one of the main questions that arise concerns the uneven benefits that different contributors to knowledge creation receive in law. This raises the need to develop new conceptual bases for knowledge protection frameworks, something which can, for instance, be achieved through the development of *sui generis* protection of traditional knowledge.⁶ Secondly, existing and proposed knowledge protection frameworks have important international law dimensions either because they are adopted at the international level, as in the case of the TRIPS Agreement, or because they concern transboundary transactions. In the context of international law agreements, where different countries are in different situations with regard to their capacity to benefit from the legal framework in place, the concept of differential treatment needs to inform the development of these agreements.⁷ In other words, international legal frameworks in this field need to incorporate provisions that take into account that full reciprocity will not lead to results that are substantively equal and that specifically benefit developing country member states.

2 Access and benefit sharing

The question of access and benefit sharing refers to two distinct questions. The former refers to the conditions under which genetic resources and related knowledge can be obtained. The latter refers to a form of compensation meant to reward holders of genetic resources and related knowledge for their contribution to the development of products which are eventually commercialised by other actors, often in another country. In theory, the regulation of access and the introduction of a compensation system called benefit sharing are independent of each other. They are considered in the same section here because they have been discussed as a single subject in international policy-making circles for at least a decade.

³ See e.g. Section E, Decision VIII/5. Article 8(j) and Related Provisions, in Report of the Eighth Meeting of the Conference of the Parties to the Convention on Biological Diversity, UN Doc. UNEP/CBD/COP/8/31 (2006).

⁴ Decision VII/19 D, Access and Benefit-Sharing as Related to Genetic Resources (Article 15), in Report of the Conference of the Parties to the Convention on Biological Diversity, Seventh Meeting, UN Doc. UNEP/CBD/COP/7/21 (2004).

⁵ Aristotle 1991. ⁶ See section 3. ⁷ See generally Cullet 2003.

2.1 Access to genetic resources and associated knowledge

The issue of access to genetic resources as well as related knowledge concerns the conditions under which individual and collective holders of such resources or knowledge can control their transfer outside of their local environment. From an international law perspective, access refers to the conditions that states can put on the use of genetic resources and related knowledge found under their jurisdiction.

The introduction of access regimes is related to the increasing dissatisfaction in the 1980s with the open access system that prevailed at the time. On the one hand, countries seeking to develop agro-biotechnology products had started to push for the introduction and strengthening of patents on life forms at the international level.⁸ On the other hand, countries hosting most biodiversity, a large number of which are from the South, determined that the only immediate response they could give to the proposed commodification of knowledge was to propose restrictions on access to genetic resources found under their jurisdiction.

The Biodiversity Convention formalised what is in effect a new conception of equity in international law. The open access system that prevailed in the context of agricultural research was often *de facto* applicable for wild biodiversity, in view of the lack of specific national or international regulation. However, this system was replaced by a system where each developing country hosting genetic resources is given the right to control access by foreigners to its resources. This constituted a significant change which has generally been interpreted as being of benefit to developing countries in general. The reason is that the introduction of sovereign rights over biological resources gives countries of origin more control over the use that is made of resources found within their jurisdiction.

Even though the principle of sovereign rights has been accepted by all states parties to the Biodiversity Convention, this does not provide an unconditional right for countries of origin to restrict access to their resources. In fact, countries of origin have a duty to facilitate access to their resources because biodiversity is legally recognised as a common concern of humankind.⁹ More specifically, countries of origin have to ensure that there is a regulatory framework allowing users of genetic resources to access them. The specific operative legal principle for access is that of prior informed consent which implies that holders of genetic resources should give their approval to transboundary movements.¹⁰

The legal regime that prevails today at the international level gives countries of origin a fair measure of control over transboundary movements of genetic resources. This must be seen in the context of the search for increased commodification of research outputs, which includes the introduction of patents for transgenic seeds or plant breeders' rights for plant varieties that has until now benefited mostly

⁸ Cf. Hamilton 2001 at 88. ⁹ Biodiversity Convention, note 2 above, Art. 15 and preamble.

¹⁰ On prior informed consent, see *ibid.*, Art. 15(5).

countries, individuals and companies in the North. The introduction of an access regime constitutes one way to rebalance the legal framework in favour of countries of origin.

The equity dimension of the existing access regime is limited by at least two factors. First, the existing international law regime is unclear concerning access to knowledge. Thus, there are clear stipulations that the access regime applies to physical resources such as seeds, but there is much less clarity with regard to the knowledge embodied in seeds. In fact, the Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization specifically recognise that there is no congruence between access to genetic resources and access to related traditional knowledge which should be sought separately.¹¹ This is problematic because there are many cases where specific genetic resources are accessed because they are known to have specific characteristics or properties. These properties are what make the physical resource valuable from the point of view of the person accessing it. Further, in a situation where control over the final product, which may be derived from the genetic resource accessed, is mostly through intellectual property rights such as patents, it is important to ensure that not only the physical resource but also related knowledge is formally acknowledged in the access transaction. The existing draft of the proposed international legal regime seems to acknowledge this problem.¹²

Secondly, while the existing access regime gives countries of origin relatively strong rights to control transboundary movements, it does little for individuals and groups that are the actual holders of genetic resources and related knowledge. Some countries, like India, have interpreted the Biodiversity Convention mandate as the grant of a permission to governments to assert control over transboundary movements in genetic resources and related knowledge at the expense of individuals and groups that actually developed them.¹³ This tends to further weaken the position of farmers and other traditional knowledge holders that are denied rights of full control over their knowledge and physical resources.

