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Exploring Benefit-Sharing from the Lab to the Land (Part I): Agricultural Research and Development in the context of Conservation and Sustainable Use

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***Exploring Fair and Equitable Benefit-Sharing
from the Lab to the Land (Part I):
Agricultural Research and Development in the
Context of Conservation and the Sustainable Use
of Agricultural Biodiversity***

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Abstract

This paper explores the use and application of benefit-sharing arising out of the use of genetic resources for food and agriculture for research and development purposes, which is regulated mainly at the inter-State level, in light of equity considerations. It then explores benefit-sharing in relation to IPRs and farmers' rights, in particular the rights to use, save and exchange seeds, which are regulated at both the inter- and intra-State (domestic) levels. The paper concludes by delineating a research agenda, based on the inter-linkages of international law related to land, food and agriculture.

Keywords

Benefit-sharing, equity, agricultural development, farmers' rights, genetic resources, food, intellectual property, land

Exploring Benefit-Sharing from the Lab to the Land (Part I): Agricultural Research and Development in the context of Conservation and Sustainable Use

This paper is the first part of an ambitious exploration which seeks to map, interpret and analyze the use of the legal concept of *fair and equitable benefit-sharing* in the governance of land, food and agriculture. The ultimate aim of the research is to assess whether this concept serves *to operationalize equity* in the balancing of conflicting rights and policies in an increasingly complex legal and policy landscape.

Although a variety of international legal instruments will be examined, particularly with reference to international environmental and human rights law, the most prominent international treaties for the purposes of this research are the Convention on Biological Diversity (CBD)¹ and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR).² The CBD refers prominently to the fair and equitable sharing of benefits arising from the use of genetic resources as its third objective.³ Alongside conservation and sustainable use of biodiversity, benefit-sharing is to be applied across the programmes of work and other soft-law instruments developed under the Convention,⁴ including those related to agricultural biodiversity. CBD Article 15(7) specifies that the results of research and development and the benefits arising from the commercial and other utilization of genetic resources are to be shared with the country providing such resources.⁵ In addition, closely related to the CBD objective of benefit-sharing, a sophisticated system of access to plant genetic resources for food and agriculture (PGRFA) and the sharing of benefits arising from their use is operational in the framework of the ITPGR,⁶ which constitutes an obvious point of departure in this exploration.

Land planning and regulation, since interlinked with property law, have traditionally been considered within the purview of domestic law. Recently, however, a series of issues related to land management have resulted in increased international interest. These include the relevance of land management for addressing areas of common

¹ The UN Convention on Biological Diversity (CBD) entered into force on 29 December 1993 and currently has 194 Parties (notable exception the US).

² The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR) entered into force on 29 June 2004 and currently has 133 Parties.

³ CBD Article 1 reads: The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and 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.'

⁴ See BENELEX conceptual paper by E Morgera.

⁵ CBD Article 15(7) reads: Each Contracting Party shall take legislative, administrative or policy measures, as appropriate, and in accordance with Articles 16 and 19 and, where necessary, through the financial mechanism established by Articles 20 and 21 with the aim of sharing in a fair and equitable way the results of research and development and the benefits arising from the commercial and other utilization of genetic resources with the Contracting Party providing such resources. Such sharing shall be upon mutually agreed terms.

⁶ See ITPGR Arts. 1 and 10-13.

concern to humankind, such as desertification, deforestation, and the conservation and sustainable use of biodiversity, including agricultural biodiversity; and human rights issues raised in the context of large agricultural investments or commodity production. Despite such linkages, international land regulation is still in its infancy.

Against this background, the specific focus of this paper is benefit-sharing arising from the use of genetic resources and associated knowledge in the context of agricultural research and development. In the case of agricultural biodiversity, as explored below, conservation and use are linked: access to, or exchange of, genetic resources for food and agriculture and associated knowledge result in both conserving these resources and developing improved agricultural varieties. In addition, conservation and research and development take place both in farmers' fields and in scientific laboratories or genebanks; and depend on the contribution of both farmers' traditional knowledge and modern scientific knowledge.

This key observation guides the analysis in its entirety. In the context of genetic resource use, as will be fully explored below, benefit-sharing appears in *two arguably distinct but interlinked forms*. The first is the sharing of the benefits arising from the *future* utilization of genetic resources for research and development purposes, and the possible commercialization of the resulting varieties or products. In this case, the ITPGR identifies the following types of benefit-sharing: facilitated access to PGRFA (which is identified as a benefit in itself); exchange of information; access to and transfer of technology; and the sharing of monetary and other benefits arising from commercialization. Second is the sharing of the benefits arising from the *past* and *present* contributions of smallholder farmers, indigenous peoples and local communities as users and *stewards* of agricultural biodiversity on-farm. These benefits flow to humanity at large, and may be considered as part of the legal basis of a set of rights, which would enable farmers' *continued* contribution to the stewardship of the resources in the *future*.

A preliminary assessment of the academic literature in the field is also in order. The system for benefit-sharing from the use of plant genetic resources under the ITPGR is not only the most sophisticated in international law, but also serves to operationalize the third objective of the CBD in a specific sector of genetic resources. Yet its academic exploration seems to be confined within the small circle of academics and practitioners dealing specifically with the sector of genetic resources for food and agriculture.⁷ With the exception of the study of the implications of intellectual property rights (IPRs) in the conservation and use of genetic resources,⁸ including

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

⁸ See for instance D Leskien and M Flitner, *Intellectual Property Rights and Plant Genetic Resources: Options for a sui generis system* (International Plant Genetic Resources Institute, 1997); C Correa, 'Access to Plant Genetic Resources and Intellectual Property Rights' (FAO, CGRFA Background study

benefit-sharing and related rights, a systematic legal exploration of benefit-sharing under the ITPGR, in particular its linkages with relevant international law instruments⁹ and its potential relevance for other areas for international law¹⁰ is lacking. In addition, few legal scholars have attempted an examination of these matters within the context of general international law.¹¹

In light of the above, this paper will first explore the use and application of benefit-sharing arising out of the use of genetic resources for food and agriculture for research and development purposes, which is regulated mainly at the inter-State level, in light of equity considerations. Second, it will explore benefit-sharing in relation to IPRs and farmers' rights, in particular the rights to use, save and exchange seeds, which are regulated at both the inter- and intra-State (domestic) levels. The paper will conclude by delineating a research agenda, based on the inter-linkages of international law related to land, food and agriculture.

1. Background

According to the UN Food and Agriculture Organization (FAO), agriculture in the 21st century faces multiple challenges. It has to produce more food to feed a growing population with a smaller rural labor force, and more feedstocks for a potentially huge

paper no 8, 1999); LR Helfer, *Intellectual Property Rights in Plant Varieties: International legal regimes and policy options for national governments* (FAO, 2004); C Lawson, 'Patents and Plant Breeder's Rights over Plant Genetic Resources for Food and Agriculture' (2004) 32 *Federal Law Review* 107; K Raustiala and DG Victor, 'The Regime Complex for Plant Genetic Resources' (2004) 58 *International Organization* 277; F Yamin, 'Intellectual Property Rights, Biotechnology and Food Security' (IDS Working Paper 203, 2003), www.ids.ac.uk/publication/intellectual-property-rights-biotechnology-and-food-security; S Oberthur et al, *Intellectual Property Rights on Genetic Resources and the Fight against Poverty* (European Parliament, 2011).

⁹ Note however that 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, which entered into force on 12 October 2014 and currently has 53 Parties. See for instance JC Medaglia et al, 'The Interface between the Nagoya Protocol on ABS and the ITPGRFA at the International Level' (Fridtjof Nansen Institute, 2013), www.fnin.no/doc&pdf/FNI-R0113.pdf; 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* (Martinus Nijhoff, 2013), 83.

¹⁰ 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* (Martinus Nijhoff Publishers, 2014); and E Morgera, 'Benefit-sharing in marine areas beyond national jurisdiction: where are we at?' BENELEX blog post (May 2014), www.benelexblog.law.ed.ac.uk/2014/05/23/benefit-sharing-in-marine-areas-beyond-national-jurisdiction-where-are-we-at-part-i/.

¹¹ See however S Biber-Klemm and I Cottier (eds), *Rights to Plant Genetic Resources and Traditional Knowledge: Basic Issues and Perspectives* (CABI, 2005); C Chiarolla, *Intellectual Property, Agriculture and Global Food Security* (Edward Elgar, 2012); C Guneratne, *Genetic Resources, Equity and International Law* (Edward Elgar, 2012); and Morgera, Tsioumani and Buck (n 10).

bioenergy market. It has to contribute to overall development in the many agriculture-dependent developing countries, as well as adopt more efficient and sustainable production methods in the face of reduced resources and increased environmental pressures. It must also adapt to climate change.¹² 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.¹³ Never before has it been more important for humanity to generate, use fairly and share equitably the benefits of agricultural knowledge, technology and production.

Agriculture is different from other commodity production sectors, in that it has always been defined by a series of socioeconomic and cultural dimensions: throughout human history, the production and preparation of food has been a central focus of daily activity for the vast majority of the population. Agricultural biodiversity, the foundation of all agricultural production, has been inextricably linked both to the local environment and climate, and to cultural preferences and spiritual beliefs, in addition to providing the basis for sustainable livelihoods and food security. As a result, and in contrast to other forms of ‘wild’ biological diversity for which humans are mainly a threat and nuisance, agricultural biodiversity is largely a product of domestication: it is shaped and maintained by human activities and management practice. It represents an excellent example of the potential for positive interaction between humans and nature.¹⁴

As defined by the CBD, 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’.¹⁵ Agricultural biodiversity is the outcome of interactions among genetic resources, the environment, and the management systems and practices used by farmers.¹⁶

The conservation of agricultural biodiversity is thus linked to farmers’ traditional and local knowledge and participatory processes. For centuries, farmers have been

¹² See FAO, ‘Global Agriculture Towards 2050’ (FAO, 2009).

¹³ See International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD), *Global Summary for Decision Makers* (IAASTD, 2008), at 2-3.

¹⁴ See M Pimbert, ‘Sustaining the Multiple Functions of Agricultural Biodiversity: Agricultural Biodiversity’ (Background Paper prepared for the FAO/Netherlands Conference on ‘The Multifunctional Character of Agriculture and Land,’ FAO, 1999), www.fao.org/docrep/x2775e/X2775E03.htm#P8_42.

¹⁵ CBD Decision V/5 (2000), Appendix.

¹⁶ The CBD definition is also useful for indicating the breadth of this research, and the tight inter-linkages among the issues addressed: elements related to fair and equitable benefit-sharing in its different facets will be eventually explored across the spectrum of agricultural biodiversity: from the genetic to the ecosystem level.

engaged in collective systems of conservation and innovation, relying on open systems of exchange for seeds and other agriculture-related material. Crucially, unlike other natural resources, genetic resources are renewable, and usually a very small quantity is required for breeding, research and development.¹⁷ Another crucial characteristic of agricultural biodiversity is that conservation and use are linked: conservation is performed through use, and unless an agricultural variety is used, it cannot be conserved for more than a few decades before it eventually dies.

Landmarks in the history of agriculture for the purposes of this research include: the colonization of the Americas and the vast flow of agricultural species, mainly from the Americas to Europe and from South to North; the establishment of botanic gardens and later other ex situ facilities mainly in the North, which stored samples of agricultural varieties coming mainly from the global South; the beginning of scientific breeding and of the application of IPRs to protect modern varieties; the green revolution in the 1960s, the spread of monoculture practices and the first understanding of the risks of genetic diversity erosion; and the rise of genetics and the application of genetic engineering in food and agriculture.

The modernization of agriculture and the green revolution dramatically increased world food production through scientific and technological advances, including modern plant breeding, improved agronomy and the development of modern pesticides and fertilizers. As a result, several high-yielding varieties of crops were developed, and famine was reversed, at least in some parts of the world.¹⁸ The professionalization of breeding and the emergence of the commercial seed sector however shifted the focus from public research and innovation through customary farmer practices towards privately led research and the application of IPRs as a means to encourage research and innovation. This trend entails risks, both for the rights of smallholder farmers in developing countries who still rely on traditional seed systems for their livelihoods, and for agricultural biodiversity: the uniformisation promoted by the spread of commercial varieties results in genetic erosion (i.e. the loss of genetic diversity) and thus the vulnerability of agricultural production in the face of threats such as pests, diseases and climate change. In addition, the transformation of agriculture resulted in environmental degradation due to the excessive and inappropriate use of pesticides and fertilizers. The generally high price of modern agricultural inputs also increased social inequalities regarding income and access to technology, and had social impacts regarding land ownership and tenure.¹⁹

¹⁷ See Guneratne (n 11), at 69, who notes with regard to genetic resources: ‘Unlike mineral resources, large quantities do not have to be extracted in order to obtain the economic benefits to be derived from them, since their importance is contained in the information within them’.

¹⁸ Significant gains were experienced in Latin America and to some extent Asia, in contrast to Sub-Saharan Africa. For a succinct account of the green revolution, see International Food Policy Research Institute (IFPRI) ‘Green Revolution: Curse or Blessing?’ (IFPRI, 2002).

¹⁹ See KA Dahlberg, *Beyond the Green Revolution. The ecology and politics of global agricultural development* (Plenum Press, 1979); B Glaeser, *The Green Revolution Revisited: Critique and alternatives* (Routledge, 2011).

In this context, international law related to agriculture needs to perform multiple functions and resolve multiple tensions lying at the intersection between environmental, trade, 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. And crucially for the exploration of the potential of benefit-sharing, it needs to 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 require different and largely conflicting sets of measures, as described below.

