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STUDY ON EXPERIENCES GAINED WITH THE DEVELOPMENT AND IMPLEMENTATION OF THE NAGOYA PROTOCOL AND OTHER MULTILATERAL MECHANISMS AND THE POTENTIAL RELEVANCE OF ONGOING WORK UNDERTAKEN BY OTHER PROCESSES, INCLUDING CASE STUDIES

INTRODUCTION

1. At its first meeting, the Conference of the Parties serving as the meeting of the Parties to the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization adopted decision NP-1/10 on the need for and modalities of a global multilateral benefit-sharing mechanism. In paragraph 2 of the decision, the Executive Secretary was requested to commission a study on: (a) experiences gained with the development and implementation of the Nagoya Protocol and other multilateral mechanisms; and (b) the potential relevance of ongoing work undertaken by other processes, including case studies in relation to *ex situ* and *in situ* genetic resources, traditional knowledge associated with genetic resources, and transboundary situations.

2. Accordingly, with funds provided by the Government of Norway, the Executive Secretary commissioned the study, which is made available for the review of the Expert Group in the form received.

* UNEP/CBD/ABS/A10/EM/2016/1/1.

Study on experiences gained with the development and implementation of the Nagoya Protocol and other multilateral mechanisms and the potential relevance of ongoing work undertaken by other processes, including case studies

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Executive summary

This study was requested by the Conference of the Parties serving as the meeting of the Parties to the Nagoya Protocol in 2014 (decision NP-1/10) to analyse: (i) the experiences gained with the development and implementation of the Nagoya Protocol and other multilateral mechanisms; and (ii) the potential relevance of ongoing work undertaken by other processes, including case studies in relation to ex situ and in situ genetic resources, traditional knowledge associated with genetic resources, and transboundary situations.

Some experience has been gained so far with the development and implementation of the Nagoya Protocol at the national and regional levels, with regard to "situations in which it is not possible to provide prior informed consent," "transboundary situations" and "contributions to conservation and sustainable use". The selected case studies provide evidence of stakeholders' voluntary initiatives that can contribute to multilateral benefit-sharing mechanisms or complement them.

With regard to experiences gained in other multilateral mechanisms, three existing multilateral benefit-sharing mechanisms are characterized by: relatively specialized subject-matter scope; reliance on standard contractual clauses; and the more immediate sharing of non-monetary benefits than of monetary ones. Only occasionally has international guidance been provided in these contexts on how to realize fairness and equity vis-a-vis beneficiaries (WHO PIP Framework), although ongoing work in this connection is undertaken by the International Seabed Authority (ISA) and may possibly be undertaken in the negotiations of a new implementing agreement under the United Nations Convention on the Law of the Sea (UNCLOS).

Financial viability is another challenge in multilateral benefit-sharing mechanisms: the WHO PIP Framework has put in place a system of mandatory contributions and ongoing work under the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) aims to develop a subscription system. With regard to information-sharing as a form of non-monetary benefit-sharing, this is generally left to voluntary and decentralized initiatives both in multilateral and bilateral systems, although ongoing work under the ITPGRFA points towards a more institutionalized multilateral approach to information-sharing. With regard to scientific cooperation and capacity-building as forms of non-monetary benefit-sharing, in the more developed multilateral benefit-sharing systems (ISA, WHO and ITPGRFA), there is a trend towards a facilitative and brokering role for international institutions. The ongoing discussions on the content of the human right to science under the Human Rights Council may be relevant to clarify international legal standards related to scientific cooperation, information-sharing and technology transfer as forms of non-monetary benefit-sharing, be that through institutionalized/diffused, multilateral/bilateral, mandatory/voluntary approaches.

Finally, there appears to be very little experience with regard to traditional knowledge in multilateral benefit-sharing mechanisms, with the exception of the ITPGRFA. Ongoing work under the Commission on Genetic Resources for Food and Agriculture (CGRFA) and possibly the negotiations of a new implementing agreement under UNCLOS appear relevant in this connection. Furthermore, ongoing work in the framework of Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) may provide useful examples of guarantees and practical approaches when dealing with traditional knowledge at the multilateral level, as well as practical options for involving indigenous peoples and local communities in multilaterally facilitated information-sharing and scientific cooperation. In addition, the ongoing discussions on the content of the human right to science may provide an opportunity to clarify international legal standards on traditional knowledge.

Introduction

In decision NP-1/10 "the need for and modalities of a global multilateral benefit-sharing mechanism (Article 10)" adopted in 2014, the Conference of the Parties serving as the meeting of the Parties to the Nagoya Protocol noted the importance of having further discussions to reach a common understanding on the need for and modalities of a global multilateral benefit-sharing mechanism. It commissioned a study on: (i) the experiences gained with the development and implementation of the Nagoya Protocol and other multilateral mechanisms; and (ii) the potential relevance of ongoing work undertaken by other processes, including case studies in relation to ex situ and in situ genetic resources, traditional knowledge associated with genetic resources, and transboundary situations. The study is expected to be considered at a meeting of a regionally balanced expert group, which will submit the outcomes of its work to the Conference of the Parties serving as the meeting of the Parties to the Nagoya Protocol at its second meeting.

In accordance with the above mandate, the present study is structured as follows. It starts with an analysis of the experiences gained prior and following the adoption of the Nagoya Protocol at regional and national levels, as well as a review of the academic literature on Article 10 of the Nagoya Protocol. The study proceeds with a discussion of the experiences gained in existing multilateral benefit-sharing mechanisms, focusing on the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), the International Seabed Authority (ISA), the World Health Organization (WHO) Pandemic Influenza Preparedness Framework for the Sharing of Influenza Viruses and Access to Vaccines and Other Benefits (PIP Framework), the Antarctic Treaty System and rules on marine scientific research (MSR) and technology transfer under the United Nations Convention on the Law of the Sea (UNCLOS). In its third section, the study assesses the potential relevance of ongoing work undertaken under other processes, namely the ITPGRFA, the ISA, the Commission on Genetic Resources for Food and Agriculture (CGRFA) under the aegis of the Food and Agriculture Organization of the United Nations (FAO), the process under the United Nations General Assembly to develop a new international legally binding agreement on marine biodiversity in areas beyond national jurisdiction under UNCLOS, the consideration of traditional knowledge under the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), and ongoing activities to clarify the normative content of the human right to science. Section IV presents two case studies, the Potato Park and the World Federation for Culture Collections. The study concludes by summarizing the main findings of the preceding analyses.