2.2 *Benefit sharing*

Benefit sharing is a relatively new notion which has been developed as a consequence of the rapidly changing paradigm concerning claims over genetic resources, traditional

¹¹ Section 31, Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization, in Report of the Sixth Meeting of the Conference of the Parties to the Convention on Biological Diversity, UN Doc. UNEP/CBD/COP/6/20 (2002).

¹² The situation remains unclear because of the amount of bracketed text in the current draft. See Decision IX/12, Access and Benefit-sharing, in Report of the Eighth Meeting of the Parties to the Convention on Biological Diversity, Bonn, 19–30 May 2008, DOC. UNEP/CBD/COP/9/29.

¹³ The access process involves no more than the national and state authorities consulting local biodiversity management committees while taking decisions on access requests. Section 41(2), India, Biological Diversity Act, 2002, No. 18 of 2003, *Gazette of India Extraordinary* Part II, Section I (5 February 2003) (hereafter Biological Diversity Act – India).

knowledge and the strengthening of intellectual property rights to accommodate life patents. Benefit sharing is the response given to the fact that holders of genetic resources and traditional knowledge are not granted rights to control the use of their resources and knowledge but only rights to put conditions on access by outsiders. In other words, benefit sharing has evolved as an indirect recognition that traditional knowledge holders can, for instance, not directly benefit from the strengthening of the intellectual property rights system even where their knowledge constitutes the basis for a product or process which can be protected under existing intellectual property rights.

Benefit sharing is generally offered to actors who can at best negotiate the conditions under which their resources or knowledge are accessed. The situation of traditional knowledge holders under existing intellectual property rights systems needs to be compared with the situation of patent holders. The latter are in a position to stop others from using their inventions, can decide whether to license the invention to another individual or not and can independently commercialise the product without facing competition in the market place for the duration of the rights granted. In comparison, traditional knowledge holders do not have the same rights. In cases where the prior informed consent of traditional knowledge holders for accessing genetic resources or traditional knowledge is a legal requirement,¹⁴ the latter can be said to have a right to control access to their knowledge, especially if this also involves the right to deny or withdraw access.¹⁵ However, even in cases where prior informed consent is required from the holders themselves, the respective legal frameworks do not provide for any form of control after access has been granted. Benefit sharing is the compensation mechanism which has been introduced as an additional indirect control mechanism that prolongs the access regime.

Benefit sharing can be understood from two different perspectives. First, before the coming into force of the Biodiversity Convention, there was no international legal regime directly regulating transfers of genetic resources and traditional knowledge. As a result, bioprospecting took place in a legal vacuum. At best, parties involved would have signed a bilateral contract, as was the case in the Merck–INBio agreement which happened shortly before the entry into force of the Biodiversity Convention.¹⁶ At worst, as must have been the case in many situations before the 1990s, there was no contract at all. From this point of view, the institutionalisation of benefit sharing is an improvement which formalises the need to compensate holders of genetic resources and traditional knowledge for their contribution to the evolution of plant varieties for instance.

¹⁴ See e.g. Article 6, Peru, Law Introducing a Protection Regime for the Collective Knowledge of Indigenous Peoples Derived from Biological Resources, Law No. 27811, *Official Journal*, 10 August 2002 (hereafter Collective Knowledge Law – Peru).

¹⁵ See e.g. Section 7, Ethiopia: Proclamation 482/2006 to Provide for Access to Genetic Resources and Community Knowledge and Community Right, 2006.

¹⁶ Sittenfeld and Gámez 1993 at 69.

Secondly, benefit sharing can be seen as a response to the introduction and strengthening of life patents and the general move towards sovereign and private appropriation of physical resources and knowledge. Previously, at least in countries where patents on life forms and patents on products related to food were prohibited, there was no appropriation by either traditional knowledge holders or other actors since they could not get patents on any products related to food, such as seeds. Today and increasingly so in the future, patent applicants can assert rights over a range of products and processes which were previously unpatentable. This has not been accompanied by a similar change concerning traditional knowledge holders. In this sense, benefit sharing can be criticised as institutionalising the absence of property rights for traditional knowledge holders.