Finally, as the field of regulation of genetic resources is a highly technical one, providing some definitions and explanations of key terms seems a pre-condition for the understanding of more general legal issues related to benefit-sharing. Thus 'genetic resources,' as agreed upon within the CBD framework, are 'genetic material of actual or potential value,'²⁰ with 'genetic material' being defined as 'any material of plant, animal, microbial or other origin containing functional units of heredity.'²¹ 'Units of heredity' are the parts of a living organism that can pass traits to offspring, i.e. those parts containing DNA or genes. Samples of genetic resources containing units of heredity, such as seeds, pollen, sperm or individual organisms, held in in situ or ex situ collections such as genebanks, are called 'germplasm.'²²

In the form of seeds or other plant propagating material,²³ PGRFA²⁴ are the necessary building blocks for crop improvement. They 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. Defined as 'any genetic material of plant origin of actual or potential value for food and agriculture,'²⁵ PGRFA thus provide the biological foundation for a large part of the world's agriculture and food production.²⁶ As such,

²⁰ As the definition of genetic resources does not specify the nature of 'actual or potential value', it can be inferred that this value does not need to be economic, but can also be scientific or even aesthetic: therefore, the term 'genetic resources' comprises virtually any genetic material.

²¹ CBD Article 2.

²² A Zaid, HG Hughes, E Porceddu and F Nicholas, *Glossary of Biotechnology for Food and Agriculture – A Revised and Augmented Edition of the Glossary of Biotechnology and Genetic Engineering* (FAO, 2001), www.fao.org/docrep/004/y2775e/y2775e00.htm.

²³ Understood as plants and parts thereof that are intended for plant cultivation or propagation.

²⁴ This paper focuses mostly on plant genetic resources, a sector which provides several examples of international regulation, including on benefit-sharing. The much less advanced regulation of benefit-sharing in the context of other sectors of genetic resources for food and agriculture, including domesticated animals, forest trees, fish and other aquatic organisms, micro-organisms and invertebrates will be addressed in detail in future research in the context of the BENELEX project.

²⁵ ITPGR Article 2.

²⁶ Chiarolla, Louafi and Schloen (n 9), at 84.

they play a crucial role in farmers' livelihoods, agricultural development and world food security.²⁷

PGRFA are important as an immediate resource, as they each have particular characteristics which are used in plant breeding for the development of improved varieties. These characteristics may relate, for instance, to resistance to pests, tolerance of drought or distinctive taste. At the same time, crop genetic diversity serves as an insurance against future needs and challenges, as the spread of few and uniform modern varieties increases crop vulnerability to diseases and pests.²⁸

Against this background, the next section will first examine the evolution of the principles regarding the governance of PGRFA and the implications of IPRs, as the context for the emergence of the concept of benefit-sharing. Different facets and applications of benefit-sharing will be explored first in its inter-State dimension, in international instruments including the CBD, its Protocols and decisions of its Conference of the Parties (COP); the ITPGR; and the ongoing discussions for amendment of the Agreement on Trade-related Aspects of Intellectual Property Rights (TRIPS) of the World Trade Organization (WTO).²⁹ Examination of intra-State benefit-sharing, in turn, will address linkages with farmers' rights in the context of these treaties and of international human rights instruments.³⁰

2. The evolution of the global governance of plant genetic resources

The concept of benefit-sharing from the use of PGRFA as currently reflected in international instruments emerged from the conceptualization of PGRFA and their benefits for humanity, and thus the need for international regulation; and the evolution of the principles of governance of PGRFA, in the context of associated equity concerns.

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 use.³¹ In addition to informal exchanges, farmers have also participated in more organized systems, such as seed fairs and community seed banks, often as a response to a crisis

²⁷ See FAO, *The Second Report on the State of the World's Plant Genetic Resources for Food and Agriculture* (FAO, 2010).

²⁸ G Moore and W Tymowski, *Explanatory Guide to the International Treaty on Plant Genetic Resources for Food and Agriculture* (IUCN, 2005), at 3-4.

²⁹ The Agreement on Trade-related Aspects of Intellectual Property Rights (TRIPS Agreement) entered into force on 1 January 1995 and applies to all 158 WTO Member States.

³⁰ The emergence of benefit-sharing in voluntary instruments regulating sustainable commodity production will be explored in future research as part of the BENELEX project.

³¹ See M Halewood, I Lopez Noriega and S Louafi, 'The Global Crop Commons and Access and Benefit-sharing Laws' in Halewood, Lopez Noriega and Louafi (n 7), at 2.

situation, such as wars, pests and extreme weather events.³² During these early times, before the emergence of exclusive technological and legal protection and enclosures enforced through the use of hybrid seeds³³ and IPRs, the benefits were the 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.³⁴ Exchanges were regulated on a customary basis, largely at the local level.

The formalization of the PGRFA sector through institution- and law-building is a relatively recent development. FAO, established in 1945, held the first technical conference on plant genetic resources in 1967. The aim was to draw attention to the impacts of genetic erosion and agree on collective conservation actions. At the heart of discussions was also the need for a predictable flow of samples for the development of improved varieties during those times of the green revolution.³⁵ The conference succeeded in placing PGRFA on the international agenda, and indicated, following an arduous debate, a preference for ex situ conservation methods.³⁶ No agreement was reached however with regard to coordinated actions.³⁷ 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.³⁸ The CGIAR was created in 1971, and eventually gathered several international agricultural research centres under its auspices. It was initially hosted by the World Bank, co-sponsored by FAO and the UN Development Programme (UNDP).³⁹

An important characteristic of the approach promoted by the CGIAR was a focus on 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

³² Ibid, at 2.

³³ 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. See M Halewood, 'What kind of goods are plant genetic resources for food and agriculture? Towards the identification and development of a new global commons' (2013) 7 *International Journal of the Commons* 278, at 289.

³⁴ 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.

³⁵ See Halewood, Lopez Noriega and Louafi (n 31), at 4; and GT Scarascia-Mugnozza and P Perrino 'The History of ex situ Conservation and Use of Plant Genetic Resources' in JMM Engels, V Ramanatha Rao, AHD Brown and MT Jackson (eds), *Managing Plant Genetic Diversity* (IPGRI, 2002), 1, at 5.

³⁶ R Pistorius, *Scientists, Plants and Politics: A history of the plant genetic resources movement* (IPGRI, 1997), at 33.

³⁷ Halewood, Lopez Noriega and Louafi (n 31), at 4.

³⁸ Selçuk Özgediz, *The CGIAR at 40: Institutional Evolution of the World's Premier Agricultural Research Network* (CGIAR, 2012), at 1-3.

³⁹ The potential leadership role of the World Bank and/or FAO was the subject of lengthy debate. See C Farrar, 'The Consultative Group for International Agricultural Research' (UN Vision Project on Global Public Policy Networks, Global Public Policy Case Studies, 1999), at 4-5.

accordance with the conclusions of the 1967 conference.⁴⁰ It can arguably be considered in line with the priorities of the green revolution at the time, which prioritized the development of high-yielding varieties of main agricultural crops and easy access to genebank samples for such development, over the conservation of genetic diversity.

The CGIAR centres stored a large percentage of the world's agricultural germplasm, which historically and under various circumstances flowed from developing countries (which were the centre of domestication of most major agricultural crops) to developed countries in Europe and North America.⁴¹ These transfers resulted in the South losing direct control over access to a remarkable part of its plant genetic resources.⁴²

At the time, international law was silent with respect to the conditions for access to and use of PGRFA in the CGIAR system; similarly, most national genebanks did not regulate access to their samples.⁴³ PGRFA were thus considered *de facto* to be in the public domain, available to anyone for any purpose, without restrictions and without the obligation to participate in their conservation and stewardship.⁴⁴ This seems to be considerably *unfair* and *inequitable* or at least *morally unjust* from the perspective of provider countries and farmers, given the historical circumstances of the transfer and the lack of any formal sharing of benefits from their use. Nevertheless, the CGIAR system has been compared to an 'open-source' system, the benefits of which, due to the lack of restrictions to access, circulate not only among its users but flow also to humanity at large. Byerlee, for instance, writes:

*All of these programs conformed to a classic definition of 'open-source collaboration', defined here to include (i) free distribution and redistribution of the original materials, (ii) free redistribution of materials derived from the originals, (iii) full sharing of information, including pedigrees and grain yield, disease resistance and other information relating to the materials, (iv) non-discrimination in participation in the networks, and (v) intellectual property rights on final materials that, if used, did not prevent their further use in research.*⁴⁵

⁴⁰ Halewood, Lopez Noriega and Louafi (n 31), at 4.

⁴¹ C Fowler, M Smale and S Gaiji, 'Germplasm Flows Between Developing Countries and the CGIAR: An Initial Assessment' (Global Forum on Agricultural Research, 2000), 1; Chiarolla (n 11), at 9.

⁴² Chiarolla (n 11), at 9.

⁴³ Halewood, Lopez Noriega and Louafi (n 31), at 12. It should be noted that genebanks are the main providers of genetic resource samples for research and development purposes, as it is easier, safer and less costly than access in situ.

⁴⁴ Ibid, at 12.

⁴⁵ D Byerlee, HJ Dubin, 'Crop improvement in the CGIAR as a global success story of open access and international collaboration' (2009) 4 *International Journal of the Commons* 452, www.thecommonsjournal.org/index.php/ijc/article/view/147/113.

These characteristics can be identified as forms of non-monetary benefit-sharing. In addition, and with a focus on sharing benefits with the most vulnerable, in this case developing countries, data indicates that low-income countries were net beneficiaries of the system: developing countries were substantial *recipients* of germplasm samples from the CGIAR system, which indicates the benefits of the ‘open access’ system.⁴⁶

The internationalization of ex situ PGRFA collections via the creation of the CGIAR took place in a context of rising tensions about IPRs and perceived inequities concerning who bore the cost of conservation and who benefitted more from its use – namely private companies located in developed countries.⁴⁷ Although plant breeders’ rights under the International Union for the Protection of New Varieties of Plants (UPOV)⁴⁸ were in existence as early as the 1960s, the case of *Diamond vs. Chakrabarty* in the US⁴⁹ opened the way to the *patenting* of living organisms and gave rise to increasing discussions and concerns about the risk of the commodification of PGRFA. The strengthening of IPR protection 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: developing country governments began to realize that the introduction of patents 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’,⁵⁰ restricting their availability. 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.

2.1 *International Undertaking and the principle of common heritage*

The non-binding International Undertaking constituted the first attempt to regulate PGRFA in international law. Adopted by the FAO conference in 1983,⁵¹ and despite the change in dynamics described above, the Undertaking largely institutionalized 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

⁴⁶ Fowler, Smale and Gaiji (n 41), at 8. The issue of linkages between benefit-sharing and restrictions to access is identified as a topic worthy of further research.

⁴⁷ Halewood, Lopez Noriega and Louafi (n 31), at 5.

⁴⁸ Established in 1961 by the International Convention for the Protection of New Varieties of Plants, UPOV is an intergovernmental organization with 71 Members to date, which provides the basis for Members to encourage breeding of new plant varieties by granting intellectual property rights and breeders’ rights.

⁴⁹ US Supreme Court Decision *Diamond vs. Chakrabarty* (1980) 447 US 303, 310, 206 USPQ 193, 197.

⁵⁰ P Mooney, ‘The Law of the Seed: Another Development and Plant Genetic Resources’ (1983) *Development Dialogue* 1, at 24, www.dhf.uu.se/pdf/83_1-2.pdf. Mooney cites incidents around the world indicating the growing unwillingness of local officials in developing countries to provide access to germplasm.

⁵¹ By FAO Resolution 8/83.

promoted by the CGIAR. 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.’⁵²

The framework established by the Undertaking sought to benefit humanity as a whole, with no mention of a mechanism for the sharing of benefits to specific fractions of humanity, for instance the most vulnerable or less equipped for agricultural research and development. It was simply noted 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.’⁵³ In addition, a preambular paragraph stipulated that it was the responsibility of governments *to ensure the equitable and unrestricted distribution of the benefits of plant breeding*.

Still, as noted above, despite the absence of formal benefit-sharing arrangements, the CGIAR centres’ open-access policy seemed to generate substantial non-monetary benefits. These benefits would flow to developing countries in the form of the distribution and redistribution of genetic material and information about this material, and lack of IPR-related restrictions for further research. In addition, as at the time most agricultural research was conducted by public institutions, the results of the work were shared,⁵⁴ which can also be perceived as a benefit in itself.

The Undertaking sought to institutionalize the pre-existing regime of the unrestricted availability of PGRFA via a *sui generis* application of the principle of common heritage. The reference to the common heritage principle in the Undertaking is, however, less sophisticated than that in the UN Convention on the Law of the Sea (UNCLOS). A close comparison of the two seems well worthy of additional research, particularly given the lack of scholarly reflection on this point. Under UNCLOS, the principle of common heritage includes 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

⁵² International Undertaking on Plant Genetic Resources for Food and Agriculture, 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.’ See also discussion of the principle of common heritage in the BENELEX conceptual paper by Morgera.

⁵³ International Undertaking, Article 7(h)(ii) (emphasis added).

⁵⁴ ‘It was a more naive and innocent world,’ as noted by G 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* (Kluwer, 2004), 55, at 55. See also HJ Bordwin, ‘The Legal and Political Implications of the International Undertaking on Plant Genetic Resources’ (1985) 12 *Ecology Law Quarterly* 1053.

international institution⁵⁵ that embodies a multilateral shared-management and benefit-sharing machinery.⁵⁶ The preamble to the Undertaking, on the other hand, simply notes that ‘it is the responsibility of governments to undertake such activities as are needed to ensure the exploration ... and exchange of plant genetic resources in the interest of all mankind; to provide financial and technological support to institutions engaged in such activities; and to ensure the equitable and unrestricted distribution of the benefits of plant breeding.’ In addition, rather than creating an international management institution, the Undertaking developed an *internationally coordinated network* of centers, including the pre-existing CGIAR centers, which would now operate under the auspices of the FAO and assume the responsibility of holding PGRFA collections ‘for the benefit of the international community and on the principle of unrestricted exchange’.⁵⁷ The difference in the application of the common heritage principle between UNCLOS and the Undertaking may be attributed to the importance of continued exchanges of PGRFA for food security, as well as to the relatively low technological capacity required for plant breeding (at least in traditional forms). This is further supported by the informal sharing of benefits documented in the context of the CGIAR centres as noted above. 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.

