III.26 Technology transfer

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Abstract
One of the foremost conceptual foundations of the Convention on Biological Diversity (CBD) lies in the admission that the provision of access to relevant technologies can make a substantial difference in the world's ability to address biodiversity loss. This chapter provides an overview of the technology transfer regime established under the Convention and its Protocols, drawing attention to the soft law instruments that are pertinent to its interpretation and application. The chapter also discusses two of the most controversial and scientifically interesting issues that arise with regard to implementation, i.e. the role of technology transfer as a form of non-monetary benefit-sharing and the interrelation between technology transfer and intellectual property rights. The chapter concludes by highlighting some areas that would benefit from further legal research.

Keywords
Technology transfer, capacity-building, biotechnology, benefit-sharing, intellectual property rights, environmentally sound technologies, genetic resources

Contents

III.26.1 Introduction

The technology transfer regime established under the Convention on Biological Diversity (CBD) reflects the broad consensus of the international community that the development, transfer, adaptation and diffusion of technology, and in particular of environmentally sound technologies, are crucial for achieving sustainable development.[1] One of the foremost conceptual foundations of the Convention thus lies in the admission that the provision of access to relevant technologies can make a substantial difference in the

[1] This consensus has been enshrined in such key instruments as the 1992 Rio Declaration, Agenda 21, the Johannesburg Plan of Implementation and, more recently, the 2030 Agenda for Sustainable Development.

worldptation and diffusion of technology,[2] and to meet the multifaceted needs of the growing global population.[3]

This chapter provides an overview of the technology transfer regime established under the Convention and its Protocols, drawing attention to the decisions of the CBD Conference of the Parties (COP) and the soft law instruments that are pertinent to its interpretation and application. The article then discusses two of the most controversial and scientifically interesting issues that arise with regard to the implementation of this regime, i.e. the role of technology transfer as a form of non-monetary benefit-sharing and the interrelation between technology transfer and intellectual property rights.[4] The chapter concludes by highlighting some areas that would benefit from further legal research.

III.26.2 Technology transfer under the Convention on Biological Diversity

CBD Article 16 serves as the principal basis for technology transfer, requiring Parties to 'provide and/or facilitate'[5] access to and transfer of technologies that are relevant to the conservation and sustainable use of biodiversity or make use of genetic resources and do not cause significant damage to the environment.[6] The transfer of such technologies must be carried out on the basis of fair and most favourable terms,[7] including on concessional and preferential terms where mutually agreed and, where necessary, in accordance with the financial mechanism established under the Convention.[8] Where the relevant technologies are subject to intellectual property rights, the provision and/or facilitation of access and transfer must be carried out in a manner that is consistent with those rights' adequate and effective protection.[9]

CBD Parties are further required to take appropriate measures to ensure that access to and transfer of technologies that make use of genetic resources, including technologies protected by intellectual property rights, are granted to source countries on mutually agreed terms and in accordance with international law.[10] Moreover, Parties are obliged to take appropriate measures for their private sectors to facilitate access to the above-described technologies for the benefit of both the governmental institutions and the private sectors of developing States.[11] Finally, Parties are expected to cooperate in order to ensure that intellectual property rights are supportive of, and do not run counter to, the CBD objectives.[12]

The above provisions should be read in conjunction with other CBD provisions.

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[2] Convention on Biological Diversity (adopted 5 June 1992, entered into force 29 December 1993) 1760 UNTS 79 (CBD) preambular para 15.

[3] CBD preambular para 20.

[4] See also Chapter 17 in this volume.

[5] For the interpretation of this term see CBD MYPOW (2003) para 8.

[6] CBD art 16(1).

[7] For an interpretation of this term see CBD SBSTTA (1996) para 13.

[8] CBD art 16(2), making reference to CBD arts 20–21. Pursuant to CBD Decision III/8 (1996), the Global Environment Facility (GEF) serves as the financial mechanism of the Convention.

[9] CBD art 16(2).

[10] CBD art 16(3).

