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Beyond Access and Benefit-Sharing: Lessons from the Law and Governance of Agricultural Biodiversity

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Abstract

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Keywords

agriculture, biodiversity, plant genetic resources, access, fair and equitable benefit-sharing, intellectual property rights, right to food, International Treaty on Plant Genetic Resources for Food and Agriculture, research and development

BEYOND ACCESS AND BENEFIT-SHARING: LESSONS FROM THE LAW AND GOVERNANCE OF AGRICULTURAL BIODIVERSITY

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Abstract

The concept of fair and equitable benefit-sharing emerged in the early 90s as a corollary to the principle of national sovereignty over natural and genetic resources. In the context of agricultural biodiversity use, it can be conceptualized in three ways: as a defensive tool to balance the injustices enshrined in the intellectual property rights system; as a development tool to reap part of the benefits of the emerging biodiversity market; and as an incentive, to reward and enable farmers' continued contribution to conservation. This paper seeks to assess the potential of the concept in operationalizing fairness and equity in agricultural biodiversity governance, in an increasingly complex legal and policy landscape of conflicting rights and policies. After explaining its emergence in the context of the evolving principles of governance of agricultural biodiversity, it concentrates on the Multilateral System of Access and Benefit-sharing established by the International Treaty on Plant Genetic Resources for Food and Agriculture, a system for the exchange of plant genetic resources and sharing of the benefits arising thereof, which is arguably the most sophisticated one in international law. On the basis of a technical examination of the ITPGR experience in the framework of IPR- and human rights-related processes, it identifies linkages, challenges and key lessons, which are useful for a wide range of processes within and beyond the international environmental law realm.

1. Introduction

Agriculture in the 21st century faces multiple challenges. It needs to produce more food to feed a growing population and more feedstocks for a potentially huge bioenergy market, with a smaller rural labour force. It needs to contribute to overall development in many agriculture-dependent developing countries. It needs to adopt more efficient and sustainable production methods in the face of reduced resources and increased environmental pressures. It also needs to adapt to climate change.¹ In other words, the world needs to produce more food, using fewer resources, in a more challenging environment and in a context of globalization, rapid urbanization, growing inequities and insecure land tenure.² Never before

¹ See FAO, 'Global Agriculture towards 2050' (2009).

² See International Assessment of Agricultural Knowledge, Science and Technology for Development, *Global Summary for Decision Makers* (2008), at 2-3.

has it been more important for humanity to generate, use fairly and share equitably the benefits of, agricultural knowledge, technology and production.

Agricultural biodiversity is the foundation of all agricultural production. As defined by the Convention on Biological Diversity (CBD),³ agricultural biodiversity is ‘a broad term that includes all components of biological diversity of relevance to food and agriculture, and all components of biological diversity that constitute the agricultural ecosystems, also named agro-ecosystems: the variety and variability of animals, plants and micro-organisms, at the genetic, species and ecosystem levels, which are necessary to sustain key functions of the agro-ecosystem, its structure and processes’.⁴

In contrast to ‘wild’ biological diversity for which humans are mainly a threat, agricultural biodiversity is largely a product of domestication: it has been shaped and maintained by human activities and management practices. Agricultural biodiversity is the outcome of interactions among genetic resources, the environment, and the knowledge, management systems and practices used by farmers. It represents an excellent example of the potential for positive interaction between humans and nature.⁵ It is inextricably linked both to the local environment and climate, and to human ingenuity and cultural preferences.

In the form of seeds or other plant propagating material, plant genetic resources for food and agriculture (PGRFA) are the necessary building blocks for crop improvement, and thus the world’s agriculture and food production. PGRFA are used either by farmers on farm aiming at maintaining the quality and yield of their crops or by professional breeders in ex situ facilities. As such, they play a crucial role in farmers’ livelihoods, agricultural development and world food security.⁶

The conservation of agricultural biodiversity is thus linked to farmers’ traditional and local knowledge and practices. Crucially, unlike other natural resources, genetic resources are renewable, and usually a very small quantity is required for breeding, research and development. The economic benefit is largely linked to the information contained in the resource, rather than the resource itself.⁷ In addition, the final product can be used as propagating material and vice versa. Another characteristic of agricultural biodiversity is that conservation and use are linked: conservation is performed through use, and unless an

³ UN Convention on Biological Diversity (CBD) 1992, 1760 UNTS 79.

⁴ CBD Decision V/5, *Agricultural biological diversity: review of phase I of the programme of work and adoption of a multi-year work programme* (2000), Appendix.

⁵ M. Pimbert, ‘Sustaining the Multiple Functions of Agricultural Biodiversity: Agricultural Biodiversity’ (FAO Background Paper, 1999), available at www.fao.org/docrep/x2775e/X2775E03.htm#P8_42 (last visited 20 May 2016).

⁶ FAO, *The Second Report on the State of the World’s Plant Genetic Resources for Food and Agriculture* (FAO, 2010).

⁷ C. Guneratne, *Genetic Resources, Equity and International Law* (2012), at 69.

agricultural variety is used, it cannot be conserved for more than a few decades before it eventually dies.⁸

As a subsistence strategy, smallholders have maintained a high genetic diversity of plants (and animals), as well as different location-specific bodies of traditional knowledge and farming practices. In these local seed systems, the primary emphasis is not on high yields and productivity, but on resilience and risk-adverse qualities in the face of harsh, variable and unpredictable conditions. Traditional varieties therefore serve as reservoirs of agricultural biodiversity, providing a much required safety valve in the face of pests, diseases and environmental stresses. In addition, as modern varieties often rely on the traits of traditional ones, traditional varieties and the knowledge they embody are considered vital resources also for scientific agricultural research.⁹ PGRFA are thus important both as an immediate resource, as they each have particular characteristics which are used in plant breeding for the development of improved varieties, and as an insurance against future needs and challenges.

The green revolution dramatically transformed agriculture through scientific and technological advances, including modern plant breeding. While food production increased, at least in certain parts of the planet, the inappropriate use of pesticides and fertilizers had serious impacts on the environment.¹⁰ In addition, the professionalization of breeding and the emergence of the commercial seed sector had both environmental and social consequences. The uniformization promoted by the spread of commercial varieties led to erosion of agricultural biodiversity (i.e. the loss of genetic diversity) and thus the vulnerability of agricultural production in the face of threats such as pests, diseases and extreme environmental and climatic conditions.¹¹ The generally high price of modern agricultural inputs, including seed, increased social inequalities regarding income and access to technology, and had impacts regarding land ownership and tenure.¹² At the same time, customary farmer practices and varieties and traditional seed systems were marginalized and in cases criminalized, in favour of scientific, public or corporate-led research supported by intellectual property rights (IPRs). These trends put at particular risk the livelihoods of smallholder farmers in developing countries.

In this context, international law related to agriculture needs to perform multiple functions and resolve multiple tensions lying at the intersection between environmental, trade,

⁸ ITPGR Secretariat, *Conservation and Sustainable Use under the International Treaty* (2012), at 29-35.

⁹ Tsioumani et al 'Following the Open Source Trail outside the Digital World: Open Source Applications in Agricultural Research and Development', 1 *Communication, Capitalism and Critique* (2016) 14.

¹⁰ International Food Policy Research Institute (IFPRI) 'Green Revolution: Curse or Blessing?' (2002).

¹¹ The Irish potato famine in the 1840s is often cited as an illustration of the risks of genetic erosion of agricultural varieties. See FAO, *Harvesting Nature's Diversity* (1993); G. Moore and W. Tymowski, *Explanatory Guide to the International Treaty on Plant Genetic Resources for Food and Agriculture* (2005), at 3-4.

¹² See K. Griffin, *The Political Economy of Agrarian Change: an Essay on the Green Revolution* (1974); K.A. Dahlberg, *Beyond the Green Revolution. The Ecology and Politics of Global Agricultural Development* (1979); B. Glaeser, *The Green Revolution Revisited: Critique and Alternatives* (2011).

development and human rights law. It needs to address the environmental degradation caused by modern agriculture, as well as a series of trade- and food safety-related concerns. It needs to ensure respect for human rights law, and nurture creativity and research and development for global food security, while ensuring agricultural biodiversity conservation. In that regard, it needs to acknowledge and enable the contribution of both smallholder farmers and professional breeders - two sets of actors which may require different sets of measures.

In an increasingly complex legal and policy landscape of conflicting rights and policies, this paper seeks to analyse the concept of *fair and equitable benefit-sharing*¹³ in the context of international law and governance of agricultural biodiversity, with focus on plants,¹⁴ and assess its potential in operationalizing fairness and equity. After explaining emergence of the concept in the context of the evolving principles of governance of agricultural biodiversity, it concentrates on the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR),¹⁵ which refers prominently to the fair and equitable sharing of benefits arising from the use of genetic resources among its objectives¹⁶ and has established a Multilateral System for access to and benefit-sharing from the use of plant genetic resources. Although this system is arguably the most sophisticated one in international law, its exploration seems to be confined within the small circle of academics and practitioners dealing specifically with the law and policy of genetic resources for food and agriculture¹⁷ and has mostly focused on the implications of IPRs for conservation and sustainable use of agricultural biodiversity.¹⁸ While

¹³ See Tsioumani, 'Exploring Benefit-Sharing from the Lab to the Land (Part I): Agricultural Research and Development in the Context of Conservation and Sustainable Use of Agricultural Biodiversity', *Edinburgh School of Law Research Paper No. 2014/44*, available at:

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2524337 (last visited 19 January 2016).

¹⁴ International law of relevance to other sectors genetic resources for food and agriculture, including domesticated animals, forest trees, fish and other aquatic organisms, micro-organisms and invertebrates, is still at its infancy.

¹⁵ International Treaty on Plant Genetic Resources for Food and Agriculture, adopted through FAO Conference Resolution 3/2001.

¹⁶ ITPGR Article 1(1).

¹⁷ M. Halewood, I. Lopez Noriega and S. Louafi (eds), *Crop Genetic Resources as a Global Commons: Challenges in International Law and Governance* (2013); E.C. Kamau and G. Winter, *Common Pools of Genetic Resources: Equity and innovation in international biodiversity law* (2013); and C. Guneratne, *supra* note 7.

¹⁸ See S. Biber-Klemm and I. Cottier (eds), *Rights to Plant Genetic Resources and Traditional Knowledge: Basic Issues and Perspectives* (2005); C. Chiarolla, *Intellectual Property, Agriculture and Global Food Security* (2012); D. Leskien and M. Flitner, *Intellectual Property Rights and Plant Genetic Resources: Options for a sui generis system* (1997); C. Correa, 'Access to Plant Genetic Resources and Intellectual Property Rights' (FAO CGRFA Background study paper no 8, 1999); L.R. Helfer, *Intellectual Property Rights in Plant Varieties: International legal regimes and policy options for national governments* (2004); C. Lawson, 'Patents and Plant Breeder's Rights over Plant Genetic Resources for Food and Agriculture' 32 *Federal Law Review* (2004) 107; K. Raustiala and D.G. Victor, 'The Regime Complex for Plant Genetic Resources' 58 *International Organization* (2004) 277; F. Yamin, 'Intellectual Property Rights, Biotechnology and Food Security' (IDS Working Paper 203, 2003), available at www.ids.ac.uk/publication/intellectual-property-rights-biotechnology-and-food-security (last visited 31 May 2016); S. Oberthur et al, 'Intellectual Property Rights on Genetic Resources and the Fight against Poverty' (Study requested by the European Parliament, 2011); C. Oguamanam 'Regime Tension in the

acknowledging that IPRs are certainly a big part of the picture, this paper aims at drawing general lessons for the application of fair and equitable benefit-sharing at the inter-state level.¹⁹ It explores linkages between the ITPGR and other instruments²⁰ and areas of international environmental and human rights law;²¹ assesses the potential of the concept to operationalize fairness and equity in agricultural and rural development for global food security; and identifies challenges and key lessons which can be useful for a wide range of processes within and beyond the international environmental law realm.