As noted, the (non-binding) Undertaking emerged to a large extent due to developing countries’ early equity-related concerns arising from the protection of modern varieties in contrast to (their) raw germplasm. IPRs were at the heart of the impasse, and this was already noteworthy at the time of adoption. Some developed countries⁵⁸ were reluctant to allow the principle of common heritage to apply to their modern varieties, giving priority to IPRs, in particular plant breeders’ rights under UPOV, over unrestricted exchange for the benefit of the international community. On the other side, developing countries started first identifying themselves as the countries of origin and providers of biodiversity⁵⁹ and second, formulating concerns about protection of their farmers’ rights and farmer varieties.⁶⁰ IPRs were used to protect varieties originating from freely-accessed germplasm and farmer varieties coming from developing countries via the CGIAR centres and other genebanks. The emergence of IPRs can thus be seen as a catalyst for the radical shift in the global governance of genetic resources: from the principle of common heritage to the

⁵⁵ The 1982 UN Convention on the Law of the Sea entered into force on 16 November 1994 and currently has 166 Parties. See UNCLOS Arts. 136-141.

⁵⁶ P Birnie, A Boyle and C Redgwell, *International Law and the Environment* (OUP, 2009), at 128-130 and 197. See BENELEX conceptual paper by Morgera.

⁵⁷ International Undertaking Article 7(a).

⁵⁸ Canada, France, Germany, Japan, New Zealand, Switzerland, the United Kingdom, and the United States signed the Undertaking with reservations.

⁵⁹ NI Vavilov, ‘Studies on the Origin of Cultivated Plants’ (1925) 26 *Bull. of Applied Botany*, 1.

⁶⁰ The issue of farmers’ rights is addressed below.

principle of national sovereignty over natural and genetic resources embedded in the CBD. These two trends in the ownership of genetic resources, private and national, will be briefly examined below, in turn.

2.2. *Intellectual property rights and private control of genetic resources*

The privatization of plant varieties through the use of IPRs acted as *the* catalyst for the change of scenery in PGRFA governance in that the restrictions in use IPRs entail created a major *enclosure* in the previously open-access and unrestricted exchange systems of genetic resources.⁶¹ This naturally resulted in rising equity concerns. Why would some varieties be considered public goods and be freely accessible, while others were considered private property and restrictions were put in place on their use? The emergence of the principle of national sovereignty over genetic resources was partly a response to this situation. It aimed to defend the rights of countries providing genetic resources by creating a second, *defensive enclosure* in the previously open systems. The discomfort of developing countries was particularly increased first by the insistence of developed countries to include IPRs in the Uruguay round of trade negotiations which resulted in the TRIPS Agreement, and second by the fact that Europe and the US had for decades exerted bilateral pressure on several developing countries to enforce legislation providing IP protection for their biologically-based products exceeding even the TRIPS standards.⁶² As will be examined in the next section, CBD rules subject access to genetic resources to the prior informed consent of the country providing those resources and to the sharing of the benefits arising from their commercial or other utilization.⁶³ Benefit-sharing is thus linked to the principle of national sovereignty, and has a *corrective* function against the perceived injustice created by the emergence of IPRs. To better understand the rationale of benefit-sharing, the problematic relationship between IPRs and agricultural biodiversity needs to be explored. The focus will be on identifying equity-related considerations arising from relevant IPR instruments, in particular the UPOV Convention, followed by a brief comparison of plant breeders' rights under UPOV with patents under the TRIPS Agreement.

The rationale behind the existence of IPRs is to foster and reward creativity and innovation by protecting inventions of the mind.⁶⁴ IP-driven discoveries can thus

⁶¹ The impact of IPRs was eloquently summarized 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.' C 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* (Crop Science Society of America, 1993), 127, at 128..

⁶² See C Toro Pérez, 'Biodiversity in the FTAs with the USA and Europe: the crisis of the Andean integration process' (2009), <http://www.bilaterals.org/?biodiversity-in-the-ftas-with-the>; C Correa, 'Negotiation of a Free Trade Agreement European Union-India: Will India Accept TRIPS-Plus Protection?' (Oxfam, 2009), www.oxfam.de/download/correa_eu_india_fta.pdf.

⁶³ CBD Article 15.

⁶⁴ See WIPO, 'What is Intellectual Property' www.wipo.int/about-ip/en/. In economic terms, the effect of IPRs is to transform a 'non-rival public good' (knowledge) into a good subject to private control. See C Correa 'Sovereign and Property Rights over Plant Genetic Resources' (FAO, 1994).

address global challenges, including those related to food and agriculture. However, it has been widely argued that, particularly in the field of agriculture, IPRs are designed to suit the needs and agricultural production systems of developed countries. For developing countries, the costs of strengthening IPRs may outweigh the possible gains: IPRs and IPR-protected inputs and technologies tend to reduce national developmental choices, and make research and development more expensive, and agriculture more unsustainable.⁶⁵ The most vulnerable groups in developing countries, including smallholder farmers and indigenous peoples, are particularly at risk: IPRs facilitate control by agrochemical companies and restrict farmers' ability to save and exchange seeds from IPR-protected plants, thus creating tension with farmers' rights.⁶⁶ Combined with payments in the form of royalties, these factors undermine the food security and livelihoods of these groups,⁶⁷ making IPRs a threat to the right to food.⁶⁸ IPR-related restrictions are exacerbated by the emergence of modern biotechnologies, and developed countries' increased technological capacity to exploit biological diversity for commercial gain. At the same time, they constitute a well-known barrier to technology transfer, which in turn is a form of non-monetary benefit-sharing.

The tension between IPR and biodiversity law, including in the food and agriculture context, is well-studied albeit still unresolved in legal and policy terms.⁶⁹ There are certain fundamental characteristics lying at the heart of IP law, which make compromises hard to find.

Plant breeders' rights are a common type of IPR protecting plant varieties. Promoting a system of private ownership 'with the aim of encouraging the development of new varieties of plants for the benefit of society,'⁷⁰ the 1961 UPOV Convention established *sui generis* IPRs (plant breeders' rights) over plant varieties.⁷¹ Standards adopted under the UPOV Convention provide protection to novel (in terms of prior commercialization)⁷² and distinct, uniform and stable plant varieties. 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

⁶⁵ See Yamin (n 8); Commission on Intellectual Property Rights, *Integrating Intellectual Property Rights and Development Policy* (CIPR, 2002), at 58–61.

⁶⁶ The concept of farmers' rights and its link with benefit-sharing is addressed in detail below.

⁶⁷ Yamin (n 8), at 7.

⁶⁸ See 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; 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.

⁶⁹ See Raustiala and Victor (n 8); C Oguamanam 'Regime Tension in the Intellectual Property Rights Arena: Farmers' Rights and Post-TRIPS Counter Regime Trends' (2006) 29 *Dalhousie Law Journal*, 413.

⁷⁰ Mission statement of the International Convention for the Protection of New Varieties of Plants, www.upov.int/en/about/mission.html.

⁷¹ The UPOV Convention was subsequently amended in 1972, 1978, and 1991.

⁷² UPOV Convention Article 6(1).

breeding (breeders' exception) and the re-use of saved seeds by farmers.⁷³ Both are important mechanisms to generate diversity, as well as tools for an equitable balancing of rights. As a result of the novelty requirement of intellectual property protection, however, 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. As noted above, this asymmetry between improved and traditional (farmer-developed) germplasm has led to widely-perceived unfairness among developing countries—their germplasm could be acquired and shared freely and could be used in the development of modern varieties, which would then be protected by exclusive property rights.

UPOV Membership was boosted with the adoption of the TRIPS Agreement in 1994, as WTO Member States are required to provide for the protection of plant varieties either by patents or by an effective *sui generis* system.⁷⁴ Although countries are free to identify a system to suit their particular agricultural and socioeconomic conditions, the UPOV Convention, as a ready-made framework, is obviously an easy choice. 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.⁷⁵

Furthermore, the revision of the UPOV Convention in 1991 and the growing acceptance of patents on plant materials, including genes, have changed the legal framework in which on-farm conservation and germplasm exchange take place. The 1991 UPOV Act extended the scope of protection beyond the propagating material of protected varieties to include 'essentially derived varieties.'⁷⁶ The plant breeders' exemption was preserved.⁷⁷ Acts done 'privately and for non-commercial purposes' or 'for experimental purposes' are also exempted.⁷⁸ However, a major implication of the amendment is that the farmers' privilege for replanting is restricted. The 1991 UPOV Act requires farmers to limit the amount of saved seeds or to pay an equitable

⁷³ Correa (n 8), at 3.

⁷⁴ Under review since 1999, Article 27.3b of the TRIPS Agreement reads:

Members may also exclude from patentability:

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

⁷⁵ See D Alker and F Heidhues, 'Farmers' Rights and Intellectual Property Rights – Reconciling Conflicting Concepts' in RE Evenson, V Santaniello and D Zilberman, *Economic and Social Issues in Agricultural Biotechnology* (CABI, 2002) 66; Yamin (n 8); CIPR (n 65), at 58–61.

⁷⁶ 1991 UPOV Act Article 14(5).

⁷⁷ According to 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.' See Chiarolla (n 11), at 84.

⁷⁸ Ibid, at 84.

remuneration to the right holder.⁷⁹ In addition, use of protected varieties by farmers is permitted only for propagating and planting on their own holdings; the informal sale of protected varieties falls outside the scope of the farmers' privilege.⁸⁰ From an equity perspective, these provisions limit the discretion of Member States – typically developing countries – that wish to protect their agricultural systems that rely upon the cultivation of traditional varieties by smallscale farmers; and aggravate the asymmetry in protection between modern and traditional varieties.

Any such exceptions 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 author's knowledge, patents on plant varieties are only allowed in the United States, Japan, and Australia.⁸¹ With the breakthrough of modern biotechnology, however, patents have been granted on genetically modified plants and plant material such as genes.

With regard to the impact of IPRs on access to, and sovereignty over, plant genetic resources, Correa identifies four major problems:⁸²

1. A large number of patents have been granted on genetic resources obtained from developing countries, often without the knowledge and consent of the possessors, a trend dubbed as 'biopiracy';
2. Some of the patents granted have a broad scope, thus limiting access to a wide segment of germplasm, such as the case of 'species-wide' patents;
3. In some cases, IPR protection was sought over materials deposited in genebanks and held in trust for the international community by the CGIAR centers. These cases resulted in the formulation of the CGIAR policy that germplasm held in trust should not be subject to IPRs by the Centres or the recipients of the material;⁸³ and
4. The protection by IPRs of living material, including plants, raises a number of ethical questions.

The observations and examples below serve to provide an illustration of these issues.

⁷⁹ According to Article 15, the farmers' privilege is allowed at the option of UPOV member states 'within reasonable limits and subject to the safeguarding of the legitimate interests of the breeder.'

⁸⁰ Article 15(2). See Chiarolla (n 11), at 85; C Correa, *Intellectual Property Rights, the WTO and Developing Countries: The TRIPS Agreement and Policy Options* (Zed Books, 2000).

⁸¹ Chiarolla (n 11), at 62–3.

⁸² Correa (n 8), at 5–6.

⁸³ CGIAR, 'CGIAR Centers Statements on Genetic Resources, Intellectual Property Rights and Biotechnology' (CGIAR, 1999).

A basic question in the application of patent laws has been whether isolated genes and other biological materials may be deemed ‘invented’ and thus eligible for patent protection. In addition, the *level* of inventive step required to grant a patent is crucial to determine the extent to which patents on genetic resources may be acquired.

An interesting example illustrating more than one of the problems identified above is provided by the enola patent,⁸⁴ a US patent granted in 1999 on an arguably distinct yellow bean variety. The patentee had purchased a bag of commercial bean seeds in Mexico and selected the yellow seeds for several generations through conventional methods until he obtained a ‘uniform and stable population’ of yellow bean seeds. The patent was granted and enforced against Mexican farmers selling Mexican yellow beans in the US, basically destroying their trade. In addition, the case represents a concrete example of violation of the IPR-related provisions of the agreements placing the CGIAR Centres’ collections under the auspices of FAO:⁸⁵ it was found that the patented variety was identical to at least six well-known bean varieties stored in the seed banks of the International Center for Tropical Agriculture (CIAT), one of the CGIAR centres. After nine years of litigation initiated by CIAT, the US court of appeals ruled that all the patent claims were ‘obvious’ and therefore invalid.⁸⁶ And this is just one example: 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 quinoa, neem tree and turmeric.⁸⁷

Similar questions arise with regard to patents on minor changes to existing technologies. If accepted, such patents may affect the availability of generic versions of genetically modified plant varieties after the original patents have expired – which is a major impediment to technology transfer. Finally, the multiplicity of patents of a single genetically engineered trait in plants and the patenting of components and methods for genetic engineering may mean that, although a genetically engineered trait as such may be in the public domain, the commercialization of seeds containing it or directly resulting from a patented method might be prevented on the basis of other patents in force.⁸⁸

Another matter of concern, particularly for genetic resources for food and agriculture, has been the breadth of patent claims. In some cases, claims covering a genetic

⁸⁴ US patent 5,894,079.

⁸⁵ Agreement with FAO to Place CGIAR Center In-Trust Collections of Plant Genetic Resources under the Auspices of FAO (1994).

⁸⁶ Chiarolla (n 11), at 127. See CIAT, ‘New Legal Decision Against Enola Bean’ (July 2009), www.ciatnews.cgiar.org/2009/07/22/new-legal-decision-against-enola-bean/.

⁸⁷ See PR Mooney, ‘The Parts of Life. Agricultural Biodiversity, Indigenous Knowledge and the Role of the Third System’ (1998) *Development Dialogue*, 1.