[11] CBD art 16(4).

[12] CBD art 16(5).

More specifically, CBD Article 12 envisages the establishment and maintenance of programmes for scientific and technical education and training with reference to the identification, conservation and sustainable use of biodiversity and its components, taking into account developing States' specific needs.[13] The provisions of CBD Article 12 are inextricably linked with those of CBD Article 18, which calls upon Parties to promote technical and scientific cooperation at the international level,[14] as well as to strengthen national capabilities[15] through such means as the cooperative training of personnel and exchange of experts.[16] The rationale behind these provisions lies in the fact that most of the new technologies associated with the conservation and sustainable use of biodiversity are science- or knowledge-intensive in nature and thus primarily embodied in human skills. Consequently, the acquisition of these technologies is largely dependent upon the creation of the necessary enabling environments, which in turn correlates with the development of human capital.[17] Also relevant in this respect are the provisions of CBD Article 17, according to which Parties must exchange results of technical, scientific and socio-economic research as well as information on training and surveying programmes, specialized knowledge, and indigenous and traditional knowledge.[18]

In addition, CBD Article 19 requires Parties to take legislative, administrative or policy measures, as appropriate, to allow for the effective participation in biotechnological research activities of the Parties, especially developing countries, which provide the genetic resources for such research,[19] and to promote and advance the priority access of such source country Parties to the benefits arising from the resulting biotechnologies on a fair and equitable basis.[20]

Furthermore, CBD Article 20 notes that the extent to which developing country Parties will effectively implement their commitments under the Convention largely depends on the effective implementation by developed country Parties of their own commitments as regards financial resources and technology transfer.[21] Accordingly, and in acknowledgment of the fact that socio-economic development and poverty eradication are the first and overriding priorities of developing country Parties,[22] CBD Article 20 calls upon Parties to take full account of the specific needs and special situation of least developed countries in their actions vis-à-vis funding and technology transfer.[23] These provisions illustrate the significance of so-called North-South technology transfer, which will be further elaborated upon in the following section.

Last but not least, CBD Article 25 establishes an open-ended intergovernmental scientific advisory body known as the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) to provide the Convention's Conference of the Parties

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13 CBD art 12(a).
14 CBD art 18(1).
15 CBD art 18(2).
16 CBD art 18(4).
17 CBD SBSTTA (1996) para 32.
18 CBD art 17(2). See also Chapter 19 in this volume.
19 CBD art 19(1).
20 CBD art 19(2).
21 CBD art 20(4).
22 ibid.
23 CBD art 20(5).

(COP) and, as appropriate, its other subsidiary bodies, with timely advice relating to its implementation. For present purposes, it is worth mentioning that the SBSTTA's functions include the identification of innovative, efficient and state-of-the-art technologies and know-how relating to the conservation and sustainable use of biodiversity and the provision of advice on the ways and means of promoting the development and/or transferring of such technologies.[24]

CBD Article 16 also needs to be read together with the analogous provisions of the two Protocols to the CBD, namely the Cartagena Protocol on Biosafety (the Cartagena Protocol)[25] and the Nagoya Protocol on Access and Benefit-sharing (the Nagoya Protocol).[26] The Cartagena Protocol requires Parties to cooperate in 'developing and/or strengthening' human resources and institutional capacities in developing country Parties and Parties with economies in transition, taking into account the needs of said Parties for access to and transfer of technology and know-how.[27] To this end, the Cartagena Protocol provides that developed country Parties may make available, and developing country Parties and Parties with economies in transition may avail themselves of, financial and technological resources through bilateral, regional and multilateral channels.[28]

The Nagoya Protocol, on the other hand, reiterates the importance of technology transfer and cooperation for building the research and innovation capacities necessary for the implementation of CBD Articles 16 and 19.[29] The Nagoya Protocol therefore acknowledges technology transfer both as a non-monetary benefit arising from the utilization of genetic resources[30] and as a mechanism for operationalizing fair and equitable benefit-sharing.[31] Accordingly, Parties are required to promote and encourage access to technology by, and transfer of technology to, developing country Parties and Parties with economies in transition, in order to enable the development and strengthening of a sound and viable technological and scientific base for the attainment of the objectives of the Convention and the Protocol.[32]

Owing to its potential to contribute to the realization of the three objectives of the Convention[33] (i.e. the conservation of biodiversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources),[34] technology transfer has emerged as an issue of cross-cutting importance. In

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[24] CBD art 20(2)(c).