Benefit sharing is on the whole a tool which has been found acceptable to developed and developing countries, though for partly different reasons. For countries that have strong genetic engineering industries, benefit sharing is more restrictive than the pre-Biodiversity Convention system which would have allowed freedom to choose the mode of access and compensation. However, it was a necessary part of the bargain that led developing countries to accept the facilitated access provisions now in place. For countries of origin, benefit sharing has proved to be until now an avenue through which governments can acquire more authority towards other countries and towards holders of genetic resources and traditional knowledge. For countries of origin, benefit sharing has the advantage of providing a role for the state in managing genetic resources and the compensation that comes in return.

The proposal to share benefits has gained wide acceptance in principle. Nevertheless, there is little consensus regarding the specific benefits that should be offered in individual cases. As a result, existing frameworks do no more than list possible forms of benefits without ordering them hierarchically. The most usual form of benefits offered is a form of financial compensation. This can take the form of access fees, royalty payment, licence fees or contributions to be paid to special financial mechanisms set up for this purpose. Other proposed benefits include participation in the development of products or transfer of technologies such as novel technologies which may be developed on the basis of the resources or knowledge accessed. Other benefits which can also be shared include the training of local people, access to scientific information and institutional relationships to allow local or national institutions in the country of origin to foster their own research.

One of the ongoing problems is the difficulty to conceive of benefit sharing exclusively at the national level. This is because countries of origin are not in a position to impose extraterritorial measures on users. Therefore, an effective benefit sharing system for transboundary transactions must either involve an international law framework or be coordinated between all countries. Countries of origin can take measures at the point of access of the resources but it is often difficult to judge at the outset what exact use will be made of the resources and what benefits will be eventually derived. Further, even when an estimate is made, if respect for the benefit sharing arrangement

is not made a condition of patentability or commercialisation of derived products, it becomes much more difficult to enforce benefit sharing arrangements.

On the whole, benefit sharing can be seen as fostering a weak form of distributive justice in favour of provider countries. In certain cases, according to the legal frameworks adopted by specific countries or regions, benefits will reach individuals or communities that are the providers of the genetic resources or knowledge, but often the benefits will be channelled into general funds that are administered by the state.¹⁷ Further, at present benefit sharing is conceived mostly as a bilateral instrument between providers and users, and thus may contribute to asymmetrical negotiations between unequal 'partners'. Certain countries have taken into account the fact that contracts between a large university or company and a single farmer or a group of local farmers may lead to unsatisfactory results for the farmers. This is why the South African Biodiversity Act proposes, for instance, that negotiations should involve not only the holders themselves but also the government.¹⁸

Benefit sharing as a mechanism for compensation can be improved, for instance, through the adoption of a binding international regime. There is, in fact, hope that such a regime will be adopted by 2010 in the context of the Biodiversity Convention and that countries will be willing to widely accept it.¹⁹ However, even if an international legal regime is eventually adopted and implemented, there remain problems which are intrinsically linked to the concept of benefit sharing. Indeed, benefit sharing fails to address the imbalance built into the existing legal framework for the protection of knowledge. On the one hand, different options exist to appropriate the results of research undertaken in formal laboratories through intellectual property rights. On the other hand, the protection through rights frameworks for holders of traditional knowledge is at best still in its infancy. In other words, while benefit sharing is a form of compensation for the use of resources and knowledge, it does not address the much more important issue of the protection of traditional knowledge through rights frameworks.

3 *Sui generis* protection

Besides the forms of compensation that benefit sharing can offer, there have been efforts for a number of years to pursue more elaborate options to protect the interests of providers of genetic resources and traditional knowledge holders. One such option is the introduction of a special or *sui generis* regime for the protection of traditional knowledge. This has the advantage of seeking to conceptually put on a par the rights

¹⁷ See e.g. Section 27, National Biodiversity Fund, Biological Diversity Act – India, note 13 above; and Section 45, National Gene Fund, India, Protection of Plant Varieties and Farmers' Rights Act, 2001, No. 53 of 2001, *Gazette of India Extraordinary* Part II, Section 1 (30 October 2001) (hereafter Plant Variety Act – India).

¹⁸ Section 82, South Africa, National Environmental Management: Biodiversity Act 2004.

¹⁹ For the existing draft of the regime, see Draft International Regime, note 12 above.

granted to individuals and companies that benefit from the existing intellectual property rights regime and other holders of knowledge, such as farmers developing their own plant varieties or healers developing plant-based medicines.

Sui generis intellectual property protection has been the object of significant attention since the coming into force of the TRIPS Agreement.²⁰ This is linked to a negotiating compromise concerning plant variety protection whereby the TRIPS Agreement imposes the introduction of plant variety protection in all member states, but gives member states the possibility to choose the form of protection they want to introduce. Thus, Article 27(3)(b) specifically requires all member states to ‘provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any combination thereof’.²¹ The introduction of the *sui generis* concept reflects two broad elements. First, a number of countries in the North and the South rejected the compulsory introduction of plant variety patents. Secondly, negotiators did not manage to agree on one specific alternative to patents. As a result, TRIPS gives member states a margin of appreciation in determining how to implement their obligation to introduce plant variety protection.