Against this background, the next section will examine the evolution of principles regarding the governance of plant genetic resources for food and agriculture (PGRFA),²² as the context for the emergence of the concept of fair and equitable benefit-sharing.

2. The Evolution of the Global Governance of Plant Genetic Resources

PGRFA have been exchanged freely and widely for centuries. Agricultural development throughout history since the earliest crop domestications is based on farmers' open collective systems of innovation and conservation through sharing and use.²³ During these early times, before the privatization of seed and the emergence of exclusive technological and legal protection enforced through the use of hybrid seeds²⁴ and IPRs, the benefits were the

Intellectual Property Rights Arena: Farmers' Rights and Post-TRIPS Counter Regime Trends' 29 *Dalhousie Law Journal* (2006) 413.

¹⁹ On the conceptualization of fair and equitable benefit-sharing at the inter-State and intra-State level, see Morgera 'An International Legal Concept of Fair and Equitable Benefit-Sharing', *University of Edinburgh School of Law Research Paper 2015/20*, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2633939 (last visited 19 January 2016).

²⁰ A nascent body of academic literature assesses the linkages of the ITPGR with the 2010 Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the CBD. See J. Cabrera Medaglia et al, 'The Interface between the Nagoya Protocol on ABS and the ITPGRFA at the International Level' (2013), available at <http://www.fni.no/pdf/FNI-R0113.pdf> (last visited 31 May 2016); C. Chiarolla, S. Louafi and M. Schloen, 'An Analysis of the Relationship between the Nagoya Protocol and Instruments related to Genetic Resources for Food and Agriculture and Farmers' Rights' in E. Morgera, M. Buck and E. Tsioumani (eds), *The 2010 Nagoya Protocol on Access and Benefit-sharing in Perspective: Implications for International Law and Implementation Challenges* (2013), at 83.

²¹ In particular the potential development of systems for multilateral benefit-sharing under the Nagoya Protocol Article 10 (Global Multilateral Benefit-sharing Mechanism) and discussions on benefit-sharing from the use of marine genetic resources, held within the framework of the UNGA Working Group on marine biodiversity beyond areas of national jurisdiction. See E. Morgera, E. Tsioumani and M. Buck, *Unraveling the Nagoya Protocol: A Commentary on the Nagoya Protocol on Access and Benefit-sharing to the Convention on Biological Diversity* (2014).

²² Defined in ITPGR Article 2 as 'any genetic material of plant origin of actual or potential value for food and agriculture.'

²³ See Halewood, Lopez Noriega and Louafi, 'The Global Crop Commons and Access and Benefit-sharing Laws' in M. Halewood, I. Lopez Noriega and S. Louafi, *supra* note 17, at 2.

²⁴ Progeny grown from the seed of hybrid crops generally do not perform well, and farmers cannot create, maintain, and cross the parental lines. As a result, farmers are required to return each growing season to suppliers of hybrid seed. Halewood, 'What kind of goods are plant genetic resources for food and agriculture?'

resources themselves and benefit-sharing was thus translated into resource-sharing. In these traditionally open-access and unrestricted exchange systems, PGRFA were conceived of, and treated like, public goods.²⁵ Exchanges were regulated on a customary basis, largely at the local level, and included both informal ones and more organized systems, such as seed fairs and community seed banks.

A series of historic events led to the transformation of agriculture and the global redistribution of PGRFA. Colonization resulted in a vast flow of agricultural species, mainly from the Americas to Europe and from South to North. Botanic gardens and other *ex situ* facilities were established, mainly in the North, which stored samples of agricultural varieties coming mainly from developing countries, the centres of domestication of most major agricultural crops. The green revolution in the 1960s and the beginning of scientific breeding, later intensified through genetic engineering, came hand in hand with IPRs protecting modern varieties and the spread of monocultures, but also the first understanding of the risks of genetic erosion. These events provided the context for the conceptualization of PGRFA and their benefits for humanity as global public goods, and thus the need for international regulation.

FAO held the first technical conference on plant genetic resources in 1967. The aim was to draw attention to the impacts of genetic erosion, agree on collective conservation actions, as well as ensure a predictable flow of samples for the development of improved varieties.²⁶ The conference succeeded in placing PGRFA on the international agenda, but reached no agreement with regard to coordinated actions.²⁷ The first institutionalized international structure on PGRFA conservation and management, the Consultative Group on International Agricultural Research (CGIAR), materialized as a result of a World Bank initiative.²⁸ The CGIAR was created in 1971 and eventually gathered several international agricultural research centres under its auspices.²⁹ These centres stored a large percentage of the world's

Towards the identification and development of a new global commons' 7 *International Journal of the Commons* (2013) 278, at 289.

²⁵ *Ibid*, at 282. In economic theory, a public good is a good that is non-excludable and non-rivalrous, in the sense that individuals cannot be effectively excluded from use, and use by one individual does not reduce availability to others.

²⁶ See Halewood, Lopez Noriega and Louafi, *supra* note 23, at 4; and Scarascia-Mugnozza and Perrino 'The History of *ex situ* Conservation and Use of Plant Genetic Resources', in J.M.M. Engels et al (eds), *Managing Plant Genetic Diversity* (2002), 1, at 5.

²⁷ Halewood, Lopez Noriega and Louafi, *supra* note 23, at 4.

²⁸ The CGIAR was co-sponsored by FAO and UNDP. The potential leadership role of the World Bank and/or FAO was the subject of lengthy debate. See Farrar, 'The Consultative Group for International Agricultural Research' (Case Study for the UN Vision Project on Global Public Policy Networks, 1999), available at http://old.gppi.net/fileadmin/gppi/Farrar_Ag.pdf (last visited 31 May 2016), at 4-5; S. Özgediz, *The CGIAR at 40: Institutional Evolution of the World's Premier Agricultural Research Network* (2012), at 1-3.

²⁹ CGIAR website, available at <http://www.cgiar.org/> (last visited 9 February 2016).

agricultural germplasm,³⁰ which had historically flowed from developing to developed countries.

The CGIAR promoted *ex situ* conservation of crops of agro-economic value, virtually excluding *in situ* conservation methods, such as those exercised by farmers on farm. This choice was in accordance with the conclusions of the 1967 conference³¹ and arguably in line with the priorities of the green revolution at the time, which prioritized the development of high-yielding varieties of main agricultural crops over conservation of genetic diversity. In addition, 'development' has traditionally been perceived as a process of technological substitution occurring in industrialized countries. Farmers' traditional practices and the breeding of traditional crop varieties on farm were assumed to be incompatible with this process.³²

At the time, international law was silent with respect to the conditions for access to and use of PGRFA, both *in situ* and in the CGIAR system; similarly, most national genebanks did not regulate access to their samples.³³ PGRFA were thus considered *de facto* to be in the public domain, available to anyone for any purpose, with no restrictions and no obligation to share benefits or participate in their conservation and stewardship.³⁴

Still, the CGIAR system has traditionally had a strong policy of making their resources and research results freely available as international public goods.³⁵ CGIAR has been compared to an 'open-source' system, the benefits of which circulate not only among its users but flow also to humanity at large, due to its characteristics: free distribution and redistribution of the original material and research results, full sharing of related information, and non-discrimination in participation. In addition, IPRs on research results, if acquired, would not prevent further use for research purposes.³⁶ Data indicates that low-income countries were

³⁰ Fowler, Smale and Gaiji, 'Germplasm Flows between Developing Countries and the CGIAR: An Initial Assessment' (Global Forum on Agricultural Research Technical Report, 2000), 1; Chiarolla, *supra* note 18, at 9.

³¹ Halewood, Lopez Noriega and Louafi, *supra* note 23, at 4; R. Pistorius, *Scientists, Plants and Politics: A History of the Plant Genetic Resources Movement* (1997), at 33.

³² Aoki "'Free Seeds, not Free Beer": Participatory Plant Breeding, Open Source Seeds, and Acknowledging User Innovation in Agriculture', 77 *Fordham Law Review* (2009), 2276, at 2298, who cites S. Brush, *Farmers' Bounty: locating crop diversity in the contemporary world* (2004), at 196-198 and C. Fowler, *Unnatural Selection: Technology, Politics and Plant Evolution* (1994).

³³ Halewood, Lopez Noriega and Louafi, *supra* note 23, at 12. 'Germplasm' refers to samples of genetic resources, such as seeds, pollen, sperm or individual organisms, held *in situ* or in *ex situ* collections such as genebanks. Genebanks are the main providers of germplasm for research and development purposes, as it is easier, safer and less costly than access *in situ*.

³⁴ *Ibid*, at 12.

³⁵ Ryan, 'International Public Goods and the CGIAR Niche in the R for D Continuum: Operationalizing Concepts' in CGIAR Science Council, *Positioning the CGIAR in the Research for Development Continuum* (2006), available at <ftp://ftp.fao.org/docrep/fao/009/a0839e/a0839e00.pdf> (last visited 30 May 2016).

³⁶ Byerlee, Dubin, 'Crop Improvement in the CGIAR as a Global Success Story of Open Access and International Collaboration' 4 *International Journal of the Commons* (2009) at 452, available at www.thecommonsjournal.org/index.php/ijc/article/view/147/113 (last visited 30 May 2016).

net beneficiaries of the system: developing countries were substantial *recipients* of germplasm samples from the CGIAR system.³⁷

By prioritizing *ex situ* conservation and scientific breeding of high-yielding varieties to serve the needs of the green revolution however, the CGIAR model at the time promoted monocultures and contributed to genetic erosion of agricultural biodiversity. In addition, it pushed for global application of a 'western' type of agricultural development, failing to acknowledge local conditions, needs and capabilities, and ignoring farmers' practices and traditional varieties around the globe. Developing countries and farming communities were thus treated indeed as *recipients* of agricultural development as understood by developed countries and scientists, rather than as partners in innovation.

Rising tensions about IPRs and perceived inequities concerning who bore the cost of conservation and who benefitted more from its use – arguably private companies in developed countries³⁸ - challenged the CGIAR practices. Concerns about the risk of the commodification of PGRFA intensified as a result of the case of *Diamond vs. Chakrabarty* in the US,³⁹ which opened the way to the *patenting* of living organisms. The strengthening of IPR protection, to be addressed below, can be seen as catalyzing the international regulation of PGRFA. Very soon, questions related to the legal status of the collections held by the CGIAR centers and genebanks in developed countries were raised with concern: farmers and governments in developing countries began to realize that the introduction of IPRs resulted in a major asymmetry, noting that 'their raw materials were to be exchanged freely while patents were to be placed upon the finished varieties',⁴⁰ restricting their availability. This was considered as *unfair* and *inequitable* or at least *morally unjust* from the perspective of provider countries and farmers. It was also a major attack to the previous treatment of PGRFA and related knowledge as public goods. Following the acknowledgment of the need for some form of legal arrangement regarding access to stored germplasm, the International Undertaking on Plant Genetic Resources for Food and Agriculture was adopted.

A International Undertaking and the Principle of Common Heritage

³⁷ Fowler, Smale and Gaiji, *supra* note 30, at 8.

³⁸ Halewood, Lopez Noriega and Louafi, *supra* note 23, at 5.

³⁹ US Supreme Court Decision *Diamond vs. Chakrabarty* (1980) 447 US 303, 310, 206 USPQ 193, 197. See, among many, Kevles 'Ananda Chakrabarty Wins a Patent: Biotechnology, Law, and Society' 25 *Historical Studies in the Physical and Biological Sciences* (1994) 1, at 111; Carolan 'The Mutability of Biotechnology Patents' 27 *Theory, Culture and Society* (2010) 1, at 110; Sease 'From Microbes, to Corn Seeds, to Oysters, to Mice: Patentability of New Life Forms' 38 *Drake Law Review* (1989) at 551; and Jasanoff 'Ordering Life: Law and the Normalization of Biotechnology' 17 *Notizie di Politeia* (2001), 62, at 34.