[25] See also Chapter 16 in this volume.

[26] See also Chapter 17 in this volume.

[27] Cartagena Protocol on Biosafety to the Convention on Biological Diversity (adopted 29 January 2000, entered into force 11 September 2003) 2226 UNTS 208 (Cartagena Protocol) art 22(1) and (2). See also arts 11, 20 and 28.

[28] Cartagena Protocol art 28(6).

[29] Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity (adopted 29 October 2010, entered into force 12 October 2014) (Nagoya Protocol) preambular paragraph 5; art 23.

[30] Nagoya Protocol Annex, paras (2)(b), (f) and (g).

[31] Nagoya Protocol Article 1. See also Morgera (2015).

[32] Nagoya Protocol art 23.

[33] CBD Decisions III/16 (1996) para 4; VII/29 (2004) preambular paragraph 1; X/16 (2010) para 1. See also Lesser (1997) 1.

[34] CBD art 1.

addition to being the primary focus of a number of COP decisions,[35] technology transfer thus serves as a crucial component of several thematic decisions on, *inter alia*, climate change,[36] invasive alien species,[37] synthetic biology,[38] plant conservation,[39] protected areas,[40] the ecosystem approach,[41] inland water ecosystems,[42] island biodiversity,[43] forest biodiversity,[44] marine and coastal biodiversity,[45] agricultural biodiversity,[46] mountain biodiversity,[47] and biodiversity in dry and sub-humid lands.[48] Moreover, technology transfer is an element of paramount importance for the CBD's long-term biodiversity strategy, most recently having been incorporated into the 'Strategic Plan for Biodiversity 2011–2020' and in particular Aichi Target 19.[49]

Also noteworthy is the fact that technology transfer features in some of the key soft law instruments elaborated under the auspices of the CBD. One such instrument is the Tkarihwaiuch Code of Ethical Conduct, which is meant to serve as guidance for States to develop their own ethical codes for research, access to, and use, exchange and management of traditional knowledge, innovations and practices. According to the Code, 'Information obtained from activities/interactions with indigenous and local communities should be shared with them in understandable and culturally appropriate formats, with a view to promoting . . . technology transfer . . .'.[50] Moreover, the Addis Ababa

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[35] CBD Decisions III/16 (1996), VII/29 (2004), VIII/12 (2006), IX/14 (2008), X/16 (2010).

[36] CBD Decisions VIII/30 (2006) para 7; XI/19 (2008) para 7(b); IX/16 (2008) para 1(f) and Annex, paras 9–12. See also Chapter 21 in this volume.

[37] CBD Decisions VI/23 (2002) Annex, guiding principle 9; XII/17 (2014) para 9(a). See also Chapter 20 in this volume.

[38] CBD Decision XII/2 (2014) para 3(f). See also Chapter 16 in this volume.

[39] CBD Decisions VI/9 (2002) Appendix, Target 8; IX/3 (2008) para 6(d). See also Chapter 14 in this volume.

[40] CBD Decisions IX/18 (2008) para 7; VII/28 (2004) Annex, Goal 3.3. See also Chapters 8–9 in this volume.

[41] CBD Decision VII/11 (2004) paras 4 and 14 and Annex, para 15. See also Chapter 5 in this volume.

[42] CBD Decisions IV/4 (1998) Annex I; VII/4 (2004) para 14(a) and Annex, paras 4 and 9(a), and Goal 2.2. See also Chapter 13 in this volume.