⁸⁸ See C Correa, ‘Trends in Intellectual Property Rights Relating to Genetic Resources for Food and Agriculture’ (FAO, 1999), [ftp://ftp.fao.org/docrep/fao/meeting/017/k533e.pdf](http://ftp.fao.org/docrep/fao/meeting/017/k533e.pdf).

modification in many field crops or throughout an entire species (meaning several varieties) have been granted. For instance, in 2007, the European Patent Office revoked, after 13 years of procedures, a species-wide patent on GM soybeans, challenged by several NGOs.⁸⁹ The sheer amount of resources and time needed to challenge and eventually revoke an erroneous patent (for instance due to lack of knowledge of prior art) is obvious, as is the significant length of time during which this patent is enforced.

Nonetheless, the interaction between IPRs and benefit-sharing can also be constructed in positive terms. As it will be explored below in the context of the ITPGR, IPRs may provide the means for monetary benefit-sharing. In addition, IPR-related processes may provide a way to monitor whether benefit-sharing has been performed. This is one of the objectives of the proposal to amend the TRIPS Agreement to bring it in line with the CBD, as discussed below.

2.3 *The CBD and the principle of national sovereignty over natural and genetic resources*

As anticipated above, the principle of national sovereignty over genetic resources can be seen as a *defensive* tool against the use of IPRs; and benefit-sharing, at least in its inter-State dimension and as enshrined in the CBD, as a tool *correcting* the injustices embedded in the IPR system. 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.’⁹⁰

The shift in principles from common heritage to national sovereignty should be viewed 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.⁹¹ It can be further justified due to the growing expectations of the commercial value of biodiversity.⁹² The emergence of the biotechnology industry in the 1990s and the possibility to patent its products are at the centre of these expectations. It is true that the adoption of the CBD was the culmination of public concern over environmental concerns and biodiversity loss. However, at the same time, ‘the Convention . . . was anticipating a

⁸⁹ See ETC Group, ‘Revoked!! Monsanto Monopoly Nixed in Munich’ (3 May 2007), www.etcgroup.org/fr/node/619.

⁹⁰ Halewood et al (n 31), at 6.

⁹¹ See BENELEX conceptual paper by Morgera.

⁹² M Petit, C Fowler, W Collins, C Correa, and CG Thornström, *Why Governments Can’t Make Policy: The Case of Plant Genetic Resources in the International Arena* (CIP, 2001), 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 (Fridtjof Nansen Institute, 2004), at 37–41.

market and laying the ideological basis for commercial transactions. It both reflected and encouraged existing expectations that there would soon be a substantial market for biodiversity, the benefits from which would flow to developing countries.⁹³ 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.⁹⁴

Based therefore on the principle of national sovereignty over natural and genetic resources, the CBD is a legally binding treaty and expression of the North-South divide described above.⁹⁵ Its influence on the FAO realm was immediate: even before finalization of the CBD negotiations, the 1991 FAO conference adopted Resolution 3/91, which endorsed that ‘nations have sovereign rights over their plant genetic resources,’ and recognized that ‘the concept of mankind’s heritage as applied in the International Undertaking, is subject to the sovereignty of the States over their plant genetic resources.’⁹⁶ At the same time, it implicitly addressed benefit-sharing by stating 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 by establishing an international fund to support plant conservation and utilization programmes and implement farmers’ rights.⁹⁷

Not surprisingly, the principle of common heritage was rejected in the CBD negotiations, revealing what may be the central weakness of the common heritage concept: that it is largely motivated by States’ desire for access to resources rather than by genuine community interest in their protection.⁹⁸ The CBD affirms instead that the conservation of biodiversity is a ‘common concern of humankind,’ indicating that it is an issue involving global responsibilities and requiring global cooperation.⁹⁹ In parallel to the affirmation of the principle of national sovereignty, it includes a provision on access to genetic resources, which recognizes that the authority to determine such access rests with national governments and is subject to national legislation.¹⁰⁰ At the same time, it refers prominently to benefit-sharing as its third objective in Article 1: ‘the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources

⁹³ Petit et al (n 92), at 8–9; Raustiala and Victor (n 8).

⁹⁴ See BENELEX conceptual paper by Morgera.

⁹⁵ CBD Article 3.

⁹⁶ FAO Resolution 3/91, preamble.

⁹⁷ FAO Resolution 3/91, preamble and paras 3–4.

⁹⁸ J Brunnée ‘Common Areas, Common Heritage, and Common Concern’ in D Bodansky, J Brunnée, and E Hey, *The Oxford Handbook of International Environmental Law* (Oxford University Press, 2008), 551, at 558.

⁹⁹ See Birnie, Boyle and Redgwell (n 56), at 129–130, who identify three elements as part of the concept of common concern: the global responsibilities in question have an *erga omnes* character, owed to the international community as a whole; states’ responsibilities are equitably differentiated between developed and developing countries; and application of the precautionary approach is required.

¹⁰⁰ CBD Article 15.

and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.’

The shift in principles of governance of PGRFA had very practical consequences for the *ex situ* collections held by the CGIAR centres. In the early 1990s, widely publicized rumours had it that the World Bank may appropriate the collections, or that the host countries may seek to control them, or that the centres themselves may seek to do so.¹⁰¹ Under pressure to end such controversies, in 1994 the centres signed agreements with the FAO, placing their collections within the international network of the International Undertaking. They affirmed that they held their collections ‘in trust for the benefit of the international community,’ and that they would not claim legal ownership or IPRs over the germplasm.¹⁰² Following the finalization of the negotiations for the ITPGR (discussed below) and its entry into force, agreements were signed between the CGIAR centres and the Governing Body of the ITPGR, placing the in-trust international crop and forage collections within the Treaty’s framework.¹⁰³

3. Agricultural Biodiversity and Inter-State Benefit-Sharing

The current picture of global PGRFA governance is largely defined by the CBD and the ITPGR. This section will review specific applications of benefit-sharing with regard to agricultural biodiversity at the inter-State level, starting from the CBD and instruments adopted under its auspices, including the programme of work on agricultural biodiversity and related instruments, as well as the Cartagena Protocol on Biosafety and the Nagoya Protocol on access and benefit-sharing, which address benefit-sharing in different contexts and levels. It will then concentrate on the ITPGR, which attempts to operationalize benefit-sharing from the use of PGRFA at the multilateral level. Finally, in view of the relevance of IPRs for agricultural biodiversity and food security, it will briefly review the negotiations for the amendment of the TRIPS Agreement in line with the CBD and the proposed requirement for the disclosure of benefit-sharing as part of patent applications.¹⁰⁴

3.1. *Benefit-sharing and agricultural biodiversity: the CBD in context*

The CBD refers prominently to fair and equitable benefit-sharing arising from the use of genetic resources as its third objective. Benefit-sharing is thus to be applied as a cross-cutting issue throughout the programmes of work of the Convention, including

¹⁰¹ Halewood et al (n 31), at 12-13.

¹⁰² Ibid, at 13; see CGIAR Statement (n 83).

¹⁰³ Currently, at least 50 per cent of the material positively identified as being in the Multilateral System and exchanged according to the benefit-sharing terms of the standard Material Transfer Agreement is hosted by the CGIAR centres. See Halewood et al (n 31), at 14.

¹⁰⁴ Applications of benefit-sharing in voluntary instruments on responsible agricultural investment will be investigated in future research as part of the BENELEX project.

that on agricultural biodiversity. In addition, benefit-sharing is the objective of the CBD Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization,¹⁰⁵ which also addresses the specific issue of genetic resources for food and agriculture. Some elements of benefit-sharing of relevance are also to be found within the CBD Cartagena Protocol on Biosafety,¹⁰⁶ which will be addressed in the context of relevant human rights obligations.

As noted above, agricultural biodiversity is defined as including all components of biodiversity of relevance to food and agriculture and all components of agricultural ecosystems, at the genetic, species and ecosystem levels.¹⁰⁷ The focus of CBD instruments on agricultural biodiversity is therefore broader than genetic resources. Thus, although benefit-sharing is still mostly linked to the use of genetic resources, there are elements indicating linkages with conservation and sustainable use of agricultural ecosystems - in other words, linkages with the *stewardship* of such ecosystems.¹⁰⁸

3.1.1 Programme of Work on Agricultural Biodiversity and Related Instruments

In 1996, when CBD Parties decided to establish a multi-year programme of work on agricultural biodiversity, the promotion of fair and equitable benefit-sharing arising out of the use of genetic resources was already among its aims.¹⁰⁹ In parallel with the main elements of benefit-sharing singled out in the third CBD objective, the sharing of experiences and ‘the transfer of knowledge and technologies’ as specific forms of benefit-sharing of particular relevance to the conservation and sustainable use of agricultural biodiversity featured among the components of the work programme. Implementation of the programme of work¹¹⁰ needs to take into account the application of the ecosystem approach,¹¹¹ which requires, among others, the ‘equitable distribution of benefits.’¹¹² This can be interpreted as a means to support measures for the on-farm management of agricultural biodiversity at the local level, and build the capacity of local communities and smallholder farmers in that regard.

¹⁰⁵ See n 9.

¹⁰⁶ With 167 Parties to date, the Biosafety Protocol entered into force on 11 September 2003.

¹⁰⁷ CBD Decision V/5 (2000), Appendix.

¹⁰⁸ See BENELEX conceptual paper by Morgera.

¹⁰⁹ CBD Decision III/11 (1996).

¹¹⁰ CBD Decision V/5.

¹¹¹ The ecosystem approach is considered the primary framework for action under the CBD. It is a strategy for the integrated management of land, water and living resources, which promotes conservation and sustainable use in an equitable way and recognizes that humans, with their cultural diversity, are an integral component of ecosystems. See CBD Decision V/6 (2000) and BENELEX conceptual paper by Morgera.

¹¹² This is usefully specified in the operational guidance on the ecosystem approach adopted by the CBD Conference of the Parties, which notes that ecosystem functions ‘should benefit the stakeholders responsible for their production and management’ through inter alia capacity building, especially at the level of local communities managing biological diversity in ecosystems, and the removal of perverse incentives and, where appropriate, their replacement with local incentives for good management practices.

This interpretation is also reflected in the programme of work on agricultural biodiversity, which highlights that the management of agricultural biodiversity requires ‘genuine participation of stakeholders in decision-making and in the sharing of benefits’; while ‘benefit-sharing arrangements and incentive measures’ are identified as required to support local-level management of agricultural biodiversity.¹¹³ Although the programme of work has made the need for local-level benefit-sharing conceptually clear, a *typology* of such benefit-sharing arrangements and incentive measures would be a welcome additional specification to guide legislative action at the national level.

The decision on the International Pollinators Initiative¹¹⁴ provides an interesting conceptualization of benefit-sharing as an incentive to support *local-level management* (thus operating mainly at the intra-State level), to protect a *global public good* and thus achieve a *global benefit*.¹¹⁵ Pollination is a key process in both human-managed and natural terrestrial ecosystems: it links directly wild with agricultural ecosystems and is critical for global food production and human livelihoods.¹¹⁶ Pollination is thus considered a global ecosystem service, without which many interconnected species and processes functioning within an ecosystem would collapse. It is currently under threat, mainly due to land-use change¹¹⁷ as a result of habitat fragmentation and, ironically, the expansion of industrial agriculture. While it is often erroneously assumed to be ‘free,’ pollination conservation requires resources, mainly in the form of the preservation of natural vegetation to support populations of pollinators.

The interaction between local-level management and global benefits foreseen under the Pollinators Initiative is certainly an interesting one and will be further researched in the future within the project.¹¹⁸ It should also be preliminarily noted that the CBD-endorsed plan of action for the Pollinators Initiative¹¹⁹ already provides certain indications for the application of benefit-sharing in this context. The knowledge, innovations and practices of farmers, indigenous peoples and local communities in sustaining pollinator diversity and agro-ecosystem services for food production and food security are to be assessed, alongside scientific taxonomic knowledge, to identify gaps and opportunities for application.¹²⁰ At the same time, such knowledge and practices are to be supported, and farmers’ and communities’ capacities

¹¹³ CBD COP Decision V/5, Annex, Programme element 3: capacity-building.

¹¹⁴ CBD Decision VI/5 (2002), Annex II: Plan of Action for the International Initiative for the Conservation and Sustainable Use of Pollinators.

¹¹⁵ Ibid.

¹¹⁶ See FAO ‘Pollination and Human Livelihoods’, <http://www.internationalpollinatorsinitiative.org/>.

¹¹⁷ See S Lautenbach et al, ‘Spatial and Temporal Trends of Global Pollination Benefit’ (2012) 7 PLoS ONE e35954.

¹¹⁸ Parallels can also be identified in the climate context: see BENELEX working paper by A Savaresi.

¹¹⁹ CBD Decision VI/5, Annex II.

¹²⁰ Ibid, element 1: Assessment, activity 1(3).

strengthened:¹²¹ it is acknowledged that ‘the management of pollinator diversity involves many stakeholders and often implies transfers of costs and benefits between stakeholder groups.’ Mechanisms should therefore ‘be developed not only to consult stakeholder groups, but also to facilitate their genuine participation in decision-making and in the sharing of benefits.’¹²² In addition, possible improvements in the policy environment to support local-level management of pollinators and related dimensions of biodiversity in agricultural ecosystems include ‘benefit-sharing arrangements and incentive measures,’ such as certification schemes.¹²³

Given the limited legal literature on the interplay between local-level management and the protection of global public goods, future research will address these linkages, and in particular the potential and limitations of market-based approaches, such as certification schemes, in addition to rights-based approaches under the concept of farmers’ rights.

3.1.2 The Cartagena Protocol on Biosafety and modern biotechnology in the context of the right to benefit from scientific progress

The Biosafety Protocol is an international agreement which aims to ensure the safe handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effects on biodiversity, while also taking into account risks to human health.¹²⁴ The creation of transgenic agricultural crop varieties¹²⁵ has been one of the most prominent developments of modern biotechnology.

Benefit-sharing in this context can be envisaged in two ways, both related to information sharing and technology transfer: first, with regard to the sharing of the benefits arising from *biosafety*-related research, thus the sharing of the results of research aiming to avoid or minimize the risks of modern biotechnology; and second, with regard to the sharing of the benefits arising from modern biotechnology directly.