⁴⁰ Mooney, 'The Law of the Seed: Another Development and Plant Genetic Resources' 1 *Development Dialogue* (1983), at 24, available at <http://www.daghammarskjold.se/publication/law-seed-another-development-plant-geneticresources/> (last visited 30 May 2016). Mooney cites incidents around the world indicating the growing unwillingness of local officials in developing countries to provide access to germplasm.

The non-binding International Undertaking constituted the first attempt to regulate PGRFA in international law. Adopted by the FAO Conference in 1983,⁴¹ and despite the change in dynamics associated with the introduction of IPRs, the Undertaking attempted to institutionalize the pre-existing regime of free access to, and exchange of, PGRFA, as well as the utilitarian approach of the conservation of crops of major agronomic interest. It sought to ensure that ‘plant genetic resources of economic and/or social interest, particularly for agriculture, will be explored, preserved, evaluated and made available for plant breeding and scientific purposes,’ based on the ‘universally accepted principle that plant genetic resources are a *heritage of mankind* and consequently should be available without restriction.’⁴² Significantly, the principle of common heritage would cover *all* plant genetic resources, including ‘newly developed varieties.’⁴³ The initial strategic and legal response was thus not to restrict access or share the benefits arising from protected varieties, but to declare that all plant genetic resources, both traditional and commercial plant varieties would be treated as common heritage and be freely accessible to farmers and breeders around the world.⁴⁴ This –retrospectively radical– approach can be explained in the light of the asymmetry introduced by IPRs: the main problem was not that seed companies were obtaining and using PGRFA for free, or even that they were selling seed, but that they were restricting access to and preventing the use of materials that, as a matter of reciprocity, ought to have been shared.⁴⁵

The principle of common heritage has traditionally been applied in the context of the UN Convention on the Law of the Sea (UNCLOS)⁴⁶. Under UNCLOS, the principle of common heritage requires a series of elements, including that: resources cannot be appropriated to the exclusive sovereignty of States; they must be conserved and exploited for the benefit of mankind; and they are subject to a unique international institution that embodies a multilateral shared-management and benefit-sharing machinery.⁴⁷ The Undertaking, on the other hand, leaves it to the responsibility of national governments to ensure the exploration and exchange of plant genetic resources in the interest of all mankind, and the *equitable and unrestricted distribution of the benefits of plant breeding*.⁴⁸ In addition, the Undertaking does not create an international management institution, but calls for an *internationally coordinated network* of centers, including the pre-existing CGIAR centers, which would now

⁴¹ FAO Resolution 8/83.

⁴² International Undertaking Article 1 (emphasis added). Resolution 4/89 later clarified that ‘plant genetic resources are a common heritage of mankind to be preserved, and to be freely available for use, for the benefit of present and future generations.’ On the principle of common heritage, see K. Baslar, *The Concept of the Common Heritage of Mankind in International Law* (1998); Noyes ‘The Common Heritage of Mankind: Past, Present and Future’ 40 *Denver Journal of International Law & Policy* (2011), at 447.

⁴³ International Undertaking, Article 2(1).

⁴⁴ Kloppenburg, ‘Re-purposing the Master’s Tools: The Open Source Seed initiative and the Struggle for Seed Sovereignty’ 41 *The Journal of Peasant Studies* (2014) 6, 1225, at 1232-1237; Aoki, *supra* note 32, at 2279-2280.

⁴⁵ Kloppenburg, *supra* note 44, at 1237.

⁴⁶ UNCLOS, 1833 UNTS 3; 21 ILM 1261 (1982).

⁴⁷ P. Birnie, A. Boyle and C. Redgwell, *International Law and the Environment* (2009), at 128-130 and 197.

⁴⁸ International Undertaking, Preamble.

operate under the auspices of the FAO and assume the responsibility to hold PGRFA collections ‘for the benefit of the international community and on the principle of unrestricted exchange’.⁴⁹

The difference in application of the common heritage principle may be attributed to a series of factors, including the long-standing status quo regarding unrestricted exchanges of PGRFA and the importance of continued exchanges for food security, as well as to the relatively low technological capacity required for plant breeding (at least in traditional forms). In addition, the principle of common heritage in the UNCLOS context was designed to apply to *non-living resources*, thus rivalrous and non-renewable, *beyond* the limits of national jurisdiction, in contrast to PGRFA, which are living, renewable and non-rivalrous resources, found within the territory of States.

The framework established by the Undertaking sought to benefit humanity as a whole, noting that ‘the overall activity within the Undertaking ultimately ensures a significant improvement in the capacity of developing countries for the production and distribution of improved crop varieties, as required to support major increases in agricultural production, especially in developing countries.’⁵⁰ As the distribution of the benefits of plant breeding was left to the responsibility of national governments, no mechanism was established to address the needs of specific fractions of humanity, for instance the most vulnerable or less equipped for agricultural research and development. The absence of formal benefit-sharing arrangements can be explained in the light of the strong belief that the substantial benefits linked to the unrestricted exchange and the CGIAR centres’ open-access policy would flow to developing countries in the form of distribution of PGRFA and related information. In addition, most agricultural research at the time was conducted by public institutions, and the results of the work were shared.⁵¹ Noble in its intentions, the architecture seemed to ignore the global inequities regarding distribution of the infrastructures, knowledge and skills, which are necessary to make use of an open system such as the one created by the Undertaking.⁵² At the same time, it revealed what may be the central weakness of the common heritage approach: that it is largely motivated by States’ desire for access to resources rather than by genuine community interest in their protection.⁵³

⁴⁹ International Undertaking Article 7(a).

⁵⁰ International Undertaking, Article 7(h)(ii).

⁵¹ ‘It was a more naive and innocent world,’ as noted by Rose, ‘The International Undertaking on Plant Genetic Resources for Food and Agriculture: Will the Paper be Worth the Trees?’ in N. Stoianoff (ed), *Accessing Biological Resources: Complying with the Convention on Biological Diversity* (2004), at 55. See also Bordwin, ‘The Legal and Political Implications of the International Undertaking on Plant Genetic Resources’ *12 Ecology Law Quarterly* (1985), at 1053.

⁵² See Louafi, Welch, ‘Open Systems Versus Strong Intellectual Property Rights: Disentangling the Debate on Open Access for Meeting Global Challenges in Life Science’ in J.Y. Grosclaude, L Tubiana and R.K. Pachauri, *A Planet for Life 2014: Innovation for Sustainable Development* (2014), at 145; Aoki, *supra* note 32. 2009.

⁵³ Brunnée, ‘Common Areas, Common Heritage, and Common Concern’ in D. Bodansky, J. Brunnée, and E. Hey, *The Oxford Handbook of International Environmental Law* (2008), 551, at 558.

The International Undertaking did not resolve the impasse between developed and developing countries largely associated with IPRs and equity-related concerns. Some developed countries signed it with reservations,⁵⁴ reluctant to allow the principle of common heritage to apply to modern varieties, and giving priority to IPRs. Developing countries, in turn, considered impractical the attempt to apply the principle of common heritage against IPRs. Identifying themselves as providers and thus owners of genetic resources, they pushed for the principle of national sovereignty over natural and genetic resources, eventually embedded in the CBD.

The emergence of IPRs can thus be seen as *the* catalyst for the radical shift in the global governance of genetic resources: from the principle of common heritage to the principle of national sovereignty. These two trends in the ownership of genetic resources, private and national, will be briefly examined below.

B Intellectual Property Rights and the Privatization of Genetic Resources

IPRs are supposed to foster and reward creativity and innovation by protecting inventions of the mind,⁵⁵ including those aiming to address global challenges, such as food security. The types mainly in use in the field of agricultural development are plant breeders' rights and patents. IPRs have been widely criticized as designed to suit the needs and agricultural production systems of developed countries. They have been associated with reducing the developmental choices of developing countries, intensifying control by agrochemical companies, raising the cost of agricultural inputs, and risking the food security, rights and livelihoods of vulnerable groups, including smallholder farmers and indigenous peoples.⁵⁶

Plant breeders' rights are historically the first to appear, in association with the emergence of scientific plant breeding at the times of the green revolution in the 1960s. They were established by the 1961 International Convention for the Protection of New Varieties of Plants (UPOV Convention), which promoted a system of private ownership 'with the aim of

⁵⁴ Canada, France, Germany, Japan, New Zealand, Switzerland, the United Kingdom, and the United States.

⁵⁵ See WIPO, 'What is Intellectual Property' available at www.wipo.int/about-ip/en/ (last visited 30 May 2016). In economic terms, the effect of IPRs is to transform a 'non-rival public good' (knowledge) into a good subject to private control.

⁵⁶ Correa 'Sovereign and Property Rights over Plant Genetic Resources' *FAO Background Study Paper* (1994); G. Dutfield, *Intellectual Property Rights, Trade and Biodiversity* (2000); Yamin, *supra* note 18; Commission on Intellectual Property Rights, *Integrating Intellectual Property Rights and Development Policy* (2002), at 58–61; F. Shaheed, UN Special Rapporteur in the Field of Cultural Rights, *Report on the Right to Enjoy the Benefits of Scientific Progress and its Applications* (2012) UN Doc A/HRC/20/26; O. de Schutter, UN Special Rapporteur on the Right to Food, *Seed Policies and the Right to Food: Enhancing Agrobiodiversity and Encouraging Innovation* (2009) UN Doc A/64/170; For a critical reading of global IPR development in general, see P. Drahos, J. Braithwaite, *Information Feudalism: Who Owns the Knowledge Economy?* (2002); P. Drahos, *A Philosophy of Intellectual Property* (1996).

encouraging the development of new varieties of plants for the benefit of society.’⁵⁷ Standards adopted under the UPOV Convention, which was amended in 1972, 1978, and 1991, provide protection to novel (in terms of prior commercialization) and distinct, uniform and stable plant varieties. As a result of the novelty requirement, farmers’ varieties have been regarded as ‘prior art’ within the public domain. In addition, farmers’ varieties are neither uniform nor stable, thus they cannot satisfy the UPOV criteria for protection.

The model of plant breeders’ rights as epitomized by the 1978 version of the UPOV Convention clearly permitted the use of protected varieties as the source material of further breeding (breeders’ exception) and the re-use of saved seeds by farmers (farmers’ privilege).⁵⁸ Both are important mechanisms to protect farmers’ livelihoods, allow for innovation based on traditional seed-saving and exchange practices and, in general, guarantee the continued exchange of material for public research and global food security purposes.⁵⁹ These exceptions however were restricted in the latest revision of the UPOV Convention in 1991. The plant breeders’ exemption was preserved;⁶⁰ acts done ‘privately and for non-commercial purposes’ or ‘for experimental purposes’ were also exempted;⁶¹ but the scope of protection was extended beyond the propagating material of protected varieties to include ‘essentially derived varieties,’⁶² and the farmers’ privilege for replanting was restricted and made optional.⁶³ According to this amendment, use of protected varieties by farmers is permitted only for propagating and planting on their own holdings, but not for informal sale,⁶⁴ thus also restricting exchanges among farmers and affecting their livelihoods.⁶⁵ From a fairness and equity perspective, these provisions aggravate the asymmetry in protection between modern and traditional varieties, and limit the discretion of Member States that wish to protect agricultural systems that rely upon traditional practices and smallholder farmers, although, technically speaking, Member States retain the possibility to preserve the farmers’ privilege to a certain degree.

UPOV Membership was boosted with the adoption of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement) by the World Trade Organization (WTO) in 1994, as WTO Member States are required to provide for the protection of plant

⁵⁷ UPOV mission statement, available at <http://www.upov.int/about/en/mission.html> (last visited 31 May 2016).

⁵⁸ Correa, *supra* note 18, at 3.

⁵⁹ Tsioumani et al, *supra* note 9.

⁶⁰ 1991 UPOV Act Article 15(1). Neither the authorization of the right-holder nor the payment of royalties is required when protected varieties are used ‘for the purpose of breeding other varieties.’

⁶¹ 1991 UPOV Act Article 15(1).