This study builds on academic research carried out since 2011 at or under the aegis of Edinburgh Law School, United Kingdom,[1] on the Nagoya Protocol specifically, but also on the legal concept of fair and equitable benefit-sharing in different areas of international law.[2] According to the latter, benefit-sharing is understood as the concerted and dialogic process in identifying and allocating ("sharing", rather than just benefitting) economic and non-economic benefits, with a view to realizing fairness and equity among States, as well as between States and indigenous peoples and local communities. In addition, the idea of "sharing" is understood as encompassing multiple streams of benefits of local and global relevance that has as its beneficiaries a wider group than those actively or directly engaged in a specific activity triggering benefit-sharing obligations.[3] In the context of the Nagoya Protocol, this is reflected in the

[1] Most of this research has been published as: E Morgera, M Buck and E Tsioumani (eds), *The Nagoya Protocol in Perspective: Implications for International Law and Implementation Challenges* (Martinus Nijhoff, 2013); and E Morgera, E Tsioumani and M Buck, *Unravelling the Nagoya Protocol: A Commentary of the Protocol on Access and Benefit-Sharing to the Convention on Biological Diversity* (Martinus Nijhoff, 2014). The latter has been made open access at http://www.brill.com/products/book/unraveling-nagoya-protocol. I am grateful to Elsa Tsioumani for research on the ITPGRFA, CGRFA, and the Potato Park, James Harrison for research on the ISA, Charlotte Salpin for research on the law of the sea, Marie Wilke for research on the WHO, Annalisa Savaresi and Claudio Chiarolla for research on IPBES, and Tom Dedeurwaerdere and his team (particularly Fulya Batur) for research on the World Federation for Culture Collections. I am also grateful to Mara Ntona and Marta Juhasz for research assistance during the preparation of this report.

[2] www.benelex.ed.ac.uk.

[3] E Morgera, "An International Legal Concept of Fair and Equitable Benefit-sharing" (SSRN, 2015; forthcoming in *European Journal of International Law*), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2633939.

Protocol objective (the global benefits related to the conservation and sustainable use of biodiversity) and the wording of Article 10 ("to support the conservation of biological diversity and the sustainable use of its components globally"). Accordingly, this study has focused on international mechanisms that are clearly shaped by this understanding of fair and equitable sharing of benefits, rather than other multilateral developments, such as international funds, that only overlap in part with that concept.[4]

I. Experiences gained with the implementation of the Nagoya Protocol

A recent assessment has concluded that, even if an international ABS regime has been in place for more than 20 years, implementation at the national level has been slow in terms of enacting legislation.[5] A survey of the implementation measures contained in the ABS Clearinghouse in effect as of October 2015 shows that 14 countries have submitted 52 measures. Furthermore, the European Union has published its ABS Regulation, which applies to its 28 Member States. According to media and other reports, however, several other countries are developing their ABS national frameworks following the adoption of the Nagoya Protocol, but these measures have not been adopted.

Against this background, a review of regional and national measures in existence at the time of the preparation of this report provides some indications as to an emerging understating among Parties to the Nagoya Protocol of key elements of Article 10. As will be discussed below (section I.i), few implementing measures expand on "transboundary situations", "situations in which it is not possible to provide PIC", and "contributions to conservation and sustainable use." On the other hand, suggestions on modalities for accruing and distributing benefits through a global multilateral mechanism have been made in the academic literature (section I.ii). The review will distinguish between measures adopted before and after the adoption of the Nagoya Protocol.[6]

i. Trends in regional and national implementing measures

A review of regional and national ABS measures (adopted prior or after the adoption of the Nagoya Protocol) provides few pointers for better understanding the possible triggers of the global multilateral benefit-sharing mechanism envisaged under Article 10 (namely "transboundary situations" and "situations in which not possible to provide PIC") and its objective ("contributions to conservation and sustainable use").

Some general provisions have been included on **contributing to the conservation and sustainable use** of biodiversity in domestic measures adopted prior or after the Nagoya Protocol. For instance, Norwegian legislation provides that genetic material "shall be utilized to the greatest possible benefit of the environment and human beings in both a national and international context."[7] In South Africa, it is provided that, if there is surplus money in the bioprospecting trust fund that is not due to any party to a benefit-sharing agreement, the relevant authority may use the money for conserving indigenous biological resources or support research on indigenous resources and traditional knowledge, among other options.[8] Kenya includes among non-monetary benefits, fees to be paid to trust funds supporting conservation and sustainable use of biodiversity.[9]

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[4] This could be the object of a separate, follow-up study as currently there is no literature on the extent to which multilateral funds overlap with the international legal concept of fair and equitable benefit-sharing.

[5] C Prip and K Rosendal, *Access to Genetic Resources and Benefit-sharing from their Use (ABS) - State of Implementation and Research Gaps* (Fridtjof Nansens Institutt, August 2015).

[6] Note that not all measures discussed in this section can be found in the ABS Clearinghouse.

[7] Norway, Act relating to the management of biological, geological and landscape diversity (Nature Diversity Act) 2009, section 59.

[8] South Africa, Regulation 138 on Bio-prospecting, access and benefit-sharing, 2008, article 19(6).

[9] Kenya, Environmental Management and Co-ordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006, section 20(f).