The *sui generis* option constitutes a form of flexibility which is of some benefit to European countries that refused to introduce patents to protect plant varieties to maintain their existing system of plant breeders’ rights formalised under the International Convention for the Protection of New Varieties of Plants (UPOV).²² The UPOV Convention is a *sui generis* regime under the terms of Article 27(3)(b) of the TRIPS Agreement, but it is only one among many possible alternatives to patents on plant varieties that can be adopted by states. In fact, the lack of specificity of this clause means that the main theoretical beneficiaries of the existing flexibility are developing countries that wanted to introduce neither plant variety patents nor plant breeders’ rights. From this perspective, the *sui generis* option is a form of differential treatment in favour of developing countries that are given the liberty to decide which system of protection is best suited to their needs.

Over the past decade, a number of countries have attempted to take advantage of the flexibility offered by Article 27(3)(b). In particular, a number of countries determined that the introduction of plant variety protection laws provided an opportunity to formalise the notion of farmers’ rights. This is, for instance, reflected in the African Model Legislation for the Protection of Rights of Local Communities, Farmers, and Breeders and for the Regulation of Access to Biological Resources.²³

²⁰ Cullet 2005 at Chapter 8. ²¹ TRIPS Agreement, note 1 above.

²² International Convention for the Protection of New Varieties of Plants, Geneva, 19 March 1991 (Geneva: UPOV Doc. 221(E), 1996), also available at www.upov.int/en/publications/conventions/1991/pdf/act1991.pdf.

²³ African Model Legislation for the Protection of Rights of Local Communities, Farmers, Breeders and for the Regulation of Access to Biological Resources, endorsed by the Organization of African Unity in 2000, available at www.grain.org/brl_files/oau-model-law-en.pdf.

Debates around *sui generis* plant variety protection have largely been triggered by the necessity to introduce 'a' form of plant variety protection under the TRIPS Agreement. From an intellectual property protection point of view, one of the main contributions of more than a decade of thinking about plant variety protection has been the more prominent role given to farmers' rights. Nevertheless, *sui generis* plant variety protection need not be conceived only as an intellectual property protection mechanism. In fact, the reason why there was no consensus in the TRIPS Agreement negotiations over the introduction of patents over plant varieties is that agriculture has always been seen as a field that must be addressed separately. This is due to the fact that agriculture directly contributes to meeting humankind's food needs, to the links between agricultural production and environmental conservation and to the fact that agriculture remains the primary source of employment and livelihood in most of the South. As a result, plant variety protection provides an apt entry point not only to introduce farmers' rights but also to associate intellectual property protection with food security, agro-biodiversity conservation and sustainable use of resources as well as the realisation of the human right to food.

The introduction of a legal regime where farmers are given substantially the same rights as commercial breeders, as is the case under the Indian plant variety and farmers' rights legislation, constitutes a significant advance over a system of compensation like benefit sharing.²⁴ Such a *sui generis* system constitutes an acknowledgment that the contribution that farmers have made and are making to agriculture, food security and livelihoods is as important as that made by commercial actors. From a legal point of view, it also constitutes an attempt to put in perspective two different bodies of knowledge that have never been put on the same level. On the one hand, there is the knowledge that qualifies for protection under intellectual property rights such as patents and plant breeders' rights. On the other hand, there is every other knowledge which does not qualify for protection under existing intellectual property rights laws and is therefore deemed to be part of the public domain and freely available for all to use. This dichotomy is the root cause of existing imbalances that deprive farmers and other traditional knowledge holders of the legal means to control their own knowledge. One of the consequences of the absence of positive protection for traditional knowledge has, for instance, been a series of high-profile cases of knowledge appropriation through patents that was in fact public domain knowledge in other countries.²⁵ These cases of biopiracy have contributed to raising awareness about the need for benefit sharing, but the real underlying problem is the lack of knowledge protection, something that *sui generis* systems can contribute to remedying.

While the debate over *sui generis* intellectual property protection focused for several years mostly on plant variety protection, because of the specific need to comply with the TRIPS Agreement provisions, the issue is in fact much broader. It is not only plant variety-related knowledge which needs to be protected but all knowledge which is

²⁴ Plant Variety Act – India, note 17 above.

²⁵ On biopiracy, see Schuler 2004 at 159.

generally qualified as traditional knowledge. In the context of the TRIPS Agreement, traditional knowledge is knowledge which does not qualify for intellectual property rights protection. This includes, for instance, knowledge related to the medicinal properties of genetic resources and various aspects of the cultures of communities such as indigenous peoples.²⁶

At present, a few countries such as Peru and the Philippines have made attempts to introduce laws for the *sui generis* protection of traditional knowledge.²⁷ These are noteworthy efforts, since they indicate that there is scope to go beyond mainstream intellectual property rights frameworks that are fundamentally incapable of providing an answer to the interests and rights of farmer-innovators, local healers and individual or collective traditional knowledge holders in general.