⁶² 1991 UPOV Act Article 14(5).

⁶³ 1991 UPOV Act Article 15(2). The farmers’ privilege is allowed at the discretion of UPOV Member States ‘within reasonable limits and subject to the safeguarding of the legitimate interests of the breeder.’

⁶⁴ See Chiarolla, *supra* note 18, at 85; C. Correa, *Intellectual Property Rights, the WTO and Developing Countries: The TRIPS Agreement and Policy Options* (2000).

⁶⁵ Chiarolla, Louafi and Schloen, *supra* note 20, at 85.

varieties either by patents or by an effective *sui generis* system.⁶⁶ Although countries are free to identify a system to suit their particular agricultural and socioeconomic conditions, particularly if they do not wish to restrict the farmers' privilege, the UPOV Convention, as a ready-made framework, is obviously an easy choice.⁶⁷ Ratification seems to be promoted also by technical advice provided to developing countries.⁶⁸ Furthermore, ratification of UPOV 1991 or adoption of complying legislation is promoted by developed countries through free trade agreements, while bilateral pressure is also exerted to introduce patent protection for plants, animals and biotechnological innovations, exceeding even the TRIPS standards.⁶⁹ Developing country membership is thus constantly increasing, despite the fact that the UPOV system is tailored to the needs of the commercial seed sector and the commercialized farming systems of the developed countries rather than the subsistence agriculture of the developing world.⁷⁰

Exceptions aiming to protect farmers' and breeders' activities are usually even more limited under patent law. Patents provide the strongest form of intellectual property protection, in the sense that they normally allow the patent holder to exercise the greatest control over the use of patented material. Protecting plant-derived innovations under patent regimes requires an applicant to demonstrate novelty, an inventive step, and the potential for industrial application. At the moment, to the authors' knowledge, patents on conventional plant varieties are only allowed in the United States, Japan and Australia.⁷¹ With the breakthrough of modern biotechnology in the 1990s however, the patent subject matter expanded

⁶⁶ TRIPS Agreement Article 27(3)(b).

⁶⁷ See however C. Correa et al, *Plant Variety Protection in Developing Countries: a Tool for Designing a Sui Generis Plant Variety Protection System: an Alternative to UPOV 1991* (2015).

⁶⁸ De Schutter, *supra* note 56, at 6.

⁶⁹ See C. Heath and A. Kamperman Sanders (eds), *Intellectual Property and Free Trade Agreements* (2007), at 193; GRAIN 'Trade Agreements Privatising Biodiversity' (2014), available at <http://www.globalresearch.ca/free-trade-agreements-are-criminalising-farmers-seeds-for-the-benefit-of-multinational-corporations/5414731> (last visited 31 May 2016); Toro Pérez, 'Biodiversity in the FTAs with the USA and Europe: the Crisis of the Andean Integration Process' (2009), available at <http://www.bilaterals.org/?biodiversity-in-the-ftas-with-the> (last visited 31 May 2016); Correa, 'Negotiation of a Free Trade Agreement European Union-India: Will India Accept TRIPS-Plus Protection?' (2009), available at www.oxfam.de/download/correa_eu_india_fta.pdf (last visited 31 May 2016). To provide some examples, according to the EU-Morocco and the EU-Lebanon free trade agreements (FTAs), Morocco and Lebanon must join 1991 UPOV. According to the US-Morocco FTA, Morocco must also provide patents on plants and animals. According to the US-Chile FTA, Chile must join 1991 UPOV and provide patents on any invention in any field of technology without exception. According to the latest leaked draft of the Trans-Pacific Partnership Agreement, it is proposed that all parties be obliged to join 1991 UPOV. See Brennan and Kilic 'Freeing Trade at the Expense of Local Crop Markets? A Look at the Trans-Pacific Partnership's New Plant-Related Intellectual Property Rights from a Human Rights Perspective' *Harvard Human Rights Journal*, April 2015, available at http://harvardhrj.com/wp-content/uploads/2015/04/Brennan_Kilic_HRJ_04-11-152.pdf (last visited 31 May 2016).

⁷⁰ Alker and Heidhues, 'Farmers' Rights and Intellectual Property Rights – Reconciling Conflicting Concepts' in R.E. Evenson, V. Santaniello and D. Zilberman, *Economic and Social Issues in Agricultural Biotechnology* (2002), at 66; Yamin, *supra* note 18.

⁷¹ Chiarolla, *supra* note 18, at 62–3.

dramatically, with an ever-increasing number of patents to cover not only transgenic plants but also particular plant traits and parts, components such as genes, plant breeding methodologies, and vectors and processes involved in the production of transgenic plants.⁷² Geographical application also expanded, as transgenic plants became patentable in Europe under the terms of Directive 98/44/EC on the legal protection of biotechnological inventions.⁷³

Ethical considerations⁷⁴ and fairness- and equity-related concerns posed by the granting of IPRs to living organisms have been exacerbated by the practice and (mis)application of the IPR system. There are no specific standards of what is considered a 'novelty' or an 'invention' for the purpose of patent registration. A basic issue has been whether isolated genes and other biological materials may be deemed 'invented' and thus eligible for patent protection. Assessment of the *level* of inventive step required to grant a patent is crucial to determine the extent to which patents on genetic resources may be lawful or not. From a global perspective, this point has increased significance. Patents have been granted on genetic resources obtained from developing countries, often without the knowledge and consent of the country of origin and hardly any demonstration of an inventive step, a trend dubbed as 'biopiracy.'⁷⁵ There has been extensive documentation of IPRs being sought over resources in the form they are found in nature or in farmers' fields, without further improvement, or on products based on plant materials and knowledge developed and used by indigenous peoples and local communities. Examples concern the enola bean, quinoa, neem tree and turmeric.⁷⁶ In some cases, IPR protection was sought over materials held in trust for the international community by the CGIAR centers.⁷⁷

The misappropriation of genetic resources and traditional knowledge and the privatization of improved (or not) plant varieties through the use of IPRs naturally resulted in rising equity

⁷² Aoki, *supra* note 21, at 2296; Tsioumani et al, *supra* note 9, at 147.

⁷³ Directive 98/44/EC of the European Parliament and of the Council of 6 July 1998 on the legal protection of biotechnological inventions, *OJ L 213*, 30.7.1998, p. 13–21. See Crucible II Group, *Seeding Solutions: Policy Options for Genetic Resources: People, Plants and Patents Revisited* (2000), at 105-106; Dutfield 'Who Invents Life: Intelligent Designers, Blind Watchmakers, or Genetic Engineers?' 5 *Journal of Intellectual Property Law and Practice* (2010) 7, at 531-540.

⁷⁴ See, among many, Nuffield Council on Bioethics, *The Ethics of Patenting DNA* (2002).

⁷⁵ Biopiracy, a term originally coined by civil society organization ETC Group, refers to the appropriation of the knowledge and genetic resources of farming and indigenous communities by individuals or institutions that seek exclusive monopoly control (patents or intellectual property) over these resources and knowledge.

⁷⁶ See Mooney, 'The Parts of Life. Agricultural Biodiversity, Indigenous Knowledge and the Role of the Third System' 1 *Development Dialogue* (1998); Aoki 'Neocolonialism, Anticommons Property, and Biopiracy in the (Not-so-Brave) New World Order of International Intellectual Property Protection' 6 *Indiana Journal of Global Legal Studies* (1998) 1, at 11-58.

⁷⁷ This was the case of the US enola bean patent, which was granted in violation of the 1994 Agreement placing CGIAR Center in-trust collections under the auspices of FAO, and was ruled invalid after nine years of litigation. See International Center for Tropical Agriculture (CIAT), 'New Legal Decision against Enola Bean' (2009), available at www.ciatnews.cgiar.org/2009/07/22/new-legal-decision-against-enola-bean/ (last visited 31 May 2016).

and justice concerns.⁷⁸ The emergence of the principle of national sovereignty over natural and genetic resources, examined in the next section, was partly a response to this situation.

C *The CBD and the nationalization of natural and genetic resources*

If IPRs created a major enclosure to the previously open systems of exchange, the principle of national sovereignty over natural and genetic resources aimed to defend the rights of countries providing such resources by creating a second, *defensive enclosure*. In the words of M. Halewood et al, 'if developed countries were able to exercise restrictive control over advanced biologically based technologies using intellectual property rights, developing countries could exercise their sovereign rights to regulate and restrict access to the biological and genetic resources within their borders.'⁷⁹

The principle of national sovereignty was embodied in the CBD, a legally binding treaty, which recognizes that the authority to determine access to genetic resources rests with national governments and is subject to national legislation. The CBD introduced the concepts of the prior informed consent of the country providing such resources and of the fair and equitable sharing of the benefits arising from their commercial or other utilization.⁸⁰ At the same time, it refers prominently to fair and equitable benefit-sharing as its third objective: 'the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.'⁸¹ Benefit-sharing is thus linked to the principle of national sovereignty, and has a *balancing* function against the privatization of genetic resources via IPRs.

The shift in principles can be further justified due to the growing expectations of the commercial value of biodiversity⁸² and its potential use for development purposes, in the context of the New International Economic Order - an attempt in the 1970s at radically restructuring the global economic system by prioritizing the objective of development as part of the process of decolonization.⁸³ The emergence of the biotechnology industry in the 1990s and of a market for biodiversity-based products was at the centre of these expectations.

⁷⁸ As eloquently put by C. Hess, 'IPRs appear to slow the free flow of germplasm exchange, slow the diffusion of new knowledge, upset the balance between basic and applied research, and erode scientific integrity.' Hess, 'Intellectual Property Rights: Protection of Plant Materials Public Research Agendas' in Crop Science Society of America (ed), *Intellectual Property Rights: Protection of Plant Materials* (1993), at 128.

⁷⁹ Halewood et al (n 31), at 6.

⁸⁰ CBD Article 15.

⁸¹ CBD Article 1.

⁸² M. Petit et al, *Why Governments Can't Make Policy: The Case of Plant Genetic Resources in the International Arena* (2001), available at <http://cipotato.org/wp-content/uploads/2014/10/63155.pdf> (last visited 31 May 2016), at 8; S.I. Batta Bjørnstad, *A Breakthrough for "the South"?: An Analysis of the Recognition of Farmers' Rights in the International Treaty on Plant Genetic Resources for Food and Agriculture* (2004), available at <http://www.fni.no/pdf/FNI-R1304.pdf> (last visited 31 May 2016), at 37–41.

⁸³ Morgera, *supra* note 19; Raustiala and Victor, *supra* note 18.

Benefit-sharing in this sense would be linked not only to the commercialization of biodiversity-based products but also to the emergence of market-based approaches to biodiversity management such as payments for ecosystem services.⁸⁴

In conclusion, the concept of fair and equitable benefit-sharing in the context of agricultural biodiversity use can be conceptualized as following: linked to the principle of national sovereignty, as a defensive tool to balance the injustices enshrined in the IPR system; and linked to development purposes, as a tool to benefit from the emerging biodiversity market. A third conceptualization can be found under the ITPGR concept of farmers' rights,⁸⁵ which understands benefit-sharing as a tool to reward farmers and enable their continued contribution, thus linking it to conservation concerns and rural livelihoods.

Were developing countries accurate in their expectations? Adoption of the CBD was considered a victory for the developing world, but did adoption of the TRIPS Agreement mean that many of these gains were weakened?⁸⁶ Is the legal concept of benefit-sharing capable of injecting fairness and equity in the system of agricultural biodiversity conservation and use, and under which conditions? The next section will focus on this concept, exploring the legal landscape and assessing its application and use at the inter-State level, on the basis of a technical analysis of the ITPGR Multilateral System.