Among measures adopted after the adoption of the Nagoya Protocol, in the European Union (EU), the European Commission is mandated to encourage users and providers to direct benefits from the utilisation of genetic resources towards conservation and sustainable use, and to promote measures in support of collections that contribute to the conservation of biological and cultural diversity.[10] The African Union (AU) Strategic Guidelines for the Coordinated Implementation of the Nagoya Protocol[11] indicate that AU member States shall through domestic legislation, direct benefits arising from the utilization of genetic resources and associated traditional knowledge towards the promotion of the conservation and sustainable use of biodiversity and the improvement of the livelihoods of indigenous peoples and local communities. The Guidelines further note that in recognition of and as encouragement to indigenous peoples and local communities that support sustainable use and conservation of biodiversity, AU member States shall direct monetary payments to the sustainable use and conservation of biodiversity. The AU Practical Guidelines add that member States may consider as potential mechanisms for linking the three objectives of the CBD: developing regional and national scientific capacity and promoting research geared towards conservation and sustainable use; directing some benefits arising from utilization of genetic resources to conservation and enhancement of livelihoods; developing strategies for conservation and sustainable harvesting of genetic resources; and promoting and supporting traditional lifestyles relevant for the conservation of biodiversity and sustainable use of its components.[12]

With regard to **situations in which it is not possible to provide PIC**, Peruvian law foresees that in cases where the collective knowledge of indigenous peoples has passed into the public domain within the previous 20 years, a percentage of the value of gross sales resulting from the marketing of products developed on the basis of that knowledge will be set aside for a fund for indigenous peoples.[13] Among measures adopted after the adoption of the Nagoya Protocol, in India, in cases where beneficiaries are not identified, monetary benefits deriving from commercial utilization will be used to support conservation and sustainable use and to promote livelihoods of the local people living where the biological resources were accessed.[14] In Brazil, the Ministry of Environment is empowered to conclude an agreement with users of traditional knowledge of unidentified origin, who are expected to share with the Ministry 1% of their annual profits from the commercialization of products deriving from such traditional knowledge, unless there is a sectoral agreement in place.[15]

With regard to **transboundary situations**, regional approaches have been put in place,[16] in line with Nagoya Protocol Article 11 on transboundary cooperation. The Andean Community Decision 391 provides a framework for regional cooperation: it foresees that in negotiating the terms of access contracts to genetic resources that originate in more than one member country or to their by-products and in carrying out activities connected with that access, competent national authorities shall bear in mind the interests of the other member countries, which may present their viewpoints and such information as they

[10] Regulation (EU) No 511/2014 of the European Parliament and of the Council of 16 April 2014 on compliance measures for users from the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization in the Union, article 13(e)(f).

[11] The African Union Strategic Guidelines for the Coordinated Implementation of the Nagoya Protocol and the Fair and Equitable Sharing of Benefits arising from their Utilization, adopted by the 25th ordinary session of the Assembly of the African Union in June 2015, paragraphs 31 and 35(a).

[12] African Union Practical Guidelines for the Coordinated Implementation of the Nagoya Protocol in Africa, June 2015, at 42.

[13] Peru, Law No. 27811 of 24 July 2002, introducing a Protection Regime for the Collective Knowledge of Indigenous Peoples derived from Biological Resources, article 13.

[14] India, Guidelines on Access to Biological Resources and Associated Knowledge and Benefits Sharing Regulations, 2014, paragraph 15.

[15] Brazil, Lei Nº 13.123, 2015, articles 2, 19-21 and 23.

[16] G Singh Nijar, *The Nagoya Protocol on Access and Benefit Sharing of Genetic Resources: Analysis and Implementation Options for Developing Countries* (Research Paper 36, South Centre, Geneva, 2011), 32; G Dutfield, "Transboundary Resources, Consent and Customary Law" (2013) 9(2) *Law, Environment and Development Journal* 259, at 260-261.

deem advisable.[17] Among measures adopted after the adoption of the Nagoya Protocol, Ecuador's measures empower the national authority to seek from other member countries of the Andean Community their views and information with regard to genetic resources of shared interest, and establish a minimum list of genetic resources of regional importance through a system of exchange of information.[18] The African Regional Intellectual Property Organization's (ARIPO) Swakopmund Protocol on Traditional Knowledge and Expressions of Folklore provides that where two or more communities in the same or different countries share the same traditional knowledge, the relevant national competent authority of the States and ARIPO Office shall register the owners of the traditional knowledge and maintain relevant records. The ARIPO Office is responsible for raising awareness and carrying out education, guidance, monitoring, dispute resolution and other activities relating to the protection of traditional knowledge of those communities.[19] The AU Strategic Guidelines on ABS indicate that all AU member States concerned with instances in which genetic resources and associated traditional knowledge may be sourced from two or more countries, shall endeavour to cooperate and coordinate on the minimum benefit-sharing terms to be included in mutually agreed terms governing the utilization of such shared genetic resources and associated traditional knowledge.[20] The AU Practical Guidelines add that AU member States may wish to establish a regional committee of experts to provide advice to States that have common genetic resources and associated traditional knowledge being sought by bioprospectors on how to cooperate in negotiating common prior informed consent and mutually agreed terms and avoid competing against each other. The committee could also help mediate any disputes between member States, between a member and communities, or between communities regarding access to shared genetic resources and associated traditional knowledge.[21]

Key findings

- There is still limited experience gained with the development and implementation of the Nagoya Protocol at the national and regional level;
- There appear to be no noticeable trends in national and regional ABS measures with regards to "situations in which it is not possible to provide PIC" and "contributions to conservation and sustainable use"; and
- In line with Nagoya Protocol Article 11, a trend appears to be an emerging trend in national and regional ABS measures with regard to "transboundary situations" being addressed through regional approaches.

ii. Review of academic literature on Article 10 of the Nagoya Protocol

Article 10 of the Nagoya Protocol has elicited significant interest from legal commentators. A review of the academic literature serves to identify suggestions with regard to the modalities for a possible global multilateral benefit-sharing mechanism to accrue benefits, depending on the type of use/users and, to a lesser extent, modalities for their distribution.

At least two modalities for **accruing monetary benefits** have been put forward with regard to the commercial utilization of genetic resources. One model foresees that monetary benefits are to be shared upon the commercial use of genetic resources in *ex situ* collections, independently from the time of

[17] Andean Community, Decision No. 391 establishing the common regime on access to genetic resources, 1996, Final Provisions.

[18] Ecuador, Reglamento nacional al régimen común de acceso a los recursos genéticos en aplicación a la Decisión No. 392 de la Comunidad Andina (Decreto Ejecutivo Nº 905 of 2011), article 25.

[19] Entered into force 2015, sections 5(4) and 14(3).

[20] AU Strategic Guidelines on ABS, paragraph 23.