[43] CBD Decisions VIII/1 (2006) Annex II, Target 11.2; XI/15 (2008) para 1(b). See also Chapter 12 in this volume.

[44] CBD Decisions IV/7 (1998) Annex, paras 3(g) and 28; V/4 (2000) Annex, para 2(c); VI/22 (2002) paras 16, 17, 19 and Annex, Programme Element 1, Goal 4, Programme Element 3, Goal 4; IX/5 (2008) preambular paragraph 8.

[45] CBD Decisions V/3 (2000) Annex; VII/5 (2004) para 52, Annex I, operational objective 3.4 and Appendix 5, para f(ii); VIII/2 (2006) para 9; XII/23 (2014) para 3(c). See also Chapter 9 in this volume.

[46] CBD Decisions III/11 (1996) paras 1(f), 8 and 19, Annex 3, para 2; IX/1 (2008) paras 33 and 39(b); VI/5 (2002) Annex II, Element 3; VIII/23 (2006) section A, Annex, element 3.10; section B, Annex, paras 2, 3(a)(i); section C, para 4. See also Chapter 18 in this volume.

[47] CBD Decision VII/27 (2004) paras 4 and 15, and Annex, Goal 3.6. See also Chapter 11 in this volume.

[48] CBD Decision VII/2 (2004) Annex, Activity (b). See also Chapter 15 in this volume.

[49] CBD Decision X/2 (2010) Annex.

[50] Tkarihwaié:ri Code of Ethical Conduct to Ensure Respect for the Cultural and Intellectual Heritage of Indigenous and Local Communities Relevant to the Conservation and Sustainable Use of Biological Diversity, CBD Decision X/42 (2010) Annex, para 32.

Principles and Guidelines on Sustainable Use urge Parties to '[e]ncourage international support and technology transfer, relating to both consumptive and non-consumptive uses of biodiversity' and to '[e]stablish technical cooperation mechanisms in order to guarantee the transfer of improved technologies to communities'.[51]

III.26.3 Definitions and conceptual distinctions

By explicitly stating that 'technology' includes biotechnology, i.e. 'any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use',[52] CBD Article 2 brings within the meaning of 'technology' all product-specific biotechnology,[53] without, however, altering the fact that neither the Convention nor its Protocols provide a clear definition of the terms ducts or procor 'technology transfer'. This hermeneutical gap has prompted numerous scholarly and institutional attempts to identify the principal constitutive elements of these two terms and elucidate their meaning.

A commonly accepted conceptual distinction is the one between technologies that are relevant to biodiversity conservation and those that are relevant to its exploitation. Echoing one of the earliest and most influential background documents produced by the CBD SBSTTA vis-à-vis technology transfer,[54] Verhoosel argues that these two types of technologies correspond to two equally distinct types of technology transfer: one aimed at conservation and the other aimed at facilitating the development of biotechnological activities.[55] As will be further elaborated upon below, this distinction has crucial implications for the implementation of the regime discussed in this article, in so far as conservation technologies are typically available in the public domain whereas biotechnologies are often subject to intellectual property rights,[56] which may limit the amount of leverage that Parties have on the private sector to instigate or affect the transfer process.[57]

Regardless of these distinctions, the CBD technology transfer regime is commonly understood to encompass all technologies relevant to the materialization of the objectives of the Convention. The notion of technology thus includes 'hard' technologies, i.e. machinery and other physical hardware, as well as 'soft' technologies, i.e. technological information or know-how,[58] that relate to *in situ* and *ex situ* conservation; the sustainable management of biodiversity resources; monitoring techniques; benefit-sharing and access to research results; and modern biotechnologies that use genetic resources.[59]

A further characteristic of the CBD technology transfer regime is that it relates to technologies that 'do not cause significant damage to the environment',[60] or, as they

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[51] Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity, CBD Decision VII/12 (2004) Annex II, practical principles 6 and 11 respectively.

[52] See also Nagoya Protocol art 2; Cartagena Protocol art 2.

[53] Coughlin, Jr. (1993) 361.