The Biosafety Protocol was adopted at a time when the global debate on genetic engineering was at its peak,¹²⁶ but its mandate is rather narrow. It establishes an

¹²¹ For a parallel discussion on traditional knowledge and adaptation to climate change, see the research agenda identified in the BENELEX working paper by Savaresi.

¹²² CBD Decision VI/5, Annex II, element 3: Capacity-building, rationale.

¹²³ CBD Decision VI/5, Annex II, element 2: Adaptive management, activity 2(2); and element 3: Capacity-building, activity 3(3).

¹²⁴ Biosafety Protocol Article 1.

¹²⁵ Most commercialized genetically modified crops fall within two categories: those modified to be resistant to herbicides, and those modified to express the Bt toxin to serve as a pesticide.

¹²⁶ To put a highly polarized debate in a nutshell, proponents highlight the potential of genetic engineering in healthcare, agriculture, industrial production and environmental protection. Opponents draw attention to potential risks to the environment and human health, socioeconomic concerns regarding for instance the disruption of small-scale farming systems and the concentration of agro-chemicals companies in the sector, and ethical considerations.

advance informed agreement procedure for imports of LMOs for intentional introduction into the environment, and also incorporates the precautionary approach and mechanisms for risk assessment and risk management. Although the Protocol allows Parties to take into account socioeconomic considerations, particularly with regard to the ‘value of biological diversity to indigenous and local communities’ when deciding on imports,¹²⁷ and includes a provision on public participation in decision-making,¹²⁸ it does *not* regulate the entire spectrum of issues related to the products of modern biotechnology, such as those related to consumer protection through the labeling of GM products.¹²⁹

Sharing of the benefits arising from biosafety-related research is envisaged in the Biosafety Protocol, and is to be achieved through capacity building, technology transfer¹³⁰ and information sharing via the Biosafety Clearing-House.¹³¹ Sharing of benefits of modern biotechnology on the other hand is not mentioned in the Biosafety Protocol. Notably, the provision on capacity building refers to the ‘strengthening of human resources and institutional capacities in biosafety, including biotechnology *to the extent that it is required for biosafety*.’¹³² Benefit-sharing in this context is rather identified in the text of the CBD, where it is specifically mentioned that access to and transfer of technology ‘includes biotechnology.’¹³³ In an important qualification, technology to be transferred needs to be ‘relevant to the conservation and sustainable use of biological diversity or make use of genetic resources and ... not cause significant damage to the environment.’¹³⁴ Furthermore, a specific case of inter-State benefit-sharing in this context and in pursuance of equity between countries providing and using genetic resources is also provided by the CBD. Article 19 requires Parties to take measures to provide for the ‘effective participation in biotechnological research activities’ by those Parties, especially developing countries, which provide the genetic resources for such research, and to conduct such research, where feasible, on the territory of the provider Parties.¹³⁵ Benefit-sharing is thus to be pursued through *collaborative research activities*. Furthermore, specifying the provision on

¹²⁷ Biosafety Protocol Article 26.

¹²⁸ Biosafety Protocol Article 23.

¹²⁹ On the Biosafety Protocol, see among many, R Mackenzie et al *An Explanatory Guide to the Cartagena Protocol on Biosafety* (IUCN, 2003).

¹³⁰ Biosafety Protocol Article 22. Biosafety Protocol Article 22(2) notes that the needs of developing country parties for financial resources and access to and transfer of technology and know-how shall be taken fully into account for capacity building in biosafety. See F Latorre, R Mackenzie, T Gross, E Tsioumani, and C McLellan *The Cartagena Protocol on Biosafety: a record of the negotiations* (CBD, 2003), at 70-71.

¹³¹ Biosafety Protocol Article 20.

¹³² Biosafety Protocol Article 22(1), emphasis added. Although Article 22(2) also refers to ‘scientific and technical training in the proper and safe management of biotechnology’ in a more open-ended formulation, the emphasis of the provision is indeed on capacity building specifically for biosafety.

¹³³ CBD Article 16(1). Note however that mention is made of ‘biotechnology’ which is a term broader than ‘modern biotechnology.’ Compare CBD Article 2 and Biosafety Protocol Article 3(i).

¹³⁴ CBD Article 16(1).

¹³⁵ CBD Article 19(1).

benefit-sharing from the use of genetic resources,¹³⁶ the CBD requires Parties to specifically provide ‘priority access on a fair and equitable basis ... to the results and benefits arising from biotechnologies’ to the Parties that provided the genetic resources used as a basis for such research.¹³⁷

The sharing of benefits of modern biotechnology in the form of capacity building was not included in the text of the Biosafety Protocol, notably because developing countries considered it an attempt by developed countries with strong biotechnology industries to promote trade in biotechnology products and services rather than to promote biosafety.¹³⁸ This raises the specific concern that capacity-building initiatives may unduly favor the interests of developed countries and affect autonomous decision-making by developing countries; as well as the fact that not all technologies fit all contexts. The recently raised discourse in the human rights realm concerning the right to the benefits of scientific progress¹³⁹ usefully illustrates these two points.

As noted by Farida Shaheed, 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.’¹⁴⁰ Cross-referencing the provisions of several international instruments, including the ITPGR and other environmental agreements, the Special Rapporteur identifies, 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’.¹⁴¹ Developing countries, on the other hand, should prioritize the development and dissemination of simple and inexpensive technologies that can improve the life of marginalized populations. At the same time, it is recommended that States protect individuals against any harmful effects of the misuse of scientific and technological developments.¹⁴²

The latter recommendation by the Special Rapporteur did not arise in a vacuum. In April 2008, the International Assessment of Agricultural Knowledge, Science and Technology (IAASTD),¹⁴³ the most comprehensive assessment of agriculture to date,

¹³⁶ CBD Article 15(7).

¹³⁷ CBD Article 19(2).

¹³⁸ Mackenzie et al (n 129), at 144.

¹³⁹ See UN Special Rapporteur in the field of cultural rights (n 68).

¹⁴⁰ Ibid, at 18. See also BENELEX conceptual paper by Morgera.

¹⁴¹ UN Special Rapporteur in the field of cultural rights (n 68), at 18.

¹⁴² Ibid, at 21.

¹⁴³ The IAASTD was a three-year collaborative effort (2005-2007) that assessed agricultural knowledge, science and technology in relation to meeting development and sustainability goals of reducing hunger and poverty; improving nutrition, health and rural livelihoods; and facilitating social and environmental sustainability. It was launched as an intergovernmental process with a multi-stakeholder Bureau, under the co-sponsorship of the FAO, the GEF, the UNDP, the UNEP, UNESCO,

concluded that ‘technologies such as high-yielding crop varieties, agrochemicals and mechanization have primarily benefited the better resourced groups in society and transnational corporations, rather than the most vulnerable ones.’¹⁴⁴ 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. The possible tensions between the right to the benefits of scientific progress and the right to food, in particular, have been assessed by Olivier De Schutter, the outgoing UN Special Rapporteur on the right to food,¹⁴⁵ who stressed that ‘progress in science is not to be conceived as unilinear.’¹⁴⁶ 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, who need to be part of the choices made.

Pending exploration of the legal literature and further research on these linkages, a preliminary conclusion can be identified on the basis of the discourses examined above: that the sharing of the benefits of science and technology cannot have universal application but is subject to societal choices and cultural and legal contexts.

3.1.3 *The Nagoya Protocol on access and benefit-sharing*

Incorporating mainly expressions of benefit-sharing through capacity-building for biosafety-related research, the Biosafety Protocol applies to the end of the research and development chain, addressing the impact of living modified organisms on biodiversity. The Nagoya Protocol on Access and Benefit-sharing, on the other hand, applies to the very beginning of the same chain, namely the search for and acquisition of potentially valuable genetic resources. The Nagoya Protocol constitutes the most important attempt to operationalize the fair and equitable sharing of the benefits arising from the use of genetic resources and associated traditional knowledge held by indigenous and local communities within the CBD framework. It seeks to achieve fairness and equity among States, as well as between governments and indigenous and local communities through the creation of a system of access and benefit-sharing operating at the inter-State, intra-State as well as the transnational level, which builds upon the bilateral relationship between the provider and the user of the genetic resource.¹⁴⁷

the World Bank and the WHO, and involved 900 participants and 110 countries from all regions of the world. See: www.unep.org/dewa/assessments/ecosystems/iaastd/tabid/105853/default.aspx.

¹⁴⁴ IAASTD, *Global Summary for Decision Makers* (2008), at 23.

¹⁴⁵ See O de Schutter ‘The Right of Everyone to Enjoy the Benefits of Scientific Progress and the Right to Food: From Conflict to Complementarity’ (2011) 33 *Human Rights Quarterly* 304; and UN Special Rapporteur on the Right to Food (n 68).

¹⁴⁶ De Schutter, *ibid*, at 348.

¹⁴⁷ See among others Morgera, Tsoumani and Buck (n 10).

This bilateral nature of ABS transactions envisaged in the CBD and the Nagoya Protocol does not fit with the specificities of genetic resources for food and agriculture, which have been exchanged freely for centuries, for the benefit not only of agricultural biodiversity but also of food security.¹⁴⁸ This was the rationale behind the negotiation of the ITPGR, which is in fact considered a specialized international instrument for access and benefit-sharing in the field of PGRFA by the Nagoya Protocol.¹⁴⁹ In addition, the Nagoya Protocol creates the regulatory space for its Parties to differentiate genetic resources for food and agriculture in their regulation of access and benefit-sharing.¹⁵⁰ In developing national legislation, Parties will therefore need to consider the best way to foster and preserve patterns of use and exchange in the food and agriculture sectors, which generally lead to benefit-sharing through continued access to the resource itself and access to the research results. At the same time, Parties are to prevent any such specialized measure from being abused to circumvent users' benefit-sharing obligations under general legislation implementing the Nagoya Protocol.¹⁵¹

The specific legal relationship between the Nagoya Protocol and the ITPGR, which is addressed in the next section, needs to be further explored, particularly with regard to PGRFA not included in the ITPGR Multilateral System. In addition, the potential of the CBD instruments, including the programme of work on agricultural biodiversity and the Pollinators Initiative, to protect global public goods and thus achieve global benefits through local-level management of agricultural biodiversity merits further research. Of particular interest is gaining better understanding of the potential and limitations of benefit-sharing in the form of both market-based approaches, such as certification schemes, and rights-based approaches, such as farmers' rights. This may also provide opportunities to investigate parallels with climate change regulation.

3.2 *The ITPGR Multilateral System of access and benefit-sharing*

The CBD covers all biodiversity,¹⁵² including plant genetic resources for food and agriculture. However, Resolution 3 of the Nairobi Final Act¹⁵³ recognized the need to seek solutions to 'outstanding matters' concerning plant genetic resources within the FAO global system, particularly in regard to access to ex situ collections not acquired in accordance with the CBD¹⁵⁴ and farmers' rights.¹⁵⁵ It also recommended adjusting

¹⁴⁸ See UN Special Rapporteur on the Right to Food (n 68), at 16.

¹⁴⁹ Nagoya Protocol Article 4(4). In addition, the preamble to the Nagoya Protocol acknowledges the fundamental role of the ITPGR in relation to the interdependence of all countries with regard to PGRFA, their special nature, and importance for achieving food security worldwide and sustainable development of agriculture in the context of poverty alleviation and climate change.

¹⁵⁰ Nagoya Protocol Article 8(c).

¹⁵¹ See Chiarolla, Louafi and Schloen (n 9), at 100-101.

¹⁵² CBD Articles 1 and 2.

¹⁵³ 1992 Nairobi Final Act of the Conference for the Adoption of the Agreed Text of the Convention on Biological Diversity, Resolution 3.

¹⁵⁴ That is, collections of plant genetic resources acquired prior to the entry into force of the convention.

the International Undertaking in line with the CBD, providing the basis for the negotiations which resulted in the ITPGR.

The ITPGR currently provides the only operational international system of access to genetic resources and benefit-sharing. As stated above, its negotiation was the result of the radical shift introducing national sovereignty over PGRFA. The ITPGR was specifically negotiated to ensure harmony with the CBD.¹⁵⁶ Its stated objectives are the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security.¹⁵⁷

In view of the distinctive features of agricultural biodiversity, the ITPGR takes a markedly different approach to ABS than the Nagoya Protocol. Namely it is built on a multilateral – rather than prevalently bilateral – approach.¹⁵⁸ The rationale is to some degree described in the preamble to the Treaty. First agriculture in all countries depends largely on plant genetic resources that have originated elsewhere. Continued and unrestricted access to plant genetic resources, therefore, is indispensable for the crop improvements that are necessary for sustainable agriculture and food security in the face of genetic erosion, environmental changes, and future human needs. Furthermore, given the millennia of agricultural history, the geographical origins of plant genetic resources are often impossible to locate, and thus, identification of the country of origin is very difficult. Genebanks all over the world now have collections of all major crops, making the search for genetic resources in situ unnecessary.¹⁵⁹ For these reasons, in 1994 Cooper, Engels and Frison had already argued that a multilateral system was required for PGRFA, noting that ‘a multilateral framework will be vital to provide access to the total range of diversity, especially given the interdependence of countries for genetic resources and the “public good” nature of both plant genetic resources and basic scientific research.’¹⁶⁰

¹⁵⁵ To be addressed in detail further below.

¹⁵⁶ FAO Conference Resolution 7/93 requested intergovernmental negotiations on: the revision of the International Undertaking on Plant Genetic Resources for Food and Agriculture to be in harmony with the CBD; the issue of access, on mutually agreed terms, to plant genetic resources, including ex situ collections not addressed by the CBD; and the realization of farmers’ rights.

¹⁵⁷ ITPGR Article 1.

¹⁵⁸ UN Special Rapporteur on the Right to Food (n 68), paras 10 and 21-22. See also M Halewood et al, ‘Implementing “Mutually Supportive” Access and Benefit Sharing Mechanisms under the Plant Treaty, Convention on Biological Diversity, and Nagoya Protocol,’ (2013) 9 *Law Environment and Development Journal* 68, at 71.