[21] AU Practical Guidelines on ABS, at 30.

access.[22] Another model foresees a biodiversity tax on *any* products, patent or licence developed from genetic resources, with the advantage of reducing transaction costs.[23]

With regard to non-commercial utilization, Dedeurwaerdere et. al. have proposed a "knowledge pool" of public and private databases as a form of multilateral non-monetary benefit-sharing. Two models could be explored in that regard: 1) one is based on exclusive ownership rights on knowledge resources and case-by-case contractual negotiations for access between individual providers and individual users, similarly to the International Rice Research Consortium; and 2) the other model is based on non-exclusive property rights on a global scale for upstream research assets, established through an agreement between the right holders of basic knowledge assets that decide to make these assets available under global public domain-like conditions for specified research uses, similar to the system of open access publishing and the global DNA database consortium Genbank/Embl/DDJB.[24]

With regard to **transboundary situations**, it has been noted that regional approaches would only lead to sharing benefits with those countries that are covered by a regional agreement, and not necessarily with all countries sharing the material. It has rather been proposed to use a global, rather than regional mechanism, to link existing biological databases with a view to identifying all countries of origin of transboundary genetic resources and on that basis allocate benefits.[25]

It has further been suggested that the multilateral mechanism could also be envisaged as a platform for engaging **private companies** to voluntarily share benefits beyond the requirements of the Nagoya Protocol, such as in the case of publicly available traditional knowledge or pre-CBD accessions,[26] and/or the transfer of technology and capacity-building.[27]

With regards to **benefits distribution/allocation**, it has been suggested that benefits could be channelled by an independent international governing body to fund conservation and sustainable use projects in areas beyond national jurisdiction and/or to projects worldwide in areas within national jurisdiction where biodiversity is more negatively affected by anthropogenic pressures than in areas beyond national jurisdiction. In that connection it has been noted that this body could be a division of the CBD Secretariat, or the Global Environment Facility (GEF), as the latter has accrued experience in distributing funds by using scientific data on the distribution of biological resources.[28]

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[22] E Welch, E Shin and J Long, "Potential Effects of the Nagoya Protocol on the Exchange of Non-plant Genetic Resources for Scientific Research: Actors, Paths, and Consequences" (2013) 86 *Ecological Economics* 136, at 142-143.

[23] EC Kamau and G Winter, "An Introduction to the International ABS Regime and a Comment on its Transposition by the EU" (2013) 9 *Law, Environment and Development Journal* 121-122; B Pisupati, *Protected Areas and ABS: Getting Most of the Two* (Fridtjof Nansen Institute Report 4/2014).

[24] T Dedeurwaerdere, A Broggiato and D Manou, "Global Scientific Research Commons under the Nagoya Protocol", in EC Kamau and G Winter (eds), *Common Pools of Genetic Resources: Equity and Innovation in International Biodiversity Law* (Routledge, 2014), 224, at 225-226.

[25] GD Bevis Fedder, "Biological Databases for Marine Organisms: What they Contain and how they can be used in ABS Contexts" in EC Kamau and G Winter (eds), *Common Pools of Genetic Resources: Equity and Innovation in International Biodiversity Law* (Routledge, 2014) 268.

[26] MJ Oliva, "The Implications of the Nagoya Protocol for the Ethical Sourcing of Biodiversity" in E Morgera, M Buck and E Tsioumani (eds), *The 2010 Nagoya Protocol on Access and Benefit-sharing in Perspective* (Martinus Nijhoff, 2013) 371; MW Tvedt, *A Report from the First Reflection Meeting on the Global Multilateral Benefit-Sharing Mechanism* (Fridtjof Nansen Institute Report 10/2011), at 7.

[27] PT Stoll, "ABS, justice, pools and the Nagoya Protocol", in EC Kamau and G Winter (eds), *Common Pools of Genetic Resources: Equity and Innovation in International Biodiversity Law* (Routledge, 2014), 305, at 310-311.

[28] B Fedder, *Marine Genetic Resources, Access and Benefit Sharing - Legal and Biological Perspectives* (Routledge, 2013), at 169-170.

Key findings

- Academic legal literature points to the opportunities of linking databases both for the purposes of sharing information as a form of non-monetary benefit-sharing, and/or to facilitate the identification of relevant countries in the case of transboundary situations;

- Academic legal literature points to the opportunity of voluntary benefit-sharing as part of a multilateral benefit-sharing system, particularly for the private sector.

II. Experiences gained in other multilateral mechanisms

Generally, existing multilateral benefit-sharing mechanisms within an international organization share benefits on the basis of multilateral decision-making leading to the determination of standard contractual clauses. They involve monetary and non-monetary benefits, allowing the sharing of more immediately available (generally non-monetary) benefits, while monetary benefits are being accrued. Non-monetary benefits are also aimed at increasing the capabilities of countries that are not able to directly participate in bioprospecting and R&D activities. The international instruments that include multilateral benefit-sharing obligations refer to beneficiaries in different terms, although they all place special emphasis on developing countries.[29] Significantly, they appear premised on a narrow subject-matter scope of application.

The following review of experiences in existing multilateral benefit-sharing mechanisms serves to highlight lessons learned with regard to: the legal nature of the arrangement; modalities for accruing benefits; modalities for distributing/allocating benefits; compliance and implementation challenges. It should be borne in mind that different multilateral mechanisms deal with different types of resources (living/non-living, subject to excludable and non-excludable uses, etc.), which brings about different regulatory challenges (notably, deriving from the ease/difficulty in monitoring access to, and/or estimating likely income to be generated from the utilization of, the resources). These differences have thus a bearing on the design and functioning of the different multilateral benefit-sharing mechanisms. This aspect is not addressed below, but appears worthy of further study.

i. International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)

Legal nature: The ITPGRFA has created a multilateral system of access and benefit-sharing based in treaty law. It is aimed at facilitating access to, and exchange of, a specified list of crops,[30] which is considered a benefit as such, and at institutionalizing the sharing of other benefits arising from the utilization of these resources.[31] Genetic resources of listed crops that are under the management and control of Parties and in the public domain, as well as those held by the CGIAR centers,[32] are to be automatically included in the Multilateral System and exchanged according to the terms of the standard Material Transfer Agreement adopted by the ITPGRFA Governing Body.[33] In particular, the Multilateral System covers plant genetic resources for food and agriculture listed in Annex I, with inclusion in the Annex being decided on the basis of criteria of food security and interdependence.[34] The latter reflects the

[29] E Morgera, "An International Legal Concept of Fair and Equitable Benefit-sharing" (SSRN 2015, forthcoming in *European Journal of International Law*), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2633939.