[54] See also CBD SBSTTA (1996).

[55] Verhoosel (1998) 57; Verhoosel (1997) 476.

[56] CBD MYPOW (2003) para 15(c).

[57] Beurier (1996) 23; Coughlin, Jr. (1993).

[58] CBD MYPOW (2003) para 15(a).

[59] CBD (2010). See also https://www.cbd.int/undb/media/factsheets/undb-factsheet-technology-en.pdf.

[60] CBD art 16(1).

are commonly referred to, 'environmentally sound technologies'.[61] The CBD COP has highlighted the importance of these technologies in a number of thematic decisions,[62] inviting Parties to convene national, sub-regional and regional workshops to exchange information on, and to enhance capacity for, their successful transfer, diffusion and adaptation.[63] Moreover, the CBD's Ad Hoc Technical Expert Group on Technology Transfer and Scientific and Technological Cooperation Promotion has recommended that Parties, as part of their efforts to foster an enabling environment for technology transfer, could create awareness about products, processes and services that use environmentally sound technologies through such means as voluntary eco-labelling, product standards and codes.[64]

Finally, the Convention and its Protocols embody an implicit assumption that technology should be transferred from the resource-rich North to the biodiversity-rich South.[65] Nevertheless, other directions are becoming increasingly prominent in the academic and policy literature surrounding technology transfer, most notably South-North and South-South.[66] Both of these directions refer to the transfer of indigenous and traditional technologies, which largely correspond to the knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles.[67] The latter direction in particular constitutes an increasingly important element of the CBD's technology transfer regime, serving 'as an effective complementary tool to North-South cooperatione[68] and a crucial mechanism for the implementation of the Aichi Biodiversity Targets.[69] To the extent that South-South technology transfer and technical and technological cooperation are implemented on the basis of reciprocity,[70] they hold the potential of serving as key mechanisms for effective capacity-building in developing States.[71] Accordingly, the CBD COP has encouraged Parties to pursue South-South technology transfer, *inter alia*, by exploring alternative models for triangular, regional or multilateral cooperation.[72]

III.26.4 Technology transfer as non-monetary benefit-sharing

The third objective of the CBD, i.e. the fair and equitable sharing of the benefits arising from the use of genetic resources, is of particular importance to developing States, as

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[61] Agenda 21, Chapters 16 and 34. CBD MYPOW (2003) paras 6–7. See also CBD Decisions III/19 (1996) Annex; VI/21 (2002) Annex and Cripps (2001) 126–127; Verhoosel (1997); Bosselmann (2006); Shugurova and Shugurov (2015).

[62] CBD Decisions IV/4 (1998) Annex I, para 9; VII/4 (2004) Annex; VII/11 (2004) para 4; IX/2 (2008) para 6.

[63] CBD Decision VII/29 (2004) para 5.

[64] CBD WGRI (2007).

[65] Bhat (1999) 392; Verhoosel (1997) 472. See also Chapter 3 in this volume.

[66] Gadgil and Utkarsh (1999) 338.

[67] CBD MYPOW (9 January 2003) para 15(b). See also Laxman and Ansari (2012) 114; UNEP (2010); and Chapter 19 in this volume.

[68] CBD Decision IX/11 (2008) Annex, para 7.

[69] CBD Decision XI/24 (2012) para 1(h); XII/3 (2014) Annex IV, para 12.

[70] See also CBD COP (3 May 2008a) para 3.

[71] UNEP (2010).