Despite the efforts of selected countries to provide alternatives to the existing intellectual property rights system and to strengthen the position of traditional knowledge holders at the national level, such efforts can only be effective if they are supplemented by an international law level legal instrument. Indeed, many of the problems that have surfaced over the past fifteen years concern transfers of genetic resources and knowledge from the South to the North. As a result, while existing *sui generis* regimes constitute useful first steps in the development of alternative legal regimes, these must be complemented by regional and preferably international law level regimes that constitute an effective way to ensure greater fairness in knowledge-related protection regimes.

4 Equity for genetic resources and traditional knowledge

The existing legal regime for the protection of knowledge is largely imbalanced because it only rewards one particular type of contributor to knowledge, such as the person recognised as the inventor under patent law, and gives this person or entity exclusive or monopolistic control over the use of the knowledge. This is based on a conception of knowledge creation which privileges the person or entity that comes at the end of the production process and makes the final improvements to a product or process. It has been increasingly questioned whether this model is appropriate in the context in which it was developed, namely, industrial and post-industrial knowledge creation in the North, for instance, where 'overpatentability' has the potential to stifle innovation.²⁸ In any case, this model is an inappropriate tool to take into account the different

²⁶ For a definition put together in the context of WIPO, see e.g. WIPO, Composite Study on the Protection of Traditional Knowledge, IGC, Fifth Session, Doc. WIPO/GRTKF/IC/5/8 (2003), para. 61.

²⁷ Collective Knowledge Law – Peru, note 14 above; and The Philippines, An Act to Recognize, Protect and Promote the Rights of Indigenous Cultural Communities/Indigenous Peoples, Creating a National Commission on Indigenous Peoples, Establishing Implementing Mechanisms, Appropriating Funds Therefor, and for Other Purposes, 28 July 1997, Doc. S. No. 1728/H. No. 9125.

²⁸ Barton and Berger 2001, available at www.issues.org/17.4/barton.htm.

contributions to the development of a specific product like a transgenic seed that may have been made by the farmer developing the original farm-level variety, a national research institute working on the same variety and the scientists working for the multinational company that ends up patenting the transgenic seed derived from the farm-level variety. This is a problem which can surface at the national level as well as at the international level. In fact, it needs to be addressed concurrently at both levels because many governments of the South are not particularly keen to strengthen the rights of traditional knowledge holders. They would rather provide incentives for the commercial use of knowledge which seems to be a more attractive option in the short term. In other words, because of the specificities of intellectual property law which remains largely territorial in its practical application but is largely dominated by the minimum standards of the TRIPS Agreement, the justice implications of intellectual property law need to be addressed simultaneously at the national and international levels.

In view of the shortcomings of the existing legal regime, there is a need to consider alternative proposals. These must be conceived in such a way that they contribute to achieving differential treatment at the international level and distributive justice at the national level. In the context of an intricate subject that covers both the use of the physical resources and related knowledge, different suggestions can be put forward. This section does not seek to provide an overview of all possible proposals fostering substantive equality, but limits itself to examining three different options which may be considered separately or jointly.

4.1 Further commodification

One of the changes that have taken place over the past couple of decades is the increasing place given to the appropriation of physical resources and knowledge by private actors and by the state. This is reflected in the fast expanding scope of intellectual property rights protection that received a tremendous boost with the adoption of the TRIPS Agreement. This imposed, on all developing countries members of the WTO, the introduction of minimum standards of intellectual protection that were much higher than most national laws in the 1990s. Appropriation by the state is best reflected in attempts to progressively restrict the scope of the principle of the common heritage of humankind and the assertion of sovereign rights over biological and genetic resources.

Changes that have taken place over the past couple of decades make today's world a place where much more can be privately appropriated and owned than twenty years ago. Focusing on agriculture, the past couple of decades have seen the introduction of life patents in most developing countries. This has paved the way for the direct or indirect patentability of transgenic seeds as well as the introduction of plant breeders' rights for non-transgenic seeds in many countries. These are fundamental changes for

most developing countries where no intellectual property rights in agriculture existed before the adoption of the TRIPS Agreement.²⁹ The overall results of these changes is that the legal landscape has been completely modified. Today, commercial breeders and agro-biotechnology companies benefit from a number of options to protect their knowledge in most developing countries. These changes have not necessarily been accompanied by attempts to strengthen the rights of non-commercial holders of knowledge. As a result, in most countries farmers' knowledge is today legally part of the public domain that can be freely appropriated by anyone, while the knowledge protected by plant breeders' rights and patents is not freely available.

The inequity of a system which protects certain types of knowledge with exclusive or monopoly rights, while deeming all other knowledge to be part of the public domain that can be freely appropriated by anyone, has not gone unnoticed. The development of schemes of benefit sharing is in fact a response to this fundamental dichotomy between protectable and freely available knowledge. However, as noted above, benefit sharing has generally been conceived as a compensatory mechanism which does not address the underlying problem of knowledge protection.