[30] ITPGRFA Annex I. This section draws on Elsa Tsioumani, "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" (SSRN 2014), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2524337.

[31] ITPGRFA, articles 10-13.

[32] International Agricultural Research Centres of the Consultative Group on International Agricultural Research.

[33] ITPGRFA Governing Body Resolution 2/2006 (2006).

[34] ITPGRFA Article 11(1) and preamble.

fact that Parties depend on one another in having access to plant genetic resources for food and agriculture, so interdependence arguably provides a "yard stick for future amendments."[35]

With regard to the CGIAR centres, therefore, similarly to the WHO PIP Framework discussed below, the ITPGRFA built on pre-existing structures under which they held their collections "in trust for the benefit of the international community" and would not claim legal ownership or IPRs over the germplasm.[36] State Parties, on the other hand, notify the Treaty Secretariat on the material that is part of the Multilateral System and other material that they make available through the Multilateral System, by indicating the location and providing passport data and other information on the relevant accessions.

Accruing of benefits: Benefits identified in the Treaty text include monetary and non-monetary ones. The latter include, in addition to the facilitated access to crops, the exchange of information, access to and transfer of technology and capacity building. 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). 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.[37] Those that make their products available for further research and breeding without restriction, however, are exempted from mandatory payments. In addition, other benefits from commercialization include the involvement of the private and public sectors through partnerships and collaborations in R&D.[38] Furthermore, food-processing industries that benefit from plant genetic resources for food and agriculture can make benefit-sharing contributions on a voluntary basis.[39]

Allocation of benefits: Monetary benefits are allocated through the Treaty's benefit-sharing fund, under the direction of the ITPGRFA Governing Body. The benefit-sharing fund channels benefits to particular activities designed to support farmers in developing countries in conserving and utilizing crop diversity in their fields, with a view to assisting farmers and breeders globally in adapting crops to changing needs and demands. It operates through a project-based approach: following the announcement of a call for proposals, project proposals are received by the Secretariat and screened by a panel of experts according to specific eligibility and selection criteria which were adopted by the ITPGRFA Governing Body.[40] 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 successful projects are approved by the Treaty Bureau, on behalf of the Treaty's Governing Body, for funding.

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[35] See G. Moore and W. Tymowski, *Explanatory Guide to the International Treaty on Plant Genetic Resources for Food and Agriculture* (IUCN, 2005) at 81 and generally at 4-5, 10 and 15.

[36] Agreement with FAO to Place CGIAR Center In-Trust Collections of Plant Genetic Resources under the Auspices of FAO (1994). Following the finalization of the negotiations for the ITPGRFA (discussed below) and its entry into force, agreements were signed between the CGIAR centres and the Governing Body of the ITPGRFA, placing the in-trust international crop and forage collections within the Treaty's framework. See, however, CGIAR Principles on the Management of Intellectual Assets (2012), articles 5-4.

[37] See the ITPGRFA Standard Material Transfer Agreement, articles 6(7) and 6(11).

[38] ITPGRFA, article 13(2)(d)(i).

[39] ITPGRFA, article 13(5).

[40] 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).

Compliance: The observance of the contractual terms and conditions of the SMTA by individual providers and recipients is guaranteed by FAO acting as the "Third Party Beneficiary", in accordance with the terms and conditions of the SMTA. FAO is the entity designated by the ITPGRFA Governing Body to act on its behalf to request information to SMTA parties, initiate dispute settlement procedures regarding rights and obligations of SMTA parties, and in the context of dispute settlement, the right to request that the appropriate information, including samples as necessary, be made available by SMTA parties, regarding their obligations. FAO may receive and use information on cases of non-compliance from SMTA parties or any other person. Where FAO has received such information, it may request additional information from SMTA parties. If the information so gathered leads FAO to believe that a possible case of non-compliance might have occurred, FAO may trigger amicable negotiations through an initial notice to the parties to the SMTA. If the dispute cannot be resolved by negotiation, FAO shall commence or encourage SMTA parties to commence mediation proceedings. If the dispute has not been resolved by mediation within six months of the commencement of the mediation or if it otherwise appears that the dispute cannot be resolved within twelve months after the issuance of initial notice, FAO may submit the dispute to binding arbitration.[41]

Implementation challenges: The limited number of notifications of PGRFA in the Multilateral System to date has been identified as one of the current weaknesses of the Multilateral System.[42] Other holders of PGRFA, including the private sector and other organizations, including indigenous and farmer communities, are encouraged, but not required, to include listed crops in the Multilateral System in order to achieve more comprehensive coverage: their contributions are thus voluntary. The Governing Body has at times raised the issue of whether to stop facilitated access for legal and natural persons that do not include material into the Multilateral System, but obtain material from it, but has not yet reached a decision in this regard,[43] in light of the overall Treaty objectives related to sustainable agriculture and food security.

While there have, to date, been three cycles of projects under the Treaty's Benefit-sharing Fund,[44] these projects have been funded through government donations, as commercial benefits arising from the use of genetic resources in the Multilateral System are yet to materialize.[45] A projection of benefit flows concluded that such flows will be moderate at best, and will take even longer than expected, even under the most favourable conditions (such as increased membership of the Treaty, Parties' making all their plant genetic resources available immediately, no deliberate avoidance of use of material from the Multilateral System in institutional breeding programmes).[46] In particular, it has been noted that "the share of Annex I crops in plant genetic resource-related innovation has been declining over time....[whereas] non-Annex I crops are attracting an increasing share of the total research effort," making a significant contribution to the value of the global commercial seed market, but not to the potential growth of benefit-sharing payments (this is, for instance, the case of cotton and soybean).[47] As a result, an intersessional process to enhance the functioning of the Multilateral System is currently under way in the ITPGRFA framework (see section III.i below). It has, in addition, been noted that the benefit arising from

[41] http://www.planttreaty.org/content/what-third-party-beneficiary.

[42] EC Kamau, "The Multilateral System of the International Treaty on Plant Genetic Resources for Food and Agriculture: Lessons and Room for Development" in EC Kamau and G Winter (eds), *Common Pools of Genetic Resources: Equity and Innovation in International Biodiversity Law* (Routledge, 2014), 343, at 345-346 and 353-354.