[72] CBD Decision IX/14 (2008) para 13. See also CBD Decisions IX/2 (2008) para 6(a); X/6 (2010) para 7; XII/2 (2014) para 9(b).

they hold most of the world's biodiversity but feel that they do not obtain a fair share of the benefits arising out of its utilization.[73] The CBD attempted to address these concerns by explicitly recognizing States' sovereign rights over their natural resources and providing that access to these resources, including genetic resources, shall be subject to the prior informed consent of the source country.[74] The Convention further requires its Parties to take all appropriate measures to ensure the effective participation in biotechnological research activities of those Parties, especially developing States, which provide the genetic resources for such research,[75] and to take all practicable measures to promote and advance priority access by such Parties, on a fair and equitable basis, to the results and benefits arising from biotechnologies based upon the genetic resources provided.[76]

These provisions, which encapsulate the so-called 'reciprocity rule' of the CBD,[77] showcase the close interrelation between benefit-sharing and technology transfer. This interrelation has been documented—albeit not extensively—in the pertinent legal scholarship, with Ten Kate and Laird characteristically stating that 'best practice in benefit-sharing evolves in tandem with technological and scientific developments'.[78] In this light, technology transfer, together with the infrastructure and technical capacities that are necessary for making such technology transfer sustainable, serves as a non-monetary benefit of great significance for the development of the endogenous research capabilities of States and a means of adding value to their natural resources.[79]

Indeed, it has been observed that States providing samples of their genetic resources are increasingly prioritizing such non-monetary benefits.[80] Nevertheless, the CBD Secretariat has noted that access to and transfer of technology has so far occurred inconsistently and, where it has taken place, opinion on its comprehensiveness and effectiveness varies.[81] The CBD Secretariat has further identified a growing trend towards 'softer' approaches to technology transfer, i.e. approaches which are primarily focused on knowledge- and information-sharing or technologies that are not subject to intellectual property rights.[82] These approaches have been criticized for their limited ability to allow for the effective adaptation of technologies to local socio-economic and cultural conditions, as well as for the commercial considerations that underpin them.[83] These criticisms illustrate that, despite the ever-increasing number of scholarly and institutional attempts

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[73] Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization (CBD Decision VI/24 (2002) Annex), foreword to the special edition, available online at https://www.cbd.int/doc/publications/cbd-bonn-gdls-en.pdf (accessed 17 June 2016).

[74] CBD art 15(1) and (5).

[75] CBD art 15(7).

[76] CBD art 19(2). It is worth noting that the Nagoya Protocol extended the scope of application of the aforementioned provisions to traditional knowledge associated with genetic resources and the benefits arising from the utilization of such knowledge. To this effect, see Nagoya Protocol art 3.

[77] Bhat (1999) 395.

[78] Ten Kate and Laird (2000) 253.

[79] Nagoya Protocol preambular paragraph 5; CBD Decision XI/1 (2008) Annex II.

[80] Ten Kate and Laird (2000) 252.

[81] CBD Secretariat (2008) 37. See also Böhm and Collen (2015) 1291.

[82] CBD Secretariat (2008) 33.

[83] CBD Secretariat (2008) 33.

to tackle the complex interaction between technology transfer and the protection of intellectual property rights, the tensions that exist between the largely antagonistic interests of source countries and bioprospecting organizations are still far from resolved.

III.26.5 Technology transfer and intellectual property rights

The reason why intellectual property rights constitute such a prominent element of the discourse surrounding the CBD technology transfer regime is that some of the technologies that relate to biodiversity conservation and most of those that relate to the use of genetic resources are of a proprietary nature. It follows that the legal regulation and practical exercise of such intellectual property rights as trade secrets, trademarks and patents, holds the potential to substantially affect the implementation of CBD Article 16 and, by extension, the implementation of each of the three objectives of the Convention.[84] This observation is particularly pertinent in the case of the third CBD objective, i.e. the sharing of benefits derived from using genetic resources.[85]

The formulation of the 'compromise text'ompromise text of the rticularly pertinent in the case of the third CBD objective, i.e. the sharing of benefits derived from using genetic reso[86] can be attributed to the opposing viewpoints held by developed and developing nations during the CBD negotiations vis-à-vis the extent to which technology transfer would occur 'at the expense of' intellectual property rights.[87] In recognition of the interpretative challenges posed by the relevant provisions, and in accordance with the operational targets and activities foreseen in the CBD's 2006 Programme of Work on Technology Transfer and Scientific and Technological Cooperation,[88] the CBD Secretariat has prepared a technical study on the role played by intellectual property rights at different phases of technology transfer.[89] Together with an ever-expanding body of legal scholarship, this study has served to illuminate some of the more contentious implementation issues raised by Article CBD 16 and to highlight the areas that require further research.