¹⁵⁹ See DH Cooper, ‘The International Treaty on Plant Genetic Resources for Food and Agriculture,’ (2002) 11 *Review of European Community & International Environmental Law* 11, at 14; Moore and Tymowski (n 28), at 2-6.

¹⁶⁰ DH Cooper, J Engels, and E Frison, *A Multilateral System for Plant Genetic Resources: Imperatives, Achievements and Challenges* (1994) Issues in Genetic Resources No. 2, at 11.

Against this background, the ITPGR has created a multilateral system aimed at facilitating access to, and exchange of, a specified list of crops¹⁶¹ considered vital for food security and agricultural research, and at institutionalizing the sharing of benefits arising from the utilization of these resources.¹⁶² According to its provisions, collections of genetic resources of the crops listed in the Annex 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 adopted by the ITPGR Governing Body.¹⁶³ 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; their contributions however remain voluntary.

Benefits identified in the Treaty text include non-monetary ones, such as the exchange of information, access to and transfer of technology, capacity building and facilitated access to crops, recognized as a benefit in itself.¹⁶⁴ The sharing of benefits arising from commercialization is done through standard payments by the users of material accessed from the Multilateral System according to the provisions of the standard Material Transfer Agreement (SMTA). Negotiated at the first meeting of the ITPGR Governing Body, the SMTA provides for detailed regulation of monetary benefit-sharing, which is unique in international law. According to its provisions, users of material accessed from the Multilateral System must choose between two mandatory monetary benefit-sharing options: a default benefit-sharing scheme, according to which the recipient will pay 1.1 percent of gross sales to the Treaty's benefit-sharing fund in case of commercialization of new products incorporating material accessed from the Multilateral System and if its availability to others is restricted; and an alternative formula whereby recipients pay 0.5 percent of gross sales on all PGRFA products of the species they accessed from the Multilateral System, regardless of whether the products incorporate the material accessed and regardless of whether or not the new products are available without restriction.¹⁶⁵

Benefit-sharing payments, together with voluntary donations, are directed to the Treaty's benefit-sharing fund, which allocates funds under the direction of the ITPGR Governing Body to particular activities designed to support farmers in developing countries in conserving crop diversity in their fields. The benefit-sharing fund also aims to assist farmers and breeders globally in adapting crops to changing needs and demands. It operates through a project-based approach: following the announcement

¹⁶¹ ITPGR Annex I.

¹⁶² ITPGR Articles 10-13. See E Tsioumani, 'International Treaty on Plant Genetic Resources for Food and Agriculture: Legal and Policy Questions from Adoption to Implementation' (2004) 15 *Yearbook of International Environmental Law* 119, at 128.

¹⁶³ ITPGR Governing Body Resolution 2/2006 (2006).

¹⁶⁴ ITPGR Article 13.

¹⁶⁵ See the ITPGR Standard Material Transfer Agreement Articles 6(7) and 6(11).

of a call for proposals, project proposals are received and assessed by a panel of experts according to specific eligibility and selection criteria.¹⁶⁶ The successful ones are approved by the Treaty Bureau.

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. The 19 projects sponsored by the second round of the benefit-sharing fund, for instance, are currently underway in 33 countries across Asia, Africa, the Near East, and Central and South America.¹⁶⁷ Some projects place particular emphasis on farmers' traditional knowledge, their socio-cultural systems and institutions, and the role of local communities in securing access to agricultural biodiversity. Farmers are involved in the collection, characterization, evaluation and development of new varieties of crops like rice, maize, potato, wheat and barley, as well as in the compilation of information on existing crop diversity. This project-based approach arguably combines elements of inter-state benefit-sharing regulation with implementation at the domestic level. The benefit-sharing fund has been complemented by a number of government and stakeholder initiatives aiming at facilitating the implementation of the non-monetary benefit-sharing mechanisms under the Treaty, including in particular the platform for the co-development and transfer of technologies.¹⁶⁸ Overall, the ITPGR system represents the most sophisticated attempt for operationalizing inter-State benefit-sharing.

A number of concerns have arisen, however. Despite the fact that the ITPGR's Multilateral System is in general terms acknowledged as well-suited to PGRFA and preferable to the bilateral ABS structure of the Nagoya Protocol, criticisms have targeted the operation of the benefit-sharing fund, both with regard to resource mobilization and with regard to resource allocation.¹⁶⁹ Resource mobilization has been lagging behind. Given the lengthy time periods required for research, development and commercialization to take place, commercial benefits arising from the use of genetic resources in the Multilateral System are yet to materialize and eventually be shared. The Treaty's benefit-sharing fund has thus mainly relied on government donations. Some innovative ideas have seen the light of day, including Norway's tax on seed sales, which funds its contribution to the benefit-sharing fund.¹⁷⁰ In general however, the flow of income to the benefit-sharing fund is far from regular or predictable, while no benefit-sharing payments resulting from the use of the

¹⁶⁶ The priorities, eligibility criteria and operational procedures were adopted as annexes 1-3 to the Funding Strategy in 2007. See FAO, Report of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture (FAO, 2007).

¹⁶⁷ See ITPGR Secretariat, 'Enabling Farmers to Face Climate Change: Second cycle of the benefit-sharing fund projects' (FAO, 2014), http://www.planttreaty.org/sites/default/files/BSF_2nd_cycle-booklet.pdf.

¹⁶⁸ See FAO, Reports of Meetings on the Establishment of a Platform for the Co-development and Transfer of Technology (2013), FAO Doc IT/GB-5/13/Inf.16.

¹⁶⁹ Similar criticisms have arisen in the context of climate regulation. See BENELEX working paper by Savaresi.

¹⁷⁰ See ITPGR Secretariat 'First Fruits of Plant Gene Pact' (2010).

SMTA, either mandatory or voluntary, were received in the last biennium.¹⁷¹ The need for a better understanding of when payments resulting from the use of the current SMTA may be expected, as well as the need for a regular and predictable flow of resources was explicitly recognized by Parties to the ITPGR in 2009.¹⁷² They attempted to identify possible innovative approaches with the aim of putting user-based income into the benefit-sharing fund. These approaches specifically included introducing upfront payments on access, revising the provisions of the SMTA which address levels and modalities of payment, and expanding the coverage of the Multilateral System with regard to the list of crops. At the same time, a series of studies¹⁷³ attempted a projection of benefit flows, and concluded that such flows will be moderate at best, and will take even longer than expected, even under the most favorable conditions.¹⁷⁴ As a result, an intersessional process is currently underway in the ITPGR framework, focusing on enhancing the functioning of the Multilateral System, in particular through the development of measures to increase user-based payments and contributions to the benefit-sharing fund. Identifying specific entry points for the contribution of international law in operationalizing equity and ensuring food security through the ITPGR Multilateral System of access and benefit-sharing is therefore needed.

On the resource allocation side, it has been questioned whether the competitive project-based approach currently used for the distribution of funds from the benefit-sharing fund 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.¹⁷⁵ Louafi explains these challenges as follows:

- The *equity* challenge lies in addressing how to target interventions so that they address the unequal capacities of countries and actors to benefit from the ITPGR.
- The *public value* challenge lies in the need to ensure impacts beyond the actors or the sectors in which the funded activities are carried out, so that they serve common (collective) interests and/or support the creation of a common (collective) good.

¹⁷¹ See ITPGR Secretariat, Report on the Implementation of the Multilateral System of Access and Benefit Sharing' (2013), FAO Doc IT/GB-5/13/5.

¹⁷² Resolution 3/2009.

¹⁷³ 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* (FAO, 2013).

¹⁷⁴ Factors which influence benefit flows considerably 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, full compliance with voluntary payment stipulations, and no deliberate avoidance of use of material from the Multilateral System in institutional breeding programmes.

¹⁷⁵ S Louafi, 'Reflections on the Resource Allocation Strategy of the Benefit Sharing Fund' (Swiss Federal Office for Agriculture, 2013).

- The *cooperation* challenge lies in the need to take into account the various interdependencies so that maximum spillover effects are realized through directing the funds towards strengthening the coordination and cooperation between stakeholders, activities and countries.¹⁷⁶

Certainly, the (re)design of benefit-sharing under the ITPGR will remain a focus for intergovernmental deliberation, but it also requires further academic exploration, particularly on the resource allocation side, which tends to be overlooked in policy debates due to continuous concerns about resource mobilization.

A series of other, more specific, issues are also awaiting further examination in the context of benefit-sharing under the ITPGR. The first is the institutional relation between the forms of benefit-sharing identified in the Treaty text. Louafi, for instance, notes that not all such forms can operate at the same level and be used interchangeably: non-monetary benefit-sharing, including the exchange of information, capacity building and technology transfer, seems to serve as a precondition for facilitated access to PGRFA, as well as for the commercialization resulting in monetary benefit-sharing.¹⁷⁷ This again points to the need to address the equity challenge identified above.

The second area deserving further investigation is the linkage between IPRs and monetary benefit-sharing: a close reading of the text of the standard Material Transfer Agreement seems to indicate that the sharing of benefits from commercialization comes hand in hand with the restrictions in use usually associated with IPRs. If this is the case, it is worth investigating, including in the light of the international human rights framework, whether the nexus between IPRs and monetary benefit-sharing is compatible with the open exchange systems needed for food security and farmers' livelihoods. The discourse and literature on open access systems and knowledge commons might prove useful in this regard,¹⁷⁸ in particular in order to explore the limitations of benefit-sharing and the specific contribution of law. In addition, the relationship between monetary benefit-sharing arrangements, non-monetary benefits and use restrictions requires further analysis in more general legal terms, in the search for the most suitable balance towards equity and justice for human development. Preliminary research has already unveiled evidence of substitutability between upfront payments as a form of monetary benefit-sharing and non-monetary benefits related to the exchange of information and research results.¹⁷⁹

¹⁷⁶ Ibid, at 7.

¹⁷⁷ Ibid, at 2.

¹⁷⁸ See for instance an initial exploration in context in S Louafi and E Welch, 'Open systems versus strong intellectual property rights: disentangling the debate on open access for meeting global challenges in life science' in JY Grosclaude, L Tubiana and RK Pachauri, *A Planet for Life 2014: Innovation for Sustainable Development* (Teri Press, 2014), 145.

¹⁷⁹ See A Seyoum and E Welch, 'Trading off Use Restrictions and Benefit-Sharing for Genetic Materials for Food and Agriculture with an Emphasis on Upfront Payments,' paper presented at the

Third, another crucial issue that requires further investigation, from the view point of Elinor Ostrom's work on the commons but also from the view point of general international law, is 'free-riding' - that is, abusing the ITPGR multilateral system (for instance, by obtaining material or by receiving funds without contributing material) or bypassing the system altogether by obtaining material from non-Parties, notably the US. Further research is also needed to encompass the role of the CGIAR centers, which, in view of their mission to promote food security, also seem to contribute to 'free-riding'. By providing materials without discrimination to non-Parties to the ITPGR, the centers create a disincentive for countries to join the ITPGR.

3.3 *The TRIPS 'CBD amendment': IPRs and benefit-sharing*

To complete the discussion on inter-State benefit-sharing, a review of the negotiations for amending the TRIPS Agreement so as to align it with the CBD is in order. In view of the tensions between agricultural biodiversity and IPRs discussed above, amendment of the TRIPS Agreement would allow access to the WTO Dispute Settlement System for breaches of the CBD requirements, including those on benefit-sharing.

The (currently negotiated, but mostly stalled) proposal to amend the TRIPS Agreement to make it consistent with the CBD rules, including those on benefit-sharing, is illustrative of the tensions that may arise between intellectual property rules and objectives related to the right to food, sustainable development and equity. Following several high-profile and controversial patent cases involving genetic resources and traditional knowledge, including turmeric, neem, ayahuasca and hoodia,¹⁸⁰ many analysts realized that unless the TRIPS Agreement was amended to ensure respect for the CBD principles in the intellectual property field, the implementation and enforceability of such principles would remain elusive.¹⁸¹

While patenting based on the use of genetic resources is allowed under TRIPS, subject to meeting patentability criteria, the CBD objectives are not currently supported because the patentability requirements do not require evidence of prior informed consent of the provider country or of benefit-sharing in accordance with mutually agreed terms. Furthermore, there is nothing in TRIPS to provide support for the CBD's principle of national sovereignty. Foreign companies may thus obtain private rights derived from national resources without having to adhere to CBD

53rd Annual Conference of the German Society of Economic and Social Sciences in Agriculture (Berlin, September 2013).

¹⁸⁰ See CIPR (n 65), at 76.

¹⁸¹ Ibid. See also M Chouchena-Rojas, M Ruiz Muller, D Vivas and S Winkler 'Disclosure Requirements: Ensuring Mutual Supportiveness Between the WTO TRIPS Agreement and the CBD' (IUCN and ICTSD, 2005).

principles.¹⁸² Although it can be argued that access to resources in violation of the CBD principles of prior informed consent and benefit-sharing may not be legitimate, in the absence of national legislation implementing such principles, enforceability is weak, if existent at all.

Therefore, several developing countries have 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,¹⁸³ 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.

As the impasse on these negotiations at the WTO continues at the time of writing, 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 do not provide any indication of any specific link with the food and agriculture sector and thus remain outside the scope of this paper.

4. Intra-State Benefit-Sharing

The concept of farmers' rights, enshrined in the ITPGR and recently also discussed in international human rights processes, has a central role in the exploration and assessment of benefit-sharing in its intra-State dimensions, in the food and agriculture sector.

4.1 *Farmers' rights*

Despite the recognized contribution of farmers to the global pool of plant genetic resources and thus food security, farmers' rights remain little understood internationally, let alone implemented nationally. A brief exploration of the origin and rationale of farmers' rights is useful for understanding the concept.¹⁸⁴

The development of farmers' rights may be considered a result of equity considerations. Farmers' rights emerged as a reaction to the asymmetry in the

¹⁸² CIPR (n 65), at 84.