[43] Ibid, 358-359.

[44] http://www.planttreaty.org/content/benefit-sharing-fund.

[45] See ITPGRFA Secretariat, Report on the Implementation of the Multilateral System of Access and Benefit Sharing' (2013), FAO Doc IT/GB-5/13/5; and Resolution 3/2009.

[46] 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).

[47] Ibid, at 154.

making products available for further research and breeding through the Multilateral System may not reach developing countries that lack the technologies or capacity to use the product or knowledge.[48]

It has finally been reported that, with project partners under the Benefit-sharing Fund being generally research institutes and gene banks, questions have been raised as to whether farming communities benefit directly from the Fund.[49] It has been questioned, in fact, whether the competitive, project-based approach sufficiently takes into account the unequal capacities of countries and actors to benefit from the ITPGRFA, allows for projects that also serve collective interests beyond the specific area or actors involved in the project, or serve to also strengthen coordination and cooperation between stakeholders, activities and countries to address food security concerns.[50]

ii. WHO PIP Framework

Legal nature: The WHO PIP Framework was adopted in 2011 through a formally non-binding WHO Assembly resolution. It is therefore non-binding for Member States, but the use of the system is governed by Standard Material Transfer Agreements (SMTA), so the specific provisions included in the SMTAs are contractually binding on parties. The Framework aims to promote both the sharing of samples of pandemic influenza viruses and benefit-sharing arising from it, most notably the sharing of vaccines produced from research on the viruses. It built upon existing WHO structures linking national and WHO-recognized laboratories in cooperation to monitor the spread of influenza and develop appropriate responses (the Global Influenza Surveillance and Response System or GISRS). The Framework improved these structures by adding contractually binding benefit-sharing and reporting obligations and agreed goals with regard to technology transfer and research collaboration among others,[51] but it has not modified actual exchange routes and practices.[52] There are two SMTAs: SMTA1 applies automatically to institutions within the GISRS in accordance with standard terms of reference attached to the Framework, including a prohibition of granting intellectual property rights on the material.[53]

Accruing of benefits: Benefits include technical and regulatory capacity building, technology transfer and sustainable and innovative financing,[54] which are services that were already provided by WHO or the GISRS laboratories before the adoption of the Framework.[55] In addition, SMTA1 places benefit-sharing obligations on recipients to actively seek the participation of scientists to the fullest extent possible from originating laboratories, especially from developing countries, in scientific projects and in the preparation of publications.[56]

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[48] EC Kamau, "The Multilateral System of the International Treaty on Plant Genetic Resources for Food and Agriculture: Lessons and Room for Development" in EC Kamau and G Winter (eds), *Common Pools of Genetic Resources: Equity and Innovation in International Biodiversity Law* (Routledge, 2014), 343, at 362.

[49] S Gagnon et al., "Summary of the Sixth Session of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture" (2015) 9:565 *Earth Negotiations Bulletin*.

[50] S Louafi, *Reflections on the Resource Allocation Strategy of the Benefit Sharing Fund* (Swiss Federal Office for Agriculture, 2013) at 7.

[51] M Wilke, "A Healthy Look at the Nagoya Protocol-Implications for Global Health Governance" 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), 123, at 139.

[52] Ibid, at 327.

[53] PIP Framework Annexes 4-8. See M Wilke, "A Healthy Look at the Nagoya Protocol-Implications for Global Health Governance" 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), 123, at 140.

[54] PIP Framework, article 6.

[55] M Wilke, "A Healthy Look at the Nagoya Protocol-Implications for Global Health Governance" 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), 123.

[56] SMTA 1, article 5(2)-(3) and PIP Framework Annex 5, Terms of Reference for WHO Collaborative Centre for Influenza, guiding principle 6.

SMTA2 applies to recipients of material outside the system, including private-sector manufacturers. As opposed to the SMTA 1, it does not apply automatically: rather it needs to be negotiated by the WHO Director General and any outside institution requesting material, prior to the transfer.[57] It has been noted that this has allowed a differentiation between the rights, duties and obligations of public research institutes and those of other for-profit research entities.[58] It has further been noted that the private sector was involved in intense consultations with a view to devising an acceptable and workable system.[59] SMTA2 allows for intellectual property rights, but obliges the recipient to engage in at least two benefit-sharing activities: either make available (through a donation or at affordable prices, subject to case-by-case negotiations) the products of commercial research (vaccines/antiviral medicine) or grant licences to manufacturers in developing countries or the WHO. When the products are not vaccines or antiviral treatments, manufacturers may choose to engage in capacity building or technology transfer. The Framework otherwise only requires States to urge manufacturers to engage in these activities and the SMTA2 calls upon recipients to consider such additional support.[60]

In addition, SMTA2 parties are under an obligation to contribute 50% of the running costs of the System though an annual partnership contribution, as is also established under the PIP Framework.[61] According to the WHO website, "each year WHO issues a questionnaire that identifies potential contributors. It is distributed to existing contributors, all companies and institutions that conduct research and development in the field of influenza and to all recipients of PIP biological material recorded in the Influenza Virus Traceability Mechanism database."[62] The specific amount for each company and the mechanism for contribution is to be defined by the WHO Director General and an Advisory Group (discussed below).

Allocation of benefits: The contributions are used for improving pandemic preparedness and response,[63] with a decision taken in 2012 to devote 70% to preparedness and 30% to response. Guidelines for preparedness-related and response-related distributions have been adopted in 2014. As to the former, prioritization of countries is carried out by WHO regional officers. The benefits are shared by WHO with all WHO membership based on public health risk and need, so countries have a right to benefits vis-a-vis the WHO. The WHO Director General oversees the distribution of benefits, with the support of an Advisory Group (comprising a mix of internationally recognised policy makers, public health experts and technical experts) that monitors implementation, assesses the Framework functioning and provides recommendations, including on the fair and equitable sharing of benefits.[64] Significantly, the PIP Framework provides a key (qualitative) benchmark for equity: first, its objective is to improve global health, not just reward countries for their individual contributions; and second, it includes a principle of "fair, equitable and transparent allocation of scarce medical resources based on public health risk and needs."[65] As a consequence, "the most affected countries and those with limited access to needed vaccines

[57] PIP Framework Annex 2, article 4(4). Note that SMTA2 allows for intellectual property rights, but combines them with at least two different benefit-sharing activities. See M Wilke, "A Healthy Look at the Nagoya Protocol-Implications for Global Health Governance" 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), 123, at 140.