One point commentators appear to agree on is that the role of intellectual property rights in the context of the CBD's technology transfer regime is twofold: on the one hand, by acknowledging that inventors bear time and other costs associated with the creation process, intellectual property rights serve as an incentive for investment in creative activities. On the other hand, intellectual property rights can function as a facilitative mechanism for access to and transfer of protected technological creations.[90] However, when taken to extremes, the traditional perception of intellectual property rights, whereby they constitute a protectionist mechanism that can be used to prevent competition within a specific market, can shift the balance away from the public interest

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84 CBD COP (3 May 2008b) para 18.
85 Verhoosel (1998) 56–57.
86 CBD COP (6 October 1995). See also Goldman (1994) 708–713; Barron and Couzens (2004) 23–24.
87 Goldman (1994) 709; Coughlin (1993) 345–349; Blomquist (2002); Downes (1993).
88 Shugurova and Shugurov (2015) 136.
89 CBD COP (3 May 2008b) paras 30–34.
90 Lesser (1997) 5. CBD Decision VII/29 (2004) Annex, programme element 3.

and towards the monopolistic privileges of their holders.[91] It is therefore imperative that efforts are undertaken with a view to harmonizing and creating synergies between relevant CBD provisions and those of such instruments as the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement).

As a final remark, it is worth noting that intellectual property rights are but one element of the CBD's technology transfer regime, since they solely concern protected technologies. In order to adequately address the issue of non-protected technologies, including technologies developed by local communities and indigenous peoples, equal importance will have to be assigned to the principles of equity and fairness.[92]

III.26.6 Areas requiring further reflection

The sheer range of tasks and agendas encompassed by the CBD objectives can create confusion and divert attention from issues such as benefit-sharing and technology transfer, which are of particular relevance to biodiversity conservation at the national level but are not adequately addressed by national legislative frameworks.[93] On the other hand, the persistent lack of a succinct definition of the term 'technology' and the consequent vagueness of target wording emerge as major stumbling blocks to the implementation of the provisions discussed in this chapter.[94] It is therefore necessary for legal scholars to intensify their commentary vis-à-vis the implementation of the provisions discussed in this chapter and to contribute to the broader discourse regarding the development of a comprehensive set of indicators for measuring compliance.[95]

Furthermore, the CBD Programme of Work on Technology Transfer and Technological and Scientific Cooperation invites governments to focus on the legal and institutional underpinnings of technology markets at the national and international levels, and develop legislative institutions that will introduce relevant codes and standards, reduce environmental risk and protect intellectual property rights.[96] Legal research could be undertaken with a view to identifying best practices for the elaboration of these instruments. Additionally, interdisciplinary research could explore how the characteristics of each particular technology influence the kinds of policies and mechanisms that are put in place to promote its development and transfer.[97]

As regards the issue of intellectual property rights, the CBD COP has already called for more in-depth analyses of new open-source-based modes of innovation; empirical studies on the extent of use of patent data information in research and development in different sectors; empirical analyses on the scope, extent and effects of patent clustering on technologies and other associated biological materials that are necessary inputs to desired technology development processes; and further examination of the overall trends in the application of the flexibilities provided by the TRIPS Agreement.[98] The legal

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91 Barron and Couzens (2004) 29.
92 Lesser (1997) 5; Shugurova and Shugurov (2015) 135.
93 Chandra and Idrisova (2011) 3312.
94 Böhm and Collen (2015) 1291.
95 Böhm and Collen (2015).
96 CBD Decision VII/29 (2004) Annex, programme element 3.
97 CBD SBSTTA (12 August 1996) para 16.
98 CBD Decision IX/14, para 11.

implications of these studies will undoubtedly provide scholars with ample ground for reflection.

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