The introduction of *sui generis* traditional knowledge protection, as attempted in certain countries, is a much more effective way to address this imbalance. However, while the conceptual framework for providing a more equal knowledge protection system is known, much more needs to be done to make it a reality. First, in the few countries that have attempted to introduce protection for farmer knowledge or indigenous people knowledge, the focus of the laws adopted is usually relatively specific. Thus, in India, it is only farmer knowledge which is protected and not traditional knowledge in general.³⁰ In Peru, it is only the collective knowledge of indigenous peoples which is protected.³¹

Secondly, it is insufficient to introduce national laws in a context where resources and knowledge are increasingly often the object of transboundary movements. While the Biodiversity Convention has introduced an international regime which binds all its member states, the same cannot be said with regard to the protection of knowledge. On the one hand, there is no uniformity in intellectual property rights standards of protection because countries can choose to go beyond the minimum requirements of the TRIPS Agreement. This implies that there is scope for asymmetrical knowledge appropriation in different countries. In other words, even if a developing country uses some of the restrictions on life patents allowed in the TRIPS Agreement, that same knowledge may still be patentable in the United States or another jurisdiction that does not have the same restrictions. On the other hand, the absence of an international treaty for the protection of farmer knowledge and traditional knowledge in general means that even traditional knowledge holders who can assert some rights

²⁹ For instance, most African countries, with the exception of a handful – Kenya, South Africa, Zimbabwe – had not even introduced plant breeders' rights before the adoption of the TRIPS Agreement.

³⁰ Plant Variety Act – India, note 17 above. ³¹ Collective Knowledge Law – Peru, note 14 above.

at the national level would not be in a position to effectively enforce them in other countries.

Overall, a system of traditional knowledge protection constitutes one way to redress imbalances in the existing legal regime for knowledge protection. This is, however, only one option which builds on the ongoing worldwide trend seeking to give specific actors such as states, private companies and individuals control over an increasing array of resources and knowledge.

4.2 An open access system

Among the various alternatives that can be proposed to a system which suggests further commodification as a response to existing commodification, a system that reverts back to open flows of resources and knowledge is one option. The best example is the open access system for plant genetic resources that constituted the basis for the development of an effective international research network on plant genetic resources for food and agriculture. The reason why agriculture was given this special treatment up to the 1980s was based on the direct link between agriculture and food security, or in other words between agriculture and the eradication of hunger.

A system which privileges open access for plant genetic resources and for improved seeds is legally based on the principle of common heritage of humankind.³² It recognises that there is a community of interests among all states to share their resources and knowledge to contribute to the development of plant varieties that can contribute to the eradication of hunger. The sharing of plant genetic resources is in nearly every country's interest since an overwhelming majority of countries are mostly dependent on germplasm from other countries for their main food crops.³³ Since there is a dichotomy between countries that are rich in agro-biodiversity and countries which have the resources to foster the development of new plant varieties, a consensus position that suits everyone has to provide not only for the free access to plant genetic resources but also to the improved varieties developed on the basis of existing varieties. This is in fact what was recognised in the International Undertaking of 1983.³⁴ The reason why this system promptly collapsed was that some developed countries had already invested at that time substantial sums in the development of agro-biotechnology. The refusal of these countries to accept a completely open system eventually led countries of origin to also reject an open system and assert sovereign rights over their genetic resources.

Today, the legal regime for plant genetic resources for food and agriculture embodied in the 2001 FAO International Treaty on Plant Genetic Resources for Food and Agriculture ('Plant Gene Treaty') reflects the various compromises that have been

³² MacDonald 1995. ³³ Flores Palacios 1997.

³⁴ International Undertaking on Plant Genetic Resources, Resolution 8/83, Report of the Conference of FAO, 22nd Session, Rome, 5–23 November 1983, Doc. C83/REP.

reached over the past two decades. On the one hand, states' sovereignty over plant genetic resources is recognised.³⁵ Further, the legitimacy of intellectual property rights over products derived from plant genetic resources is also recognised.³⁶ On the other hand, in recognition of the need to share plant genetic resources and in recognition of the fact that hunger is still prevalent in many parts of the world, certain plant genetic resources collections have been maintained in the public domain.³⁷

Existing compromises are unsatisfactory for most countries. First, developed countries would have wanted to keep all plant genetic resources freely available to ensure easier access for agricultural research centres or private companies. Secondly, developing countries would have wanted much stronger restrictions on intellectual property rights in agriculture to ensure easier access to products developed on the basis of plant genetic resources that originate in developing countries.³⁸ Thirdly, the Plant Gene Treaty provides limited additional mechanisms to recognise the contribution of farmer innovators. There is, for instance, a benefit sharing mechanism put in place. However, it provides that access to plant genetic resources is in itself to be seen as a major benefit. This leaves little place for farmers themselves to be compensated.³⁹ It also mentions farmers' rights, and much hope was pinned on the fact that negotiators would strengthen the clause adopted in the context of the revised International Undertaking in 1989.⁴⁰ However, the Plant Gene Treaty does not go further than largely restating the 1989 position and giving pointers to member states on ways in which they can develop farmers' rights regimes at the national level.⁴¹

On the whole, the Plant Gene Treaty fails to take a clear conceptual line. It advocates an open access position as traditionally advocated by the agricultural community but makes a number of significant compromises to ongoing commodification. An effectively open access system would therefore not look like the existing Plant Gene Treaty. Rather, it would seek to rebalance equities in a different way. An open access system would first be based on free flows of plant genetic resources as well as related knowledge. It would not differentiate between knowledge which is deemed 'traditional' or in the public domain and knowledge which can be protected by intellectual property rights. It would further not recognise barriers to transfers such as sovereign rights or intellectual property rights. As a result, there would be no place for any exclusive rights over knowledge.