[58] A Broggiato et. al., "Fair and Equitable Sharing of Benefits from the Utilization of Marine Genetic Resources in Areas beyond National Jurisdiction: Bridging the Gaps between Science and Policy" (2014) 49 *Marine Policy* 182.

[59] M Wilke, "A Healthy Look at the Nagoya Protocol-Implications for Global Health Governance" 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), 123, at 143.

[60] PIP Framework, article 6(13)(1).

[61] PIP Framework, article 6(14)(3).

[62] http://www.who.int/influenza/pip/benefit_sharing/partnership_contribution/en/.

[63] PIP Framework, article 6(14)(4).

[64] PIP Framework, article 7(1)-(2) and Annex 3, 2(1)(d).

[65] PIP Framework, article 6(1).

will be the first to receive vaccines in time of emergencies, rather than those that shared the utilized specimen unless they also are experiencing health risks and needs."[66]

The system is supported by other WHO facilities: its Shipping Fund Project that provides logistical support in the form of guidance and transportation; and a web-based traceability mechanism covering also non-GISRS institutions, which in addition to monitoring, contributes to information sharing and research collaboration, as it shares also the outcomes of testing series.[67]

Compliance: If GISRS laboratories breach any SMTA provisions, they can be sanctioned with suspension or revocation of the laboratory's WHO designation.[68] But there are no sanctions for non-GISRS institutions transferring material to other non-GISRS institutions.[69] It is useful to note that unlike other genetic resources, PIP material is easy to detect and can be clearly associated with access to one particular sample; also, due to biosafety requirements for infectious materials, the shipment of PIP specimens is fairly well documented.[70]

Implementation challenges: The non-legally binding nature of the PIP Framework has been considered problematic when non-GISRS institutions acquire GISRS material in an unlawful manner: in principle, the intent to transfer GISRS material to a non-GISRS institution must be notified in advance to the WHO Director General (both under SMTA1 and 2), so that she can enter into necessary SMTA2 negotiations with the non-GISRS institution.[71]

iii. International Seabed Authority (ISA)

Legal nature: Benefit-sharing provisions were included in the operative text of UNCLOS in relation to the non-living resources both in the continental shelf beyond 200 nautical miles ("outer continental shelf"[72]) under Article 82 (which has not yet been operationalized - see section III.ii below) and in the deep seabed beyond national jurisdiction (the "Area"[73]) under Article 140. With regards to the latter, the mineral resources in the Area are designated as the common heritage of mankind[74] and are therefore subjected to a treaty-based international regulation and management regime whereby they must be exploited for the benefit of mankind as a whole. To that end, the ISA is to "provide for the equitable sharing of financial and other economic benefits derived from activities in the Area…"[75] Furthermore, the Authority is involved in ensuring that other benefits are distributed, such as the transfer of scientific and

[66] M Wilke, "The World Health Organization's Pandemic Influenza Preparedness Framework as a Public Health Resources Pool" in EC Kamau and G Winter (eds), *Common Pools of Genetic Resources: Equity and Innovation in International Biodiversity Law* (Routledge, 2014), 315, at 332.

[67] PIP Framework, article 4(4).

[68] PIP Framework, article 7(3)(4).

[69] M Wilke, "The World Health Organization's Pandemic Influenza Preparedness Framework as a Public Health Resources Pool" in EC Kamau and G Winter (eds), *Common Pools of Genetic Resources: Equity and Innovation in International Biodiversity Law* (Routledge, 2014), 315, at 330.

[70] Ibid, at 330.

[71] PIP Framework, Annex 2, 4.4.

[72] Coastal States whose continental margin extends beyond 200 nautical miles can claim an extended continental shelf: UNCLOS, article 76: "The continental shelf of a coastal State comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance."

[73] UNCLOS, article 1(2).

[74] UNCLOS, article 136.

[75] UNCLOS, article 140.

technical knowledge.[76] On the basis of UNCLOS, the Authority adopts regulations that provide contractual clauses, which will then be negotiated with, and become contractually binding on, contractors.

Accruing of benefits: Due to the fact that mining activities in the deep seabed have not yet reached the exploitation stage, the ISA has not yet elaborated on monetary benefit-sharing (see section III.ii below), but has done so already on non-monetary benefit-sharing,[77] through two channels. First, the Authority has adopted regulations for prospecting and exploration of seabed mineral resources,[78] whereby contractors are expected to provide training and capacity-building activities to assist developing States that wish to participate in activities in the Area by drawing up "practical programmes for the training of personnel of the Authority and developing States."[79] These are contractually enforceable because the training programme is drawn up by a contractor in cooperation with ISA and the sponsoring State and inserted as a schedule to each exploration contract. According to the Convention, training programmes must focus on training in the conduct of exploration and provide for full participation by personnel in all activities covered by the contract. According to the standard contract clauses, the scope and financing of the training programme are subject to negotiations between the contractor, ISA and the sponsoring State.

Second, the Authority has created an endowment fund for marine scientific research in the Area,[80] which was initially filled with the balance of the application fees paid by pioneer investors and is currently dependent on donations. The fund aims to promote and encourage the conduct of marine scientific research (see also section II.v below) in the Area for the benefit of mankind as a whole. This is done by supporting the participation of qualified scientists and technical personnel from developing countries in marine scientific research programmes and by providing them with opportunities to participate in international technical and scientific cooperation, including through training, technical assistance and scientific cooperation programmes.[81]

Allocation of benefits: With regard to the endowment fund, the Authority has maintained a list of opportunities for scientific collaboration including research cruises, deep-sea sample analysis and training, and internship programme, which foresee partnerships among scientists in the international community, as well as collaboration with contractors. The ISA has also prepared application guidelines for potential funding recipients: applications are normally submitted by a developing country but may also be accepted from other countries if the proposal demonstrates benefits to scientists from developing countries. An advisory panel evaluates applications and makes recommendations to the ISA Secretary-General for the award of funding assistance.[82]

With regard to contractors' training and capacity-building activities, the Authority has produced recommendations for the guidance of contractors and sponsoring States relating to training programmes under plans of work for exploration,[83] which are used by the ISA Legal and Technical Commission to review contractors' applications. The guidelines specify that the training programme is designed and carried out for the benefit of the trainee, the nominating country and ISA member States, with every attempt being made to follow best practice at all times and to contribute to the training and capacity

[76] UNCLOS, article 144.