3. Governance of Agricultural Biodiversity and Fair and Equitable Benefit-Sharing

The current picture of global governance of agricultural biodiversity, from conservation to use in research and development, is largely defined by the CBD and instruments adopted under its auspices,⁸⁷ the ITPGR, and IPR-related instruments, in particular the UPOV Convention and the TRIPS Agreement. While fair and equitable benefit-sharing is an objective of the environmental treaties, namely the CBD and the ITPGR, the concept is not enshrined in the IPR instruments. This section concentrates on the ITPGR, which operates a sophisticated multilateral system of access to PGRFA and benefit-sharing. It then briefly reviews interlinkages with the UPOV Convention and the negotiations for the amendment of the TRIPS Agreement in line with the CBD.

A *The ITPGR Multilateral System of Access and Benefit-Sharing*

The shift in principles triggered by the CBD negotiations had an immediate influence on the FAO realm. The 1991 FAO Conference recognized that 'the concept of mankind's heritage as applied in the International Undertaking is subject to the sovereignty of the States over their

⁸⁴ Morgera, *ibid.*

⁸⁵ ITPGR Article 9.

⁸⁶ Aoki, *supra* note 32, at 2285.

⁸⁷ These include the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization and the Cartagena Protocol on Biosafety, as well as the Programme of Work on Agricultural Biodiversity and the International Pollinators Initiative.

plant genetic resources.’⁸⁸ At the same time, it stated that the availability of plant genetic resources and the information, technologies and funds necessary to conserve and utilize them are complementary and of equal importance, and established an international fund to support plant conservation and utilization programmes and implement farmers’ rights,⁸⁹ thus implicitly addressing benefit-sharing. With adoption of the CBD, the Nairobi Final Act⁹⁰ recommended adjusting the International Undertaking in line with the CBD, providing the basis for the negotiations which resulted in the ITPGR.

The objectives of the ITPGR are the conservation and sustainable use of PGRFA and the fair and equitable sharing of the benefits arising out of their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security.⁹¹ The core of the Treaty is the Multilateral System, which facilitates access to, and exchange of, a specified list of crops⁹² considered vital for food security and agricultural research. It also institutionalizes the sharing of the benefits arising from the utilization of these resources: the Treaty regulates both monetary benefit-sharing, i.e. the sharing of monetary benefits arising from commercialization and voluntary contributions, and non-monetary benefit-sharing, which, according to its provisions, refers to exchange of information, access to and transfer of technology, and capacity building. In addition, facilitated access to the genetic resources in the Multilateral System is recognized as a benefit in itself.⁹³

The Multilateral System aimed to respond to the specificities of agricultural biodiversity and the ‘public good’ nature of PGRFA and basic scientific research in general,⁹⁴ for which the bilateral system of exchanges promoted by the CBD and its Nagoya Protocol on access and benefit-sharing was not considered suitable.⁹⁵ The exchange of plant genetic resources is indispensable for the continuation of agricultural research, as well as for the adaptation of key crops to the new conditions brought about by climate change, and plant pests and diseases. In addition, when it comes to crop genetic resources, all countries are independent and identification of the country of origin is often difficult, given the millennia of agricultural

⁸⁸ FAO Resolution 3/91, Preamble.

⁸⁹ FAO Resolution 3/91, Preamble and paras 3-4.

⁹⁰ 1992 Nairobi Final Act of the Conference for the Adoption of the Agreed Text of the Convention on Biological Diversity, Resolution 3.

⁹¹ ITPGR Article 1.

⁹² ITPGR Annex I.

⁹³ ITPGR Articles 10-13. See Tsioumani, ‘International Treaty on Plant Genetic Resources for Food and Agriculture: Legal and Policy Questions from Adoption to Implementation’ 15 *Yearbook of International Environmental Law* (2004) 119, at 128.

⁹⁴ Cooper, Engels and Frison, ‘A Multilateral System for Plant Genetic Resources: Imperatives, Achievements and Challenges’ 2 *Issues in Genetic Resources* (1994), at 11; Halewood et al, ‘Implementing “Mutually Supportive” Access and Benefit Sharing Mechanisms under the Plant Treaty, Convention on Biological Diversity, and Nagoya Protocol,’ 9 *Law Environment and Development Journal* (2013) 68, at 71; De Schutter, *supra* note 56, paras 10 and 21-22.

⁹⁵ Chiarolla, Louafi and Schloen, *supra* note 20; Morgera, Tsioumani and Buck, *supra* note 21.

history.⁹⁶ Furthermore, genebanks all over the world, as well as private companies, now have collections of all major crops, making the search for genetic resources in situ largely unnecessary.⁹⁷

Collections of genetic resources of the Annex I crops that are under the management and control of Parties and in the public domain, as well as those held by the CGIAR centers, are to be automatically included in the Multilateral System and exchanged according to the terms of the standard Material Transfer Agreement (SMTA).⁹⁸ The SMTA is a standardized private law contract between a provider and recipient (user) of material, adopted by the ITPGR Governing Body.⁹⁹ Other holders, including the private sector and other organizations, are *encouraged* to include such material in the system in order to achieve more comprehensive coverage; thus their contributions remain voluntary. While the providers of material are usually public or international genebanks, the users can be organizations, private entities or individuals. In practice, research suggests that it is mostly public-sector breeders that make use of the Multilateral System.¹⁰⁰

Monetary benefit-sharing is currently operated through the Benefit-sharing Fund.¹⁰¹ The original concept was that this fund would be replenished through user-based payments on the basis of the SMTA provisions, following commercialization of products developed from material accessed through the Multilateral System. The SMTA provides for mandatory payments to the Benefit-sharing Fund according to two monetary benefit-sharing options:

- a default scheme, according to which a recipient that commercializes a plant product incorporating material from the Multilateral System that is *not available to others for further research and breeding* (i.e. it is patented) will pay 1.1% of gross sales to the Treaty's Benefit-sharing Fund, less 30% (to cover expenses), i.e. 0.77%;¹⁰² and
- an alternative, discounted formula, whereby recipients pay 0.5% of gross sales on all products of the species they accessed from the Multilateral System, regardless of

⁹⁶ ITPGR Preamble.

⁹⁷ Cooper, 'The International Treaty on Plant Genetic Resources for Food and Agriculture,' 11 *Review of European Community & International Environmental Law* (2002) 11, at 14; Moore and Tymowski, *supra* note 11, at 2-6.

⁹⁸ ITPGR Articles 11(2) and (5).

⁹⁹ ITPGR Governing Body Resolution 2/2006 (2006).

¹⁰⁰ See López Noriega, Wambugu and Mejías, 'Assessment of Progress to Make the Multilateral System Functional,' in Halewood, López Noriega and Louafi, *supra* note 17, 199, at 216; ITPGR Secretariat, 'Typology of Users of the Multilateral System and their Regional Distribution, including PGRFA under Development' (FAO Doc IT/OWG-EFMLS-3/15/Inf.9).

¹⁰¹ The Benefit-sharing Fund forms part of the ITPGR Funding Strategy and was established by the ITPGR Governing Body at its first session, see FAO, Report of the First Session of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture (2006), FAO Doc IT/GB01/06/Report.

¹⁰² SMTA Article 6(7) and Annex 2. See G. Moore and E. Goldberg (eds), *The International Treaty on Plant Genetic Resources for Food and Agriculture: Implementing the Multilateral System. Learning Module*, available at: <http://treatylearningmodule.bioversityinternational.org/> (last visited 31 May 2016).

whether the products incorporate the material accessed and regardless of whether or not the new products are available without restriction.¹⁰³

Voluntary payments are encouraged when a recipient commercializes a plant product that incorporates material from the Multilateral System if that product is available without restriction to others for further research and breeding.¹⁰⁴ Under the direction of the Governing Body and through a project-based approach,¹⁰⁵ the Benefit-sharing Fund would then allocate the acquired funds to particular activities designed to support farmers and breeders in adapting crops to changing needs and demands, particularly farmers in developing countries who still conserve crop diversity in their fields.

A lack of conceptual clarity is observed: Monetary benefit-sharing refers both to the *accumulation* of monetary benefits through the SMTA (user-based benefit-sharing) and to the *distribution* of monetary benefits through the Benefit-sharing Fund. The sub-sections below address legal and policy challenges related to these two sides of benefit-sharing under the Treaty.

1. *Accumulation of Benefits*

A set of challenges arise with regard to the effectiveness of the Multilateral System and its ability to generate monetary benefits. The lengthy time-period required for research, development and commercialization is often mentioned as the reason behind the failure to generate and share commercial benefits to date as a result of the use of the SMTA.¹⁰⁶ There is more than that though. The first challenge concerns the relationship between benefit-sharing and IPRs. Monetary benefit-sharing, according to the main option under the SMTA, takes the form of *compensation* when material is taken out of the Multilateral System, i.e. when it is no longer available for further research and breeding. Monetary benefit-sharing is thus linked to the restriction in use associated with the patenting of PGRFA. Such restrictions are arguably incompatible with the open exchange systems¹⁰⁷ needed for food security and agricultural biodiversity conservation. This illustrates a *fundamental contradiction* inherent in the Treaty system as agreed upon by its negotiators and drafters: monetary benefit-sharing was designed to be a central tool for revenue generation to fund the ITPGR goals; at the same time, monetary benefit-sharing is tied to restrictions in use, which threaten the very essence

¹⁰³ SMTA Article 6(11).

¹⁰⁴ SMTA Article 6(8).

¹⁰⁵ Following the announcement of a call for proposals, project proposals are received and assessed by a panel of experts according to specific eligibility and selection criteria, before approval by the ITPGR Bureau. The priorities, eligibility criteria and operational procedures were adopted as annexes 1-3 to the Funding Strategy in 2007. See FAO, Report of the Second Session of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture (2007) FAO Doc IT/GB-2/07/Report.

¹⁰⁶ See ITPGR Secretariat, Report on the Implementation of the Multilateral System of Access and Benefit Sharing' (2013) FAO Doc IT/GB-5/13/5.

¹⁰⁷ See Louafi and Welch, *supra* note 52, at 145.

of the system and its goal of food security, by impoverishing (or at least not enriching) its material base.¹⁰⁸

Three additional factors greatly impact effectiveness of the system. First, coverage of the Multilateral System is not comprehensive. It does not cover certain major crops, such as soybean, sugarcane, tomato and coffee. Notably, some of these crops have attracted significant research effort resulting in patented material, and their inclusion could result in mandatory benefit-sharing payments according to the terms of the SMTA. Second, as noted above, the Multilateral System only covers public and CGIAR collections of genetic resources of the listed crops. This means that most material in the Multilateral System is also available elsewhere, and can be accessed without adherence to the benefit-sharing terms of the SMTA. In addition, many Parties have to date failed to notify the Secretariat of their material that is included in the Multilateral System,¹⁰⁹ thus making this material inaccessible to users due to lack of awareness.

On the user side, in practice most of the commercializing organizations that choose to take material from the Multilateral System and incorporate it in new products do *not* restrict access to the improved material for further research and breeding purposes¹¹⁰ and are thus not obliged to share monetary benefits. Commercial users who would be more likely to trigger monetary benefit-sharing requirements have consistently chosen to access material from other sources, not the Multilateral System.¹¹¹

A series of studies undertaken in the ITPGR framework has explored obstacles to the realization of monetary benefits and confirmed that projections of benefit flows will be 'moderate at best,' and will take even longer than expected, even under the most favourable conditions.¹¹² As a result, in 2013 the Governing Body established an intersessional process

¹⁰⁸ See Helfer 'Intellectual Property Rights and the International Treaty on Plant Genetic Resources for Food and Agriculture' in 97 *Proceedings of the Annual Meeting of the American Society of International Law* (2003), at 33-35.

¹⁰⁹ The material notified to be included in the Multilateral System is available at <http://www.planttreaty.org/inclusions> (last visited 1 June 2016).

¹¹⁰ CGIAR, Comments from the CGIAR Consortium and its 11 CGIAR Centers Hosting International 'In trust' Crop and Forage Collections (CGIAR) on Options Considered by the Ad Hoc Open-ended Working Group to Enhance the Functioning of the Multilateral System of Access and Benefit-sharing (2015), available at <https://library.cgiar.org/bitstream/handle/10947/3861/CGIAR%20paper%20on%20options%20considered%20by%20WG-EFMLS%20%28final%29.pdf?sequence=1> (last visited 1 June 2016).