¹⁸³ Documents circulated under the 2001 mandate of the Doha Development Agenda are available at: www.wto.org/english/tratop_e/trips_e/art27_3b_e.htm.

¹⁸⁴ See R Andersen, *The History of Farmers' Rights. A Guide to Central Documents and Literature* (Fridtjof Nansen Institute, 2005).

distribution of benefits between farmers as donors of germplasm in the form of open-access traditional seeds/propagating material and the producers of commercial varieties that ultimately rely on such germplasm. While commercial varieties were protected and generated returns on the basis of plant breeders' rights, there was no system of compensation, reward or incentive for the providers of the traditional germplasm that led to the development of protected commercial varieties. At the same time, farmers' rights were meant to ensure that the restrictions in use associated with IPRs would not adversely affect farmers' practices, which provide the basis of all agricultural and food production. That means that farmers should not only be allowed to continue, but also encouraged and supported in their contribution to the maintenance and development of plant genetic resources and food security globally. Farmers' rights are therefore seen not only as a means towards equity but also as a crucial tool for conservation.¹⁸⁵

Farmers' rights were first introduced into the International Undertaking on Plant Genetic Resources as an Agreed Interpretation of the Undertaking, adopted by FAO Resolution 4/89. In this resolution, participating States recognized the 'enormous contribution that farmers of all regions have made to the conservation and development of plant genetic resources, which constitute the basis of plant production throughout the world, and which form the basis for the concept of Farmers' Rights.' In addition, Resolution 5/89 on farmers' rights¹⁸⁶ introduced the element of benefit-sharing, acknowledging that 'farmers, especially those in developing countries, should benefit fully from the improved and increased use of the natural resources they have preserved.' Farmers' rights were defined in the latter resolution as arising from the past, present and future contributions of farmers in conserving, improving and making available plant genetic resources, particularly in the centers of origin/diversity. These rights were vested in the international community, as trustee for present and future generations of farmers, for the purpose of ensuring full benefits to farmers, and supporting the continuation of their contributions.

The issue of farmers' rights was debated intensely during the ITPGR negotiations and was eventually left to the responsibility of national governments. The Treaty provision on farmers' rights acknowledges the 'enormous contribution that the local and indigenous communities and farmers of all regions of the world, particularly those in the centres of origin and crop diversity, have made and will continue to make for the conservation and development of plant genetic resources which constitute the basis of food and agriculture production throughout the world.'¹⁸⁷ The Treaty stops short, however, of actually defining farmers' rights. It rather sets out measures a Party should take to protect and promote them, including: the protection of traditional knowledge; the right to equitably participate in sharing benefits arising from the

¹⁸⁵ C Correa, 'Options for the Implementation of Farmers' Rights at the National Level' (South Centre, 2000).

¹⁸⁶ As an agreed interpretation of the International Undertaking.

¹⁸⁷ ITPGR Article 9(1).

utilization of plant genetic resources for food and agriculture; and the right to participation in decision-making at the national level on related matters.¹⁸⁸

Interestingly enough, the final text of the Treaty reaches no final conclusion with regard to the link between farmers' rights and IPRs. Instead, it states that 'nothing in this Article shall be interpreted to limit any rights that farmers have to save, use, exchange and sell farm-saved seed/propagating material, subject to national law and as appropriate.' It does not, therefore, limit the customary rights of farmers to reuse, exchange or sell farm-saved seeds. Nor, however, does it safeguard these rights by establishing an international legal basis for their protection. Still, the Treaty provision obliges governments to assume responsibility for upholding farmers' rights. In addition, the preamble emphasizes the need to promote farmers' rights at both the national and international levels. It affirms that the basis of farmers' rights is the past, present and future contributions of farmers in all regions of the world, particularly those in centres of origin and diversity, in conserving, improving and making available these resources. And with an interesting twist of formulation, it adds that 'the rights recognized in this Treaty to save, use, exchange and sell farm-saved seed and other propagating material, and to participate in decision-making regarding, and in the fair and equitable sharing of the benefits arising from, the use of plant genetic resources for food and agriculture, are fundamental to the realization of farmers' rights, as well as the promotion of farmers' rights at national and international levels.'

The right of farmers to save seeds for further use, also known as the farmers' privilege within UPOV, had been a typical feature under plant variety protection until it was restricted under the 1991 version of UPOV, where it was introduced as an exception subject to conditions, as highlighted above. It should be noted that patent laws in contrast do not generally provide for an exception of this kind, and patents on plant genetic material may be enforced to restrict the saving and replanting of seeds that contain patented subject matter. The plant variety protection regimes examined above also include the so-called breeders' exception, allowing the use by breeders of a protected plant variety for research and breeding. However, the application of the breeder's exception may also be constrained when a patented material is present in a plant variety.

The ITPGR does not provide any indication of how the right of farmers to benefit-sharing may be implemented at the national level. A more systematic examination of other relevant ITPGR provisions is necessary in this regard, with a view to determining which of the possible types of benefit-sharing identified by Article 13 of the Treaty are relevant, such as: facilitated access to plant genetic resources for food and agriculture; the exchange of information; access to and transfer of technology; and the sharing of monetary and other benefits arising from commercialization.

¹⁸⁸ ITPGR Article 9(2).

It is worth noting that, in line with the general framework established by the ITPGR, benefit-sharing in this context is not bilateral – that is, an arrangement between the farmer that provides the traditional variety and the company that develops the commercial one. As farmers' rights are collective rights, benefits are not to be shared only with those farmers that happen to develop varieties later utilized in commercial breeding. In any case, identifying beneficiaries according to individual rights would be virtually impossible in view of the continuous experimentation and exchanges among farmers and farmer communities. Thus, benefits stemming from the Treaty's Multilateral System are to be shared with farmers engaging in the conservation and sustainable use of agricultural biodiversity, in particular in developing countries, through the projects funded by the ITPGR benefit-sharing fund addressed above.¹⁸⁹ The same consideration applies in cases where there is no commercial application, but the conservation of genetic diversity by farmers contributes to the common good. Therefore, in parallel with the provision on benefit-sharing under the Multilateral System, the priority of funds distributed under the Treaty's Funding Strategy, including the benefit-sharing fund, is the implementation of plans and programmes for farmers in developing countries.¹⁹⁰

In addition, the concept of farmers' rights implies that farmers should not only be rewarded in monetary terms for their contribution, but should also be supported to continue their practices, which contribute to the conservation of genetic diversity. It can thus be argued that benefit-sharing as an element of farmers' rights extends beyond Article 9 of the Treaty to include supporting measures, such as the legal recognition of customary agricultural practices; assistance in the organization of community-based structures such as local genebanks; the organization of collaboration between farmers and scientists or professional breeders; access to seeds, including traditional varieties and commercial seeds at reasonable prices; and access to markets.

An argument to support such a broad interpretation comes from the realm of human rights. The rights to benefit-sharing, access to seeds and to the benefits of scientific progress, in the context of farmers' rights, have recently been the focus of the work by the former UN Special Rapporteur on the Right to Food.¹⁹¹ Among others, the Special Rapporteur noted that States' obligation to fulfill the right to food implies strengthening access to and utilization of resources and means to ensure people's livelihoods, including food security, and improving food production methods by making full use of technical and scientific knowledge.¹⁹² These obligations apply both to the regulation of commercial seed systems and to the preservation and enhancement of informal or traditional farmers' seed systems. He noted that human

¹⁸⁹ ITPGR Article 13(3).

¹⁹⁰ ITPGR Article 18(5).

¹⁹¹ UN Special Rapporteur on the Right to Food (n 68).

¹⁹² International Covenant on Economic, Social and Cultural Rights Articles 11(2)(a) and 15(1)(b) and Guideline 8.4.

rights obligations imply that the commercial seed system needs to be regulated in order to ensure that farmers have access to inputs, including non-open-access seeds ‘on reasonable conditions’; and that innovations leading to improved varieties and resources benefit all farmers, including the most vulnerable and marginalized ones. It follows, at the same time, that States should ensure that informal, non-commercial seed systems can develop and be protected from interference and pressures imposed by the commercial seed sector.¹⁹³ In this context, the implications of IPRs for the achievement of the right to food need to be further investigated in the context of the linkages between IPRs and benefit-sharing identified above.

Most importantly, such a broad interpretation of farmers’ rights would be in line with Article 5 of the Treaty on conservation, exploration, collection, characterization, evaluation and documentation of plant genetic resources for food and agriculture.¹⁹⁴ This provision requires Parties to promote or support farmers’ and local communities’¹⁹⁵ efforts to manage and conserve on-farm their plant genetic resources for food and agriculture. It should be read together with Article 6 on sustainable use, which calls for the development of legal and policy measures, including on promoting the expanded use of local and locally adapted crops, supporting the wider use of a diversity of varieties and species in on-farm management, and reviewing regulations on variety release and seed distribution. Farmers’ rights are therefore a precondition for the achievement of the Treaty’s objectives concerning the conservation and sustainable use of plant genetic resources for food and agriculture, for sustainable agriculture and food security. Additional clarity with regard to their implementation at the national and local levels would therefore support implementation of the Treaty’s objectives.

The Nagoya Protocol on access and benefit-sharing also includes one provision which may prove to be of particular interest, reinforcing the international legal basis of farmers’ rights. According to Article 12(4), Parties are subject to a qualified obligation not to restrict the customary use and exchange of genetic resources and associated traditional knowledge within and amongst indigenous and local communities in accordance with the objectives of the Convention. This provision, therefore, envisages that States should avoid placing restrictions on traditional use and exchanges within communities, particularly as long as such traditional use and exchange contribute to the conservation and sustainable use of biodiversity, and the fair and equitable sharing of benefits. The rationale is to recognize that, due to the inseparable nature of genetic resources and traditional knowledge for indigenous and

¹⁹³ UN Special Rapporteur on the Right to Food (n 68), at 4.

¹⁹⁴ See A Argumedo et al ‘Implementing Farmers’ Rights under the FAO International Treaty on PGRFA: The need for a broad approach based on biocultural heritage’ (IIED, 2011).

¹⁹⁵ The provision does not differentiate between ‘farmers’ and ‘local communities,’ leaving open questions with regard to the stewards of PGRFA on-farm and thus the beneficiaries of protection. On the status of local communities in international law see BENELEX conceptual paper by Morgera.

local communities,¹⁹⁶ traditional use and exchanges of genetic resources are essential for the preservation and continued evolution of traditional knowledge, and for its role in the preservation of communities' cultural identities.

Article 12(4) thus represents an elaboration of the more general obligation under the CBD to 'protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements.'¹⁹⁷ Although not limited to PGRFA, the provision can be compared with, and used to reinforce at the national level, farmers' rights currently addressed under the ITPGR,¹⁹⁸ as it is framed as a positive (albeit qualified) obligation for Parties.

Although a large body of literature has discussed farmers' rights, one question of particular interest to benefit-sharing seems to have escaped the attention of legal scholars: taking into consideration that farmers are hardly a homogeneous group and agricultural contexts differ greatly among countries or locations, this question involves the identification of the beneficiaries and possibly a set of criteria for such an identification in the context of conservation and sustainable use of agricultural biodiversity.

4.2 A case study on farmers' rights and an example of inter-community benefit-sharing: the Andean Potato Park, a holistic approach to land, food and agriculture at the local level

The tight linkages among the subject areas researched in this paper across the spectrum of the food and agriculture sector, and the need for a holistic, rights-based approach, are best illustrated through the case study of the Potato Park in the Peruvian Andes. This is an area spanning 10,000 hectares of land in Písaq, the Sacred Valley of the Incas, between 3,400 and 4,500 meters above sea level on the Peruvian Andes. The initiative was established in 1998, by the Asociación ANDES, the IIED and six Quechua communities in the area, as an Agrobiodiversity Conservation Area dedicated to the protection of the native potato via indigenous territoriality traditions.

The Potato Park is founded upon a series of agreements, chief among which is the inter-community agreement established among the six communities that communally manage the park. The agreement aims to conserve the hundreds of potato varieties

¹⁹⁶ Nagoya Protocol 22nd preambular recital.

¹⁹⁷ CBD Article 10(c). See L. Glowka and V. Normand, 'The Nagoya Protocol on Access and Benefit-sharing: Innovations in International Environmental Law' in Morgera, Buck and Tsoumani (n 9), 21, at 40.

¹⁹⁸ ITPGRFA Article 9(3), whereby, using a formulation in the negative 'Nothing in this Article [on farmers' rights] shall be interpreted to limit any rights that farmers have to save, use, exchange and sell farm-saved seed/propagating material, subject to national law and as appropriate.' On the interactions between the Nagoya Protocol and the International Treaty provisions on farmers' rights, see Chiarolla, Louafi and Schloen (n 9), at 222 and 234.

cultivated in the area and equitably share the financial benefits arising from a number of initiatives in the park. The impetus for its development came with the signing of a repatriation agreement with the International Potato Centre (a CGIAR centre) in 2004. A mechanism was needed to ensure the equitable sharing of seeds and monetary benefits derived from this agreement, and of revenues derived from other economic activities in the park, to avoid potential conflicts amongst the communities. Following a 3-year participatory process, the agreement established new inter-community governance structures and a framework for equitably sharing the benefits arising from the work of economic collectives in the park, including benefits arising from gastronomy and ecotourism initiatives, and the production and selling of medicinal plants, potatoes and crafts.