Such a system is fundamentally opposed to the legal regime which is currently in place and which many countries want to further strengthen. There is therefore

³⁵ Article 10, International Treaty on Plant Genetic Resources for Food and Agriculture, Rome, 3 November 2001, available at <ftp://ftp.fao.org/ag/cgrfa/it/ITPGRe.pdf> (hereafter Plant Gene Treaty).

³⁶ Arts. 12(3)(f) and 13(2)(b)(iii). ³⁷ Art. 11. ³⁸ Cooper 2002.

³⁹ Plant Gene Treaty, note 35 above, Art. 13(1).

⁴⁰ Resolution 5/89, Farmers' Rights, Report of the Conference of FAO, 25th Session, Rome, 11–29 November 1989, Doc. C89/REP.

⁴¹ Plant Gene Treaty, note 35 above, Art. 9.

little chance that it will be accepted in the near future at the international level. It is nevertheless necessary to consider it as an alternative, given that the present system seems unable to ensure differential treatment among states and distributive justice among the different actors involved in agriculture and health. A fully open access system may have faults and shortcomings that will need to be addressed. Nevertheless, while an open access system may not be 'the' panacea for all equity-related issues in the field of plant genetic resources, historical experience shows that it did more for hunger than what the current commodified system is achieving. Thus, while major food-security-related gains were achieved through the development of high-yielding varieties of rice and other food crops until the 1980s,⁴² the agro-biotechnology industry is yet to develop products that are meaningful from a food security point of view.⁴³ While some useful genetically modified food crop will probably be developed in years to come, it is unwise to expect major hunger-related products because the type of incentives that drive the development of new plant varieties now are fundamentally different from what they were a couple of decades ago. Today, private companies do most of the research in new (genetically modified) plant varieties. The incentives that private companies have for the development of new plant varieties are the commercial benefits they can derive from them, largely through the protection offered by intellectual property rights. Given that intellectual property rights as conceived in the TRIPS Agreement make few concessions to food security and hunger,⁴⁴ it would be unwise to expect private companies to develop a significant number of new food crops directly targeted at people who suffer from hunger. This is, in fact, not something that the existing incentive system can be expected to produce even though some *ad hoc* measures, such as incentives for research focusing on orphan crops can be introduced within the existing intellectual property rights regime.

4.3 A broader conception of protection

One of the main shortcomings of the existing legal regime is to focus nearly entirely on the commercial benefits that can be derived from the use of genetic resources and the commercial aspects of knowledge related to genetic resources. This is the case in the context of intellectual property rights regimes whose main concern it is. In the context of the Biodiversity Convention and related instruments, broad statements that go beyond commercial aspects are repeatedly used, but the focus of access and benefit sharing negotiations has, for instance, been mostly on commercial and economic aspects. This is not surprising since governments are the main players

⁴² Sharma and Poleman 1994.

⁴³ The product in focus is the so-called golden rice. See Dawe, Robertson and Unnevehr 2002; and the website, www.goldenrice.org. On the controversies surrounding it, see Sharma 2005.

⁴⁴ See e.g. TRIPS Agreement, note 1 above, Arts. 7 and 8.

in the debates on access and benefit sharing, while the actual holders of resources and traditional knowledge are at best given a limited role. There are a number of good reasons why governments from the South and the North are focusing mostly on the economic and commercial aspects of the use of genetic resources and related knowledge. In part, access and benefit sharing can be reduced to one additional trade opportunity. Considering the importance given to international trade in the recent past as a vector of economic development, access and benefit sharing can be seen from a narrow perspective as contributing to the development opportunities created by international trade.

Nevertheless, the focus on the commercial aspects of the use of genetic resources and related knowledge is inappropriate given the subject matter. First, holders of genetic resources and traditional knowledge may have a number of reasons to seek to control the use made of their resources and knowledge. The lure of financial benefits is in many cases an important element which fits within the existing access and benefit sharing regime. Other reasons are, however, also present. These include cultural and religious reasons which may, for instance, prohibit the transmission of knowledge outside of the local context or may prohibit the use of certain religious symbols in other contexts.⁴⁵

More broadly, it cannot be assumed that all farmers, healers and other traditional knowledge holders want to control the use made of their resources and knowledge only because they hope to derive a commercial benefit. Further, it remains unclear how extensive overall commercial benefits may be. In fact, there are situations where people simply want to protect their resources and knowledge against its commercial exploitation by outsiders. Thus in the case of the biodiversity register of Pattuvam village in Kannur district (Kerala, India), the rationale for producing the register was partly to avoid biopiracy, partly to bring together all known knowledge and partly to allow exchange of information with other farming communities on a non-commercial basis.⁴⁶ In other words, the register was conceived as an instrument to rule out the commercial use of the resources and knowledge found within the village while not excluding the sharing of information and resources with other farmers or villages elsewhere.