¹¹¹ Ibid.

¹¹² Factors which influence benefit flows include: participation of more countries in the Treaty, including those with major genebank collections, fully effective participation by Contracting Parties, i.e. making all their plant genetic resources available immediately, and no deliberate avoidance of use of material from the Multilateral System in institutional breeding programmes. See N. Moeller and C. Stannard (eds), *Identifying Benefit Flows: Studies on the Potential Monetary and Non Monetary Benefits Arising from the International Treaty on Plant Genetic Resources for Food and Agriculture* (2013), available at http://www.planttreaty.org/sites/default/files/Identifying_Benefit_Flows.pdf (last visited 1 June 2016).

aiming to ‘enhance the functioning of the Multilateral System.’¹¹³ A Working Group was specifically mandated to develop measures aiming to increase user-based payments and contributions to the Treaty’s Benefit-sharing Fund, as a priority, as well as ‘additional measures’ to enhance the functioning of the Multilateral System. These ‘additional measures’ are understood as referring to a possible expansion of the list of crops under the Multilateral System. This item remains highly controversial in the ITPGR context, as many developing countries consider the generation and sharing of tangible financial benefits on the basis of the current list a necessary prerequisite for any discussion on expanding coverage. For better or for worse, the underlying sentiment of biodiversity-rich countries is that expansion of the list of crops under the Multilateral System limits their possibilities to gain from their sovereign resources by striking bilateral agreements with users.

While the precise mechanism for user-based benefit-sharing to contribute to the accumulation of monetary and non-monetary benefits is currently under consideration in the policy realm, research had suggested that policies promoting upfront payments with no or low restrictions in use may be better suited to generate benefits, ensure continued exchanges and increase legal certainty.¹¹⁴ Indeed, the Working Group has agreed that the best way forward is to elaborate a subscription system for access to material in the Multilateral System, meaning that subscribed users would need to pay *before* access.¹¹⁵ The ITPGR Governing Body then requested it to develop such a subscription system and incorporate it into a revised SMTA.¹¹⁶

Certainly, the revision of the Multilateral System is no easy task. The Treaty serves a wide and diverse set of users in the entire spectrum of agricultural production, with different and often contradictory needs: public research institutes, smallholder farmers, companies big and small, in developing and developed countries, actors engaged in commercial or non-commercial research, in formal and informal seed systems. There is a need to both create a set of incentives, which would make the Multilateral System attractive to users, and restructure users’ obligations, in order to create a steady flow of financial resources to the Benefit-sharing Fund. Negotiators need to address a wide range of considerations. How to make material in the Multilateral System unique, so that it is more attractive to users? Is it

¹¹³ Tsioumani, ‘Plant Treaty Governing Body Identifies Need to Enhance Multilateral System of Access and Benefit-sharing’ (2014), available at <http://www.benelexblog.law.ed.ac.uk/2014/02/19/plant-treaty-governing-body-identifies-need-to-enhance-multilateral-system-of-access-and-benefit-sharing/> (last visited 1 June 2016).

¹¹⁴ See Seyoum and Welch, ‘Trading off Use Restrictions and Benefit-Sharing for Genetic Materials for Food and Agriculture with an Emphasis on Upfront Payments’ (2013), available at http://ageconsearch.umn.edu/bitstream/156128/2/C4-Seyoum-Trading_c.pdf (last visited 1 June 2016).

¹¹⁵ See Tsioumani, ‘The Plant Treaty at a Crossroads: Reflections on the Sixth Session of the ITPGR Governing Body’ (2015), available at <http://www.benelexblog.law.ed.ac.uk/2015/12/18/sixth-session-of-the-itpgr-governing-body/> (last visited 1 June 2016).

¹¹⁶ Resolution 1/2015, *Measures to Enhance the Functioning of the Multilateral System of Access and Benefit-Sharing*, Report of the Sixth Session of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture (2016) FAO Doc IT/GB-6/16/Report.

possible to maintain user-based monetary benefit-sharing without affecting access to, and exchange of, material? Could, for instance, monetary benefit-sharing take the form of annual payments by Parties, based on a percentage of seed sales, as already undertaken by Norway and as proposed by the CGIAR Consortium¹¹⁷? And finally, is it possible to pursue fairness and equity, and serve global public goods through a private law contract? Or are there inherent complexities and limitations in a tool originally devised to serve private law objectives? These issues point to fascinating research questions with practical policy relevance, within and beyond the ITPGR or even the agriculture realm, addressed in the concluding remarks.

2. *Distribution of Benefits*

Distribution of monetary benefits is operated through the Benefit-sharing Fund via a project-based approach. The Benefit-sharing Fund is mandated to prioritize projects that support not only the conservation and sustainable use of agricultural biodiversity, but also the livelihoods of farmers and rural communities. According to the Treaty text, benefits should flow primarily, directly and indirectly, to farmers.¹¹⁸

Twenty-two projects were funded under the third cycle. Most of them are run by international and national agricultural research centers, two are run by NGOs, and one by an association of indigenous organizations.¹¹⁹ Channelling benefits to farmers is easier said than done, given the limited capacities of most farmer communities and organizations to reach international funding through the complex Benefit-sharing Fund application and project execution procedures. While this project-based approach arguably combines elements of inter-state benefit-sharing regulation with implementation at the local level, its results illustrate the challenges that an international organization faces to reach directly communities on the ground.

An additional challenge lies in the diversity of the ITPGR system users. The current realities of agricultural research and development, a sector characterized by a high degree of market concentration,¹²⁰ put at risk not only farmers' innovation but also public agricultural research. As a result, agricultural research centers in developing countries also compete for funding under the Treaty. The Treaty struggles to find and maintain a balance between modern scientific methods of identifying and developing new varieties on the basis of material in *ex situ* collections and farmers' traditional agro-ecological approaches. A series of measures have been taken, including the organization of regional workshops to build capacities to access funding, and the prioritization of cooperative, multi-country projects. In addition, research centers are expected to act as intermediaries and further distribute the project

¹¹⁷ CGIAR, *supra* note 110.

¹¹⁸ ITPGR Article 13(3).

¹¹⁹ The list of approved projects is available at

<http://www.planttreaty.org/sites/default/files/files/Third%20Call%20for%20Proposals-%20Projects%20approved%20for%20funding-for%20web.pdf> (last visited 1 June 2016).

¹²⁰ Tsioumani, *supra* note 9.

results at all possible levels. It remains a matter for consideration though whether the current approach serves well the objectives of sustainable agriculture and global food security.¹²¹ It has been questioned for instance whether a competitive project-based approach is appropriate to meet challenges related to distributional equity, the public value of PGRFA and the required cooperation among different States and actors to address food security concerns.¹²²

The projects funded through the Benefit-sharing Fund produce both improved genetic resources – which are to enrich the Multilateral System – but also non-monetary benefits, such as information or training. Such non-monetary benefits are being generated and shared despite the fact that Parties' obligations to share non-monetary benefits are linked to other mechanisms¹²³ and not to the Benefit-sharing Fund directly.¹²⁴ The Global Information System for instance is the mechanism specifically built for information exchange.¹²⁵ Identified as a form of non-monetary benefit-sharing, exchanged information may encompass catalogues and inventories, related technologies and research results. It may concern both documentation of the resource as well as information about its potential uses. The information thus both adds value to the resource exchanged through the Multilateral System and builds the global pool of knowledge on plant genetic resources.

Technology transfer and capacity building are also identified as specific forms of non-monetary benefit-sharing. Technology transfer may be achieved through participation in crop-based or thematic networks and partnerships, commercial joint ventures and availability of research facilities.¹²⁶ Mechanisms for capacity building include scientific education and training in the conservation and use of PGRFA, development of relevant facilities and joint scientific research.¹²⁷ Finally, in view of the distinctive characteristics of agricultural biodiversity, facilitated access is recognized as a major benefit of the Multilateral System,¹²⁸ as it enables agricultural research for global food security.

¹²¹ See the Report of Multi-stakeholder Workshop Organized by Switzerland – The International Treaty on Plant Genetic Resources for Food and Agriculture: What Investment Strategy for the Benefit-Sharing Fund? (2015) FAO Doc. IT/GB-6/15/Inf.13.

¹²² Louafi, 'Reflections on the Resource Allocation Strategy of the Benefit Sharing Fund' (2013), available at <http://agritrop.cirad.fr/573342/> (last visited 1 June 2016).

¹²³ ITPGR Article 13.

¹²⁴ See Galluzzi, Noriega and Halewood 'Non-monetary benefit sharing mechanisms within the projects funded by the Benefit Sharing Fund' (2014), available at <http://www.planttreaty.org/sites/default/files/files/Research%20Paper%206.pdf> (last visited 1 June 2016).

¹²⁵ ITPGR Articles 13(2)(a) and 17. See Ker, Louafi and Sanou 'Building a Global Information System in Support of the International Treaty on Plant Genetic Resources for Food and Agriculture' in Halewood, Lopez Noriega and Louafi, *supra* note 17, at 283-309.

¹²⁶ ITPGR Article 13(2)(b).

¹²⁷ ITPGR Article 13(2)(c).

¹²⁸ ITPGR Article 13(1).

It can be observed therefore that the limits between the mechanisms established for monetary and non-monetary benefit-sharing are blurred, highlighting their close interlinkages. This is further illustrated by the fact that one of the funding windows of the latest call for proposals under the Benefit-sharing Fund was dedicated to co-development and transfer of technologies.

Similarly blurred is the institutional relationship between the forms of benefit-sharing identified in the Treaty text. It can be argued that these forms of benefit-sharing do not operate at the same level and under the same conditions. Non-monetary benefit-sharing can be used to build the capacities required for facilitated access to, and use of, PGRFA, which could potentially result in commercialization and monetary benefit-sharing.¹²⁹ Non-monetary benefit-sharing, in the form of information exchange, technology transfer and capacity building, is thus instrumental in addressing the unequal capacities of countries and communities to benefit from the ITPGR, and thus bridging the capacity, fairness and equity gap in agriculture and agrobiodiversity conservation.

B IPR-related Instruments and Benefit-Sharing: UPOV and the TRIPS 'CBD Amendment'

Unlike the environmental treaties, there is no explicit requirement related to fair and equitable benefit-sharing in the IPR instruments, the idea being that intellectual property protection benefits society as a whole by promoting innovation. In the response of UPOV to the CBD Secretariat, requesting for contributions to the negotiations on access and benefit-sharing,¹³⁰ UPOV highlights the importance of access to genetic resources to ensure progress in plant breeding and 'thereby to maximize the use of genetic resources for the benefit of society.' The breeder's exemption, whereby acts done for the purpose of breeding are not subject to any restriction, is considered to be an 'inherent benefit-sharing principle.'¹³¹ Same goes for the compulsory exception to the breeder's right regarding acts done privately and for non-commercial purposes (which could apply to the activities of subsistence farmers) and the optional farmer's privilege concerning use of farm-saved seed for replanting a protected variety.

The UPOV Council has expressed its concern with respect to any other measures for benefit-sharing that could introduce unnecessary barriers to progress in breeding and the utilization

¹²⁹ Louafi, *supra* note 122.

¹³⁰ UPOV Council 'Access to Genetic Resources and Benefit-sharing' (2003), available at http://www.upov.int/export/sites/upov/news/en/2003/pdf/cbd_response_oct232003.pdf (last visited 1 June 2016). See Cabrera Medaglia 'The Relationship between the Access and Benefit Sharing International Regime and other International Instruments: the World Trade Organization and the International Union for the Protection of New Varieties of Plants' 10 *Sustainable Development Law and Policy* (2010) 3, 24-53; G. Dutfield, *Food, Biological Diversity and Intellectual Property: The Role of the International Union for the Protection of New Varieties of Plants (UPOV)* (2011), available at http://www.planttreaty.org/sites/default/files/role_UPOV.pdf (last visited 1 June 2016).