The agreement is rooted in conservation and equity values enshrined in customary laws, and is regulated by the community and inter-community authorities. The governance structures created aim to minimize the risk of conflicts over resources and of elites unfairly benefiting from revenues, while a percentage of the revenues is reinvested into a communal fund which is used to sustain and manage the park's agro-ecosystem and provides a safety net for the poorest people in the Park communities. At the same time, the agreement acts as a community protocol for access to genetic resources and benefit-sharing in the sense of the Nagoya Protocol.¹⁹⁹ It sets out the rules for access by outsiders to the Park's genetic resources and traditional knowledge and for equitable benefit-sharing by outsiders. National- and local-level policy support has secured the communities' land and resource rights and has enabled this model of community-based, arguably autonomous,²⁰⁰ land and resource management.²⁰¹

Showcasing an advanced understanding of benefit-sharing in its inter- and intra-community dimensions in aiming towards the ultimate goals of *equity* and *social justice*, the case of the Potato Park demonstrates the holistic nature of land, food and agriculture along with traditional knowledge systems rooted in corresponding customary laws. It also shows the need for a radically innovative approach to the distribution of benefits arising from the commercialization of selected applications of traditional knowledge. Importantly, the development of an endogenous or autonomous development model is promoted in the Potato Park, that aims to 'achieve resilience for indigenous peoples and their territorialities at a regional scale,' on the basis of the 'Ayluu' system, a traditional concept of balance among humans, the

¹⁹⁹ A community protocol refers to a document which, among others, sets the terms and conditions a community requires to allow access to its genetic resources and traditional knowledge. See BENELEX conceptual paper by Morgera.

²⁰⁰ Broadly defined as self-instituted and self-governed. See C Castoriadis, *Philosophy, Politics, Autonomy: Essays in Political Philosophy* (Odeon, 1991).

²⁰¹ See Andes, Potato Park Communities and IIED 'Community Biocultural Protocols: Building Mechanisms for Access and Benefit Sharing among the Communities of the Potato Park based on Quechua Customary Norms' (IIED, 2012), <http://pubs.iied.org/pdfs/G03340.pdf>; and M Tapia and B Tobin 'Guardians of the Seed: the Role of Andean Farmers' in Kamau and Winter (n 7), 79.

domesticated environment, the wild environment and the ‘spiritual world.’²⁰² This balance leads to ‘Sumaq Causay,’ a holistic vision of living whereby not only material goods, but also other values, knowledge, and practices influence the quality of life. This model also supports the right of peoples to control their own resources, economies, livelihoods and cultural values. It recognizes the holistic value to indigenous territoriality, elements of which have been the exploitation of the economic value of some aspects of biocultural diversity, and the development of a variety of landscape goods and services and traditional knowledge-based products.

The case of the Potato Park not only illustrates the linkages between land, food and agriculture, but also the possibility for constructive interactions between customary, national and international law. Developed on the basis of customary law, the Potato Park has also taken advantage of national and international law to strengthen and support its structures and governance system. At the national level, the Peruvian Constitution recognizes the rights of indigenous communities to autonomy in their organization, communal working and the use and disposal of their land.²⁰³ Representatives of the Potato Park communities are also active at the international level and have succeeded in bringing about a series of developments aiming at supporting the initiative. Among these, following a series of repatriation agreements signed with the International Potato Center, hundreds of potato varieties were acquired and added to the varieties managed by and within the Potato Park.²⁰⁴ In addition, the Potato Park has been among the beneficiaries of funding from the ITPGR benefit-sharing fund.²⁰⁵ Notably, the Potato Park communities do not only *receive* benefits from, but also *contribute* to international mechanisms: they have voluntarily placed their potato collections in the ITPGR Multilateral System²⁰⁶ and they have also sent duplicates of all samples to the Svalbard Global Seed Vault,²⁰⁷ to secure availability of their varieties for future generations.²⁰⁸ In this context, identification and legal analysis of the governance criteria that serve as preconditions for the successful application of benefit-sharing in the Potato Park is expected to provide lessons learnt in relation to the contribution of international law also in other local contexts..

5. Preliminary findings and a research agenda

²⁰² Andes, Potato Park Communities and IIED, *ibid*.

²⁰³ Peruvian Constitution Article 89. See Tapia and Tobin (n 201), at 90.

²⁰⁴ ANDES, ‘Communities of the Potato Park Sign a New Repatriation Agreement with the International Potato Centre’ (2010), www.andes.org.pe/note-communities-of-the-potato-park-sign-a-new-repatriation-agreement-with-the-international-potato-cente.

²⁰⁵ ITPGR Secretariat, Report on the First Round of the Project Cycle of the Benefit-sharing Fund (FAO, 2013).

²⁰⁶ See A Argumedo, ‘Customary Laws for Traditional Knowledge Protection and ABS’ in IIED, *Protecting Community Rights over Traditional Knowledge: Implications of Customary Laws and Practices* (IIED, 2009).

²⁰⁷ M Kinver, ‘Svalbard Seed Vault to Take Peruvian Potato Samples’ (BBC News, 17 February 2011), www.bbc.co.uk/news/science-environment-12493970.

²⁰⁸ See Tapia and Tobin (n 201), at 87.

It is still early to reach any definitive conclusions with regard to the potential of the concept of fair and equitable benefit-sharing in resolving tensions at the inter- and intra-State levels. The following findings stem from this preliminary examination of the food and agriculture sector and identify a series of blindspots in the literature that can contribute to define a research agenda.

At the inter-state level, benefit-sharing arising from the use of genetic resources in research and development is a well-developed legal concept in the framework of the CBD and the ITPGR. It can be considered an *entitlement* of providers of genetic resources, and seems to operate as a tool for equity *in defense* against different restrictions placed on the use of genetic resources.

The multilateral benefit-sharing system currently operating under the ITPGR remains the most sophisticated effort for benefit-sharing at the international level. This system is currently under revision aiming for improvement in terms of both resource mobilization and resource allocation. It needs to attract adequate financial resources avoiding loopholes and free-riding, and allocate its resources fairly, in order to achieve challenges related to distributional equity, cooperation and food security. In this context, academic elaboration on the role of international law and its limitations may also offer value added to ongoing intergovernmental negotiations.

Two additional areas need further investigation: the relation between non-monetary and monetary forms of benefit-sharing; and the linkages between (monetary) benefit-sharing and restrictions in use, mainly in the form of IPRs. This exploration will also be informed by international human rights discourses, particularly on the right to food and the right to benefit from scientific progress.

Blurring the line between inter- and intra-state dimensions of benefit-sharing, another preliminary finding highlights the need to approach the literature on the commons from a legal point of view, for three reasons. First, it appears necessary to assess the potential and limitations of benefit-sharing in the case of common-pool resources such as the PGRFA in the ITPGR Multilateral System, including the CGIAR centres. Second, it is worth investigating the role of benefit-sharing in the interaction between local-level management and global public goods, as in the case of pollination. In this context, the potential and limitations of market-based approaches, such as certification schemes, in addition to rights-based approaches encapsulated under the concept of farmers' rights await further exploration. Third, the literature on the commons is useful to frame the exploration of the applications of benefit-sharing in land governance and regulation, particularly with regard to common property regimes, and informal and customary land tenure systems.

Indeed, when it comes to the intra-state and transnational level, several questions remain to be answered with regard to benefit-sharing and land governance and will be dealt with in the successive step of this project. Agenda 21, the UN action plan on sustainable development adopted at the 1992 Rio Conference on Environment and Development, recognized the need for integrated planning and management of land resources, stating that it should be a decision-making process that ‘facilitates the allocation of land to the uses that provide the greatest sustainable benefits.’²⁰⁹ Land-use planning is even more crucial today, with growing pressures from industrial agriculture and biofuels, climate change and urbanization. At the same time, a series of transnational developments, sometimes related to international regulations such as REDD+,²¹⁰ have resulted in projects threatening access to land and resources on the basis of communal, customary or informal tenure systems, still very much in existence in several parts of mainly the developing world. Due to its implications for human rights, livelihoods and food security, the phenomenon, dubbed ‘land grabbing,’ has recently attracted international attention. There is currently no legal research on the potential role of benefit-sharing in relieving tensions and balancing conflicting rights regarding large agricultural investments and commodity production. The FAO Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security²¹¹ and the Principles for Responsible Investment in Agriculture and Food Systems,²¹² make reference to benefit-sharing²¹³ and therefore constitute the starting point of such an analysis. A myriad of related guidance instruments that have recently emerged or are emerging at the international or regional levels, including on the human rights of peasants,²¹⁴ also await legal analysis.

With particular reference to smallholder farmers, landscapes provide the physical space for their engagement in in situ conservation and sustainable use of agricultural biodiversity and their continued contribution to genetic variability in agriculture and thus food security. In this context, and as outlined above, a disconnection from the land would result in practice in the violation of farmers’ rights. At the same time, landscapes play an important role in cultural identities and maintenance of traditional knowledge systems. However, in many countries, the land rights of indigenous peoples and smallholder farmers are either unrecognised or unclear, and farmers face growing external pressures to abandon their land either for economic development, or for environment-related schemes, such as REDD or protected areas.²¹⁵ Even recognised land rights are not always secure in the face of powerful interests. To

²⁰⁹ Agenda 21, paragraph 10(5).

²¹⁰ See BENELEX working paper by Savaresi.

²¹¹ Voluntary guidelines officially endorsed by the Committee on World Food Security on 11 May 2012.

²¹² Voluntary instrument endorsed by the Committee on World Food Security on 16 October 2014.

²¹³ See for instance Tenure Guidelines Article 12, and Principle 7 on responsible investment.

²¹⁴ Under the aegis of a UN Intergovernmental Working Group on the human rights of peasants established by Resolution of the UN Human Rights Council A/HRC/RES/21/19 (2012).

²¹⁵ See BENELEX working paper by Savaresi.

connect the dots, loss of land is perhaps the most critical threat to PGRFA conservation and sustainable use by farmers, and there is clear evidence that loss of traditional knowledge is linked to alienation from indigenous territories.²¹⁶ In effect, land tenure questions affect a series of internationally recognized human rights and underpin all environmental regulation efforts, including those under the international climate change and biodiversity regimes, that are related to benefit-sharing. Thus, legal analysis of benefit-sharing and land tenure should be seen as a cross-cutting element of any scholarly effort in relation to benefit-sharing.

The lack of clarity and recognition of community-level land and resource rights across the world directly affects the lives and livelihoods of billions, especially the poorest and most vulnerable members of society, thereby undermining progress on poverty reduction and human development, including the realization of human rights, food security and environmental conservation.²¹⁷ From a legal point of view, a complicating factor is the lack of clarity and understanding of common property regimes and community customary systems for natural resource use, and the difficulty in translating such regimes and systems in law. Ostrom defines common property regimes in differentiation 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.²¹⁸ In addition, community customary systems take various forms, often combining common property systems with highly differentiated customary tenure systems.²¹⁹ Fully understanding the potential of benefit-sharing thus appears to necessitate discussion of the work of Ostrom and Demsetz on various property regimes,²²⁰

Large-scale investments on land are the main factor threatening not only customary systems of property and tenure but also formally recognized ones. Large-scale land investments are one of the key new trends that emerged out of the 2008 global food crisis. After losing confidence in global markets as a stable and reliable source of food for their national food security, some major food importing countries have shown a growing interest in the acquisition or long-term lease of large portions of arable land

²¹⁶ Argumedo et al (n 194).

²¹⁷ See among many L Cotula L, S Vermeulen, R Leonard and J Keeley, 'Land Grab or Development Opportunity? Agricultural Investment and International Land Deals in Africa' (IIED, 2010).

²¹⁸ E Ostrom and C Hess, 'Private and Common Property Rights' *Encyclopedia of Law and Economics* (Edward Elgar, 2008), 6, with reference to Ciriacy-Wantrup and Bishop (1975).

²¹⁹ See M Guadagni, 'Trends in customary land property' in ME Sánchez Jordan and A Gambaro (eds), *Land Law in Comparative Perspective* (Kluwer, 2002); D Fitzpatrick, 'Best Practice Options for the Legal Recognition of Customary Tenure' (2005) 36 *Development and Change* 361.

²²⁰ H Demsetz, 'Toward a Theory of Property Rights' (1963) 57 *The American Economic Review* 347 and 'Toward a Theory of Property Rights II: The Competition between Private and Collective Ownership' (2002) XXXI *The Journal of Legal Studies* 653.

in other countries, mostly in the developing world.²²¹ In addition, they have been linked to the production by investors of other commodities, mainly biofuels.²²² In this context, three key legal interventions have been identified as necessary to ensure equitable and sustainable agricultural investments that can contribute food security and rural livelihoods: securing the land rights of indigenous peoples and local communities; ensuring enforceable and meaningful benefits for the country providing land as a whole, and the local community in particular; and guaranteeing the meaningful participation (and prior informed consent) of local communities in the decisions and projects affecting them.²²³ The concept of benefit-sharing can potentially serve as a useful tool in addressing all these areas of legal intervention, but little, if any, research has yet been conducted in that regard, in particular with regard to the clarification of terms and linkages between human rights, property rights, tenure rights and farmers' rights. More clarity on these linkages appears needed also with a view to contributing to scholarly and policy debates related to benefit-sharing in other areas, such as climate change regulation.

One final cross-cutting issue that has arisen with regard to benefit-sharing in the sector of land, food and agriculture refers to the identification of beneficiaries and the criteria for such an identification in the context of the conservation and sustainable use of agricultural biodiversity. Different legal instruments seem to use different terms to identify the groups or individuals that are entitled to rights and protection (farmers, indigenous peoples, local communities, peasants and land tenure holders). Potential linkages, overlaps or differentiations are in need of investigation. Only after these questions have been fully explored would it be possible to distil law- and governance-related criteria to serve as preconditions for the successful application of benefit-sharing at the local level.

²²¹ See O de Schutter, 'Large-scale land acquisitions and leases: A set of core principles and measures to address the human rights challenge' (UN, 2009); O de Schutter, 'How Not to Think of Land-grabbing: three critiques of large-scale investments in farmland' (2011) 38 *Journal of Peasant Studies* 249.

²²² See S Vermeulen and L Cotula, 'Over the Heads of Local People: Consultation, Consent and Recompense in Large-Scale Land Deals for Biofuels Projects in Africa' *CCAFS Working Paper* (2010).

²²³ See FAO 'Report on the Symposium on Legal Aspects of Large Scale Investments in Land: Implications for Food Security and Rural Development' (FAO, 2011), http://www.fao.org/fileadmin/user_upload/legal/docs/land_symposium.pdf.