Beyond the need to recognise the broad array of factors which may motivate people in seeking to control the use made of their knowledge and resources, it is necessary to consider the fact that access regimes, as they have been conceived until today, are insufficiently evolved. Indeed, at best, communities are given the right to refuse access to their resources and knowledge for cultural, spiritual, social, economic and other

⁴⁵ Concerning the use of symbols having an important role in aboriginal ceremonies on an Australian banknote, see *Terry Yumbulul v. Reserve Bank of Australia*, Federal Court of Australia Northern Territory District Registry, 25 July 1991, 21 IPR 481.

⁴⁶ Interview with Mohan Kumar, Pattuvam.

motives.⁴⁷ Yet, even in such a situation, the access regime remains a framework that gives comparatively limited rights to resource and knowledge holders.

Where the access regime is compared with existing intellectual property rights, the divide that separates the two becomes obvious. Nevertheless, this does not mean that a more evolved protection regime for genetic resources and traditional knowledge holders should be based on existing intellectual property rights regimes. In fact, they should preferably be conceived separately so that they can be much more broadly based. What is required is a novel way to consider the protection of genetic resources and knowledge. The main rationale for introducing a new type of protection is to acknowledge the fact that different subject matters require different approaches. Control over genetic resources and related knowledge may need to be partly privatised to ensure that the current holders of these resources and knowledge can control the use that is made of them. At the same time, the control regime that is introduced should recognise that such resources and knowledge are not always individually held and that a private property rights model may not be an appropriate model. Further, the control regime should be tailored to the specific uses made of genetic resources and acknowledge the direct link between genetic resources, the realisation of the rights to food and health and the livelihoods of hundreds of millions of people more generally. This broader framework constitutes one way to introduce more equity to the legal regime concerning genetic resources and related knowledge.

5 Conclusion

In the context of sustainable development law, it has been recognised that equity should be a primary consideration in the development of a just and effective legal regime. This is, for instance, reflected in the differential treatment which is granted to developing countries in various environmental treaties and in the development of the principle of common but differentiated responsibilities which provides an acknowledgment that the legal regime should take into account the different positions of different countries.⁴⁸

As far as access to genetic resources is concerned, the legal regime which is embodied in the Biodiversity Convention seeks to balance the different interests of provider and user countries by recognising the sovereign rights of countries of origin but imposing on them the introduction of a regime of facilitated access. No such attempt has yet been made at the international level with regard to knowledge related to genetic resources. At present, the legal regime is skewed in favour of certain types of knowledge and in favour of the commercial use of this knowledge. The existing intellectual property rights regime makes little, if any, space for the protection of any knowledge apart from the knowledge which can be protected through patents or plant breeders' rights.

⁴⁷ Art. 66, Costa Rica, Biodiversity Law, 1998.

⁴⁸ See Shelton, Brunnée, and Mickelson in, respectively, Chapters 3, 16 and 15 of this volume.

Efforts to redress imbalances in knowledge protection have already been made. These include the development of benefit sharing. This is limited by the fact that it is not directly linked to the grant of patents and plant breeders' rights at the international level.⁴⁹ The other option is the development of *sui generis* knowledge protection regimes. This constitutes a first step towards rebalancing the legal regime but can only be effective if an international legal framework to this effect is adopted.

While the introduction of *sui generis* farmer and traditional knowledge protection regimes provides an avenue to ensure more equitable outcomes in knowledge protection legal regimes, this must be looked at from a broader perspective. *Sui generis* protection is a response to the increasing commodification of knowledge at the international level and is conditioned by the development of an intellectual property rights framework. There exist alternatives, like the development of an open access framework which could provide similarly or more equitable outcomes.

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⁴⁹ The need for a link has been the object of contentious debates in the context of the TRIPS Council for several years, but no compromise has yet emerged. See e.g. a recent communication by a group of developing countries and the response of the United States. Council for TRIPS, Bolivia, Brazil, Colombia, Cuba, India and Pakistan, The Relationship Between the TRIPS Agreement and the Convention on Biological Diversity (CBD) and the Protection of Traditional Knowledge, WTO Doc. IP/C/W/459 (2005). Council for TRIPS, Communication from the United States, Art. 27.3(b), Relationship Between the TRIPS Agreement and the CBD, and the Protection of Traditional Knowledge and Folklore, WTO Doc. IP/C/W/469 (2006).

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