¹³¹ UPOV Council, *supra* note 130.

of genetic resources. It argues that any mechanism to claim the sharing of revenues would impose an additional administrative burden on the authority responsible for granting breeders' rights and an additional financial obligation on the breeder when varieties are used for further breeding, and would be incompatible with the principle of the breeder's exemption. In addition, it argues that such a benefit-sharing mechanism would seem to tax only 'protected' varieties and may serve as a disincentive for developing new varieties or seeking protection.¹³²

Indeed, the breeder's exemption and other exceptions to the breeder's right seem to function as benefit-sharing mechanisms, in the form of facilitated access as enshrined also in the ITPGR. There are glaring limitations however. The UPOV text itself states that the farmer's privilege is subject to reasonable limits and requires that the legitimate interests of the breeder are safeguarded. This clearly indicates the UPOV system is built to promote scientific breeders' innovation, and views farmers' work on-farm as a subsistence activity, rather than user-based innovation. In addition, the presumption that technological developments in farming benefit the society at large fails to acknowledge the well-documented fact that technologies 'such as high-yielding crop varieties, agrochemicals and mechanization have primarily benefited the better resource groups in society and transnational corporations, rather than the most vulnerable ones'¹³³ and ignores the question of distributing the benefits to the most vulnerable groups of society, including smallholder farmers.

Exceptions to patent holders' rights are even more limited. They can be introduced under the TRIPS Agreement,¹³⁴ but practice varies among WTO Member States and the WTO dispute settlement bodies tend to interpret the provision narrowly.¹³⁵ In addition, the TRIPS Agreement does not require disclosure of prior informed consent of the country of origin and of benefit-sharing in patent applications involving use of genetic resources. Therefore foreign companies may obtain private rights derived from national genetic resources without having to adhere to the CBD principles.¹³⁶ Although it can be argued that such access to resources may not be legitimate, in the absence of national legislation implementing such principles, enforceability is weak, if existent at all. In addition, the validity of the patent would be assessed on the basis of the legislation of the country that granted it, not the country that provided the genetic resource used.

¹³² Ibid.

¹³³ International Assessment of Agricultural Knowledge, Science and Technology (IAASTD), *Global Summary for Decision Makers* (2008), at 23, available at <http://www.unep.org/dewa/assessments/ecosystems/iaastd/tabid/105853/default.aspx> (last visited 1 June 2016).

¹³⁴ Article 30 on Exceptions to Rights Conferred.

¹³⁵ H. Yamane, *Interpreting TRIPS: Globalisation of Intellectual Property Rights and Access to Medicines* (2011); Abbott 'TRIPS Dispute Settlement Decisions' (2009), available at http://www.ictsd.org/downloads/2009/10/abbott_trips_dsu.pdf (last visited 1 June 2016).

¹³⁶ CIPR, *supra* note 56.

Many analysts and policy makers have realized that unless the TRIPS Agreement is amended to ensure respect for the CBD principles in the intellectual property field, the implementation and enforceability of such principles would remain elusive.¹³⁷ Importantly, such an amendment would allow access to the WTO dispute settlement system for breaches of the CBD requirements, as, unlike the CBD, TRIPS rules are enforced through mandatory adjudication and retaliatory sanctions.¹³⁸ Several developing countries have thus called for an amendment to TRIPS to bring it in line with the CBD by introducing requirements to disclose the origin of genetic material and evidence of prior informed consent and benefit-sharing in patent applications. The original proposal, submitted by a group of developing countries led by India and Brazil,¹³⁹ was eventually supported by a coalition of 110 WTO Member States by 2008, when a strategic alliance was made with the EU and Switzerland calling for a procedural decision to negotiate in parallel the biodiversity amendment and geographical indications, another issue under discussion in the TRIPS Council.

No progress has been achieved since. The issue resurfaced at the March 2016 meeting of the TRIPS Council, when certain developed countries repeated their opposition both to an amendment of the TRIPS Agreement and to a request by many developing countries to simply invite the CBD Secretariat to the TRIPS Council for a report on the Nagoya Protocol.¹⁴⁰

As the impasse on these negotiations at the WTO continues, many countries have been calling for disclosure requirements and mechanisms, including on benefit-sharing, to be addressed in the framework of the negotiations for an international instrument or instruments under the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore (IGC) of the World Intellectual Property Organization (WIPO). At their current stage, the WIPO negotiations first do not show any sign of substantive progress and second they do not provide any indication of any specific link with the food and agriculture sector; they thus remain outside the scope of this paper. It should be noted though that potential agreement in the WIPO context would be significant, as it could mean a change in course in the IPR realm.

1. IPRs, Human Rights Concerns and Benefit-Sharing

¹³⁷ Ibid; M. Chouchena-Rojas et al, *Disclosure Requirements: Ensuring Mutual Supportiveness between the WTO TRIPS Agreement and the CBD* (2005), available at http://www.ciel.org/Publications/DisclosureRequirements_Nov2005.pdf (last visited 1 June 2016).

¹³⁸ Aoki, *supra* note 32.

¹³⁹ Documentation is available at www.wto.org/english/tratop_e/trips_e/art27_3b_e.htm (last visited 1 June 2016).

¹⁴⁰ International Centre for Trade and Sustainable Development 'WTO TRIPS Council Discusses Education Proposal, Possible Next Steps for Non-Violation and Situation Complaints' *20 Bridges* (2016) 9, available at: <http://www.ictsd.org/bridges-news/bridges/news/wto-trips-council-discusses-education-proposal-possible-next-steps-for-non> (last visited 1 June 2016).

There is ample literature highlighting that implementation of UPOV and the TRIPS Agreement may result in contraventions of human rights law.¹⁴¹ The Sub-Commission on the Promotion and Protection of Human Rights of the former UN Commission on Human Rights has declared that there are apparent conflicts between the IPR regime embodied in the TRIPS Agreement and international human rights law, in relation to the transfer of technology to developing countries, the consequences of plant variety rights and the patenting of genetically modified organisms for the enjoyment of the right to food, biopiracy, and the reduction of communities' control over their genetic and natural resources and cultural values, among other issues.¹⁴²

Highlighting concerns arising from the strengthening of breeders' rights regarding first the right to food, former UN Special Rapporteur on the Right to Food Olivier de Schutter has criticized UPOV for restricting the farmer's privilege.¹⁴³ He has further pointed to obstacles in public research caused by the intensification of IPRs, and to the need for a broad interpretation of the limitations that can be imposed to the patent rights-holder.¹⁴⁴

Against this background, fair and equitable benefit-sharing comes into play in the context of the right to benefit from scientific progress.¹⁴⁵ As noted by Farida Shaheed, former UN Special Rapporteur on cultural rights, 'the need to promote everyone's access to science and its applications raises the issue of the sharing of benefits and the transfer of scientific knowledge and technologies.'¹⁴⁶ Cross-referencing the provisions of several international instruments, including the ITPGR and other environmental agreements, she has identified, in addition to tensions with IPRs, an obligation for developed countries to 'comply with their international legal obligations through the provisions of direct aid, financial and material, as well as the development of international collaborative models of research and development for the benefit of developing countries and their populations'.¹⁴⁷ Developing countries, on the other hand, should prioritize the development and dissemination of simple and inexpensive

¹⁴¹ UN Development Programme (UNDP), *Human Development Report 1999: Globalization with a Human Face*, available at <http://hdr.undp.org/en/content/human-development-report-1999> (last visited 1 June 2016); UNDP, *Human Development Report 2000: Human Rights and Human Development*, available at <http://hdr.undp.org/en/content/human-development-report-2000> (last visited 1 June 2016); C. Correa and A. Yusuf (eds), *Intellectual Property and International Trade: The TRIPS Agreement* (2008); R. Evenson and V. Santaniello (eds), *The Regulation of Agricultural Biotechnology* (2004).

¹⁴² Sub-Commission on the Promotion and Protection of Human Rights Resolution 2000/7, UN Doc. E/CN.4/Sub.2/2000/7. See Weissbrodt and Schoff 'Human Rights Approach to Intellectual Property Protection: The Genesis and Application of Sub-Commission Resolution 2000/7' 5 *Minn.Intell.Prop.Rev.* (2003) 1.

¹⁴³ De Schutter, *supra* note 56. The UPOV Council's response (2009), available at http://www.upov.int/export/sites/upov/about/en/pdf/un_ga_note.pdf (last visited 1 June 2016), does not engage with the substance of his criticisms.

¹⁴⁴ De Schutter, *supra* note 56, at 12. See Tsioumani et al, *supra* note 9.

¹⁴⁵ Universal Declaration of Human Rights Art. 27(1), International Covenant on Economic, Social and Cultural Rights Art. 15.

¹⁴⁶ Shaheed, *supra* note 56, at 18. See Morgera 'Fair and Equitable Benefit-Sharing at the Cross-Roads of the Human Right to Science and International Biodiversity Law' 4 *Laws* (2015), 803-831.

¹⁴⁷ Shaheed, *supra* note 56, at 18.

technologies that can improve the life of marginalized populations. At the same time, States should protect individuals against any harmful effects of the misuse of scientific and technological developments.¹⁴⁸ All these recommendations are particularly relevant in the context of agricultural development and are useful in both elucidating the right to benefit from scientific progress and contextualizing the concept of fair and equitable benefit-sharing.

Similarly, de Schutter has argued that the human rights framework requires investigating primarily *who benefits* from any technological advance, with the needs of the most vulnerable groups at the centre of attention.¹⁴⁹ Scientific and technological progress does not mean that benefits are shared fairly, or that they will reach the most vulnerable groups of society; nor does it mean that all technologies are well-suited for all societal contexts. Exploring the possible tensions between the right to benefit from scientific progress and the right to food, de Schutter stressed that 'progress in science is not to be conceived as unilinear.'¹⁵⁰ For scientific progress to contribute to the advancement of broader aims, such as human development and human rights, the impacts of different paths and choices for progress must be assessed; and the right to benefit from scientific progress cannot be conceived independently of the views of the intended beneficiaries, the society at large, who need to be part of the choices made. Sharing of the benefits of science and technology therefore cannot have universal application but is subject to societal choices and cultural and legal contexts.

Fifteen years ago already, the Sub-Commission drew attention to the primacy of human rights obligations over economic policies and agreements and requested the TRIPS Council to take fully into account existing State obligations under international human rights instruments. In the meantime, the international community seems to be taking the opposite direction. The WTO dispute settlement system is being used at full speed to enforce implementation of multilateral trade agreements, often against developing countries' efforts to provide for food security for local populations;¹⁵¹ the activities of multinational companies remain largely outside the scope of international law;¹⁵² while a complex web of bilateral and regional trade and investment treaties build a WTO-plus global legal order enforced through arbitration tribunals, which limit national governments' regulatory choices outside whichever guarantees

¹⁴⁸ Ibid, at 21.

¹⁴⁹ De Schutter, *supra* note 56.

¹⁵⁰ De Schutter 'The Right of Everyone to Enjoy the Benefits of Scientific Progress and the Right to Food: From Conflict to Complementarity' 33 *Human Rights Quarterly* (2011), 304, 348.

¹⁵¹ See for instance the WTO negotiations on public stockholding programmes for food security in developing countries and their potential consideration as trade-distorting public support. Information available at https://www.wto.org/english/tratop_e/agric_e/factsheet_agng_e.htm (last visited 30 May 2016).

¹⁵² There are several soft-law but no binding legal framework regulating the activities of multinational companies in international law. See A. Clapham, *Human Rights Obligations of Non-State Actors* (2006); and De Jonge 'Transnational Corporations and International Law: Bringing TNCs out of the Accountability Vacuum' *Critical Perspectives on International Business* 7 (2011) 1, 66-89.

of equity and legitimacy multilateralism provides.¹⁵³ Trade and investment-oriented policies, including IPRs, are gaining a *de facto* supremacy over human rights and environmental treaties, because of their enforcement potential and the underlying power of actors and interests involved. In the context of this failing balance, some concluding remarks are offered below, touching upon lessons learnt and open research questions on the role and potential of fair and equitable benefit-sharing.

5. Concluding remarks

The concept of fair and equitable benefit-sharing emerged in the early 90s as a corollary to the principle of national sovereignty over natural and genetic resources. In the context of agricultural biodiversity use, it can be conceptualized in three ways: as a defensive tool to balance the injustices enshrined in the IPR system; as a development tool to reap part of the benefits of the emerging biodiversity market; and as an incentive, to reward and enable farmers' continued contribution to conservation. The emergence of IPRs and the resulting trend of privatization of genetic resources can thus be seen as *the* catalyst for the radical shift in the global governance of genetic resources, from the principle of common heritage to the principle of national sovereignty, and therefore the birth of the concept of fair and equitable benefit-sharing. At the same time, this birth was enabled, in economic terms by the emergence of the biotechnology industry and a market for biodiversity-based products; and in policy terms, by the New International Economic Order discourse.

This article has devoted a significant degree of attention to the Multilateral System of Access and Benefit-sharing established by the ITPGR, a system for the exchange of plant genetic resources and sharing of the benefits arising thereof, which is arguably the most sophisticated one in international law. A number of lessons can be drawn from the ITPGR experience and its currently ongoing revision process. These can be useful for a wide range of processes governing research and development within and beyond the international environmental law realm, including notably the UN General Assembly negotiations on an international legally binding instrument under UNCLOS on the conservation and sustainable use of marine biodiversity of areas beyond national jurisdiction, and the CBD Nagoya Protocol on Access and Benefit-sharing. Less obvious processes include those related to international health research, such as the Pandemic Influenza Preparedness Framework under the World Health

¹⁵³ Cotula 'Do Investment Treaties Unduly Constrain Regulatory Space?' 9 *Questions of International Law Zoom-in* (2014), 19-31, available at <http://www.qil-qdi.org/investment-treaties-unduly-constrain-regulatory-space/> (last visited 30 May 2016); J. Stiglitz 'Regulating Multinational Corporations: Towards Principles of Cross-Border Legal Frameworks in a Globalized World Balancing Rights with Responsibilities' 23 *American University International Law Review* (2007) 3 at <http://digitalcommons.wcl.american.edu/cgi/viewcontent.cgi?article=1025&context=auilr> (last visited 30 May 2016).

Organization¹⁵⁴ and guidance on benefit-sharing in human genetic research.¹⁵⁵ It is notable that all these diverse processes govern IPR-intensive research and development activities, and benefit-sharing is put forward as a concept and mechanism to pursue fairness and equity against the increasing privatization of genetic resources. In addition, references to benefit-sharing have been mushrooming in the context of natural resource use, including land, water, minerals or climate-related projects to reduce emissions from deforestation and forest degradation. While in these cases benefit-sharing seems to serve more as a safeguard for the rights and livelihoods of indigenous peoples and local communities, the ITPGR experience and lessons learnt can certainly be of use.

The first lesson to be drawn is that conceptual and terminological clarity is important. Admittedly, international decision-making processes often resort to ambiguities and an intended lack of clarity, in an attempt to accommodate opposing interests in a single draft. However, relatively novel legal concepts such as fair and equitable benefit-sharing demand an advanced degree of common understanding, to promote coherent implementation at the national level. In the ITPGR context for instance, it is observed that monetary benefit-sharing refers both to the *accumulation* of monetary benefits through the SMTA and to the *distribution* of monetary benefits through the Benefit-sharing Fund. The acknowledgement of this dual nature of the term may facilitate its understanding and implementation in various contexts.

Second, the dividing line between the mechanisms established for monetary and non-monetary benefit-sharing is often blurred, highlighting their close interlinkages. In the ITPGR context, the Benefit-sharing Fund was established to support monetary benefit-sharing, but its projects also contribute to forms of non-monetary benefit-sharing, such as technology transfer. In addition, non-monetary benefit-sharing can be used to build the capacities required for facilitated access to, and use of, PGRFA, which could potentially result in commercialization and monetary benefit-sharing. Non-monetary benefit-sharing is thus instrumental in building endogenously-defined needs and capacities of countries and communities, and bridging the fairness and equity gap in agricultural research and development. Exploring and clarifying the functions and role of both monetary and non-monetary benefit-sharing is more than a theoretical exercise.

Third, monetary benefit-sharing in the ITPGR context is largely linked to restrictions in use associated with patenting. Monetary benefit-sharing therefore gets the form of *compensation* when material is taken out of the Multilateral System. This is illustrative of a fundamental contradiction inherent in the Treaty system: monetary benefit-sharing was designed to be a central tool for revenue generation to fund the ITPGR goals; at the same

¹⁵⁴ See Wilke 'A Healthy Look at the Nagoya Protocol – Implications for Global Health Governance' in Morgera, Buck and Tsioumani, *supra* note 20, 123-148.

¹⁵⁵ See the Human Genome Organization's Ethics Committee Statement on Benefit-sharing, available at <http://www.eubios.info/BENSHARE.htm> (last visited 30 May 2016).

time, monetary benefit-sharing is tied to restrictions in use, which threaten the very essence of the system, by impoverishing (or at least not enriching) its material base. At the same time, patenting is still very much linked with genetically modified varieties, a technology which remains controversial and in the hands of few. This raises a different range of questions, about the nature of technologies that the Treaty's benefit-sharing system seems to promote, and whether they are the right ones for smallholder farmers in developing countries, one of the Treaty's main target groups.

This takes us to the fourth lesson. Identifying the target groups that an international law instrument aims to serve is no easy task. Times have long passed since States were the only subjects of international law, and treaties need to acknowledge the multitude of actors in the global sphere. The ITPGR for instance serves a wide and diverse set of users in the entire spectrum of agricultural production, with different and often contradictory needs: public research institutes, smallholder farmers, companies big and small, in developing and developed countries, engaged in commercial or non-commercial research and in formal and informal seed systems. The current realities of agricultural research and development, a sector characterized by a high degree of market concentration and a constantly diminishing public sector,¹⁵⁶ create an additional layer of complexity. Addressing such realities and clearly identifying priority target groups may only help crafting appropriate policies and legal tools.

Fifth, this endeavour indicates that private law contracts, whether with standard clauses or not, play a key, but largely understudied,¹⁵⁷ role in international law. How fair and how equitable the sharing of benefits is greatly depends on these contracts.¹⁵⁸ In the ITPGR context, the SMTA determines the terms for exchange of material and monetary benefit-sharing. The ongoing revision process has revealed a series of challenges arising from its complexity, which limits its use in different circumstances, regarding for instance the transfer of material directly to smallholder farmers in developing countries, who lack the required technical legal knowledge.¹⁵⁹ In more general terms, it is worth exploring the degree of influence that private law contracts have in the development and implementation of international law, and under which conditions these instruments, which have originally been devised to serve civil, commercial or other private law objectives, can be used for the pursuit of international law or public good objectives.

¹⁵⁶ Tsioumani et al, *supra* note 9.

¹⁵⁷ See however S. Bhatti et al (eds), *Contracting for ABS: The Legal and Scientific Implications of Bioprospecting Contracts*, IUCN Environmental Policy and Law Paper no. 67/4 (2009).

¹⁵⁸ To the author's knowledge, there is no intergovernmentally agreed guidance on fairness and equity in ABS contracts. See only WIPO's draft intellectual property guidelines for access to genetic resources and equitable sharing of the benefits arising from their utilization, consultation draft (2013), available at http://www.wipo.int/export/sites/www/tk/en/resources/pdf/redrafted_guidelines.pdf (last visited 30 April 2016).

¹⁵⁹ CGIAR, *supra* note 110.

The concept of fair and equitable benefit-sharing was born in international biodiversity law in the early 90s together with the CBD, and the intent of its creators was certainly noble. In the meantime however the policy and legal landscape changed dramatically, first with establishment of the WTO and adoption of the TRIPS Agreement and second through the intensification of neoliberal policies via bilateral and regional trade and investment agreements. Does the concept remain promising now, as it was at the times of its inception? Has it injected any fairness and justice in research and development sphere? Has it come up with a workable defence against IPRs? Entered into force almost a decade after the CBD, the ITPGR has developed a highly sophisticated system to operationalize benefit-sharing at the inter-state level. However, while it has introduced a complex web of technical requirements to the exchange of plant genetic resources, it has not succeeded in legally enforcing user-based benefit-sharing¹⁶⁰ and as a result no benefits have been accumulated in order to be shared.

As part of the ongoing revision process, ITPGR negotiators are now working towards devising a subscription system for access to material, meaning that subscribed users would need to pay *before* access. This idea brings in mind academic journals and knowledge management, shedding thus light on two parallels worthy of further investigation, both in the policy-making and in the academic fields: governance of knowledge; and governance of the commons.

Should genetic resources, as renewable and non-rivalrous goods, be treated more like knowledge than like non-renewable and rivalrous natural resources? Governance and management of knowledge faces similar characteristics and similar challenges: a global public good, the exchange of which would support solutions to global challenges, which however faces various IPR- and access-related restrictions. Opening a dialogue between the two sectors seems timely, particularly given the increasing 'dematerialization' of genetic resources, which risks undermining current benefit-sharing obligations and making the ITPGR and the Nagoya Protocol obsolete: synthetic biology techniques currently make possible the reconstruction of a genetic resource on the basis of its genetic information, which can easily be transferred electronically without physical access to the resource itself.

At this stage, sharing is in direct conflict with a political and economic system that is increasingly transforming genetic resources and knowledge into commodities. Two fundamental assumptions seem to collide. Does intellectual property protection contributes to technological innovation and technology transfer as the TRIPS Agreement proclaims?¹⁶¹ Or does it hamper innovation as ample research suggests?¹⁶² Is there a way to bypass the IPR issue to promote biodiversity conservation and sustainable use, and transfer technology to

¹⁶⁰ Kloppenburg, *supra* note 44, at 1226, 1233.

¹⁶¹ Art. 7.

¹⁶² Tsioumani et al, *supra* note 9.

that end? And does the currently highly proprietary environment allow us to even imagine the creation and protection of a global commons of plant genetic resources?

Ostrom distinguishes common property regimes from open-access systems: whereas in open-access systems no one has the legal right to exclude anyone from using a resource, in common property regimes the members of a clearly demarcated group have a legal right to exclude non-members from using a resource.¹⁶³ Can ideas arising from the commons literature, particularly the knowledge commons, be applied in the field of agricultural research? While the picture of international law appears rather gloom at the moment, examples from the grassroots offer rays of hope. The seed inspires: moving away from the farmer archetype, new communities are being created, on the basis of values, not profit, and engage with exchanges of seeds and preservation of agricultural biodiversity. Inspired by the successful experience in the software realm, others partner to experiment with the open source development model.¹⁶⁴ While such grassroots initiatives remain in an informal and largely unregulated sphere, their impact can be seen in the policy realm, with the CGIAR now changing its discourse to talk about research *for* development,¹⁶⁵ and increasingly engaging in participatory plant breeding initiatives.¹⁶⁶ Discussing and redefining the boundaries between what must remain in the public domain, what may be managed as a common and what can be privatized is now more than ever a critical issue for regulators and academics alike.

¹⁶³ Hess and Ostrom 'Introduction: An Overview of the Knowledge Commons' in C. Hess and E. Ostrom (eds). *Understanding Knowledge as a Commons: From Theory to Practice* (2007), 3-26.

¹⁶⁴ Tsioumani et al, *supra* note 9.

¹⁶⁵ See for instance the 2016 Third Global Conference on Agricultural Research for Development, website available at <http://www.gcard3.agric.za/index.php> (last visited 10 June 2016).

¹⁶⁶ R. Vernooy, P. Shrestha and B. Sthapit, *Community Seed Banks: Origins, Evolution and Prospects* (2015).