[77] J Harrison, "The Sustainable Development of Mineral Resources of the International Seabed Area: The Role of the Authority in Balancing Economic Development and Environmental Protection" (SSRN 2014), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2531370.

[78] Regulation 27 of the Regulations on prospecting and exploration for polymetallic nodules and Regulation 29 of the Regulations on prospecting and exploration for sulphides and crusts; and annex 4 of these regulations.

[79] UNCLOS, Annex III, article 15.

[80] Resolution establishing an endowment fund for marine scientific research in the Area, ISBA/12/A/11 (2006).

[81] Ibid, para 2.

[82] https://www.isa.org.jm/contractors/endowment-fund.

[83] Recommendations for the guidance of contractors and sponsoring States relating to training programmes under plans of work for exploration, Document ISBA/19/LTC/14 (2013).

development needs of the participants' country of origin. It is also emphasized that the provision of training is no more or less important than any other activity included in the proposed plan of work and should be afforded the same priority in terms of time, effort and financing. Contractors should as a minimum provide for training opportunities for at least 10 trainees during each 5-year period of the contract and identify additional opportunities that may arise during the contract period; make an ex gratia contribution to the Authority specifically earmarked for training purposes when circumstances dictate that training programmes cannot be implemented; and make every attempt to avoid penalizing potential deserving candidates for issues beyond their control, such as visa issues and language barriers. The guidance therefore aims to lay the ground for moving towards a more proactive, needs-based approach whereby the contractor will encourage potential applicants and nominating States; and the ISA Secretariat advertises as widely and as soon as possible information on training opportunities, develops a capacity-building programme and prepares a roster of qualified candidates, and assists in the matching of suitable candidates to opportunities in consultation with the contractor. The ISA Legal and Technical Commission will agree on a list of pre-approved candidates from the roster on the basis of transparent criteria and conduct regular reviews to ensure that the goal of equitable and geographic sharing of opportunities is followed.

Implementation challenges: The guidance notes that the identification of training opportunities with contractors has been a reactive process at the start, which was driven by the making of an offer by a contractor, followed by the canvassing of interest from countries and finally shortlisting of candidates by the ISA Legal and Technical Commission. With regard to the endowment fund, its reliance on voluntary donations does not guarantee its sustainability.

iv. Marine scientific research under UNCLOS

Legal form: The regime for marine scientific research (MSR) under UNCLOS includes provisions for non-monetary benefit-sharing both in areas within and beyond national jurisdiction.[84] Non-monetary benefit-sharing obligations are therefore established by an international treaty, but are characterised by a certain degree of generality.

Accruing and allocation of benefits: States are required to promote international cooperation in MSR for peaceful purposes and provide other States with a reasonable opportunity to obtain from the researching State, or with its cooperation, information necessary to prevent and control damage to the marine environment; and create favourable conditions for the conduct of MSR. States are also required to make available by publication and dissemination information on proposed major programmes and their objectives, as well as knowledge resulting from MSR, thereby actively promoting the flow of scientific data and information and the transfer of knowledge resulting from MSR, especially to developing States, as well as the strengthening of developing States' autonomous MSR capabilities.[85] These provisions apply also to MSR in areas beyond national jurisdiction, notably the high seas.[86] With regards to the Area, the Authority is mandated to develop programmes for sharing information, training and technology transfer (see section II.iii above).[87]
As adequate technology is considered "a necessary underpinning factor for the conduct and promotion of" MSR as required under UNCLOS Part XIII, UNCLOS Part XIV on technology should be read in

[84] This section builds on C Salpin, "The Law of the Sea: A Before and an After Nagoya?" in Morgera, Buck and Tsioumani (eds), *The Nagoya Protocol in Perspective: Implications for International Law and Implementation Challenges* (Martinus Nijhoff, 2013), 149.

[85] UNCLOS, articles 242-244.

[86] "...all parts of the sea that are not included in the exclusive economic zone, in the territorial sea or in the internal waters of a State, or in the archipelagic waters of an archipelagic State... The high seas are open to all States, whether coastal or land-locked. Freedom of the high seas is exercised under the conditions laid down by this Convention and by other rules of international law": UNCLOS, articles 86-87.

[87] UNCLOS, articles 143-144.

conjunction with Part XIII.[88] States are required to cooperate in accordance with their capabilities to promote actively the development and transfer of marine science and marine technology on fair and reasonable terms and conditions, and promote the development of the marine scientific and technological capacity of States which may need and request technical assistance in this field, particularly developing States with regard to the exploration, exploitation, conservation and management of marine resources.[89] In particular, States have an obligation to promote: the acquisition, evaluation and dissemination of marine technological knowledge and facilitate access to such information and data; the development of appropriate marine technology; the development of the necessary technological infrastructure to facilitate the transfer of marine technology; and the development of human resources through training and education of nationals of developing States and countries and especially the nationals of the least developed among them.[90] Means to these ends include: programmes of technical cooperation for the effective transfer of all kinds of marine technology; the promotion of favourable conditions for the conclusion of agreements under equitable and reasonable conditions; the convening of conferences; the promotion of the exchange of scientists and of technological and other experts; and projects, joint ventures and other forms of bilateral and multilateral cooperation.[91]

In the exclusive economic zone (EEZ)[92] and continental shelf, the consent of the coastal State is expected to be granted for MSR activities that are carried out to increase scientific knowledge of the marine environment for the benefit of mankind.[93] But a coastal State may withhold consent if proposed research is of direct significance for the exploration and exploitation of natural resources.[94] Benefit-sharing arising from MSR in the EEZ and continental shelf comprises: coastal State‘s participation in the research project, without payment of any remuneration to the scientists of the coastal State and without obligation to contribute towards the costs of the project; sharing of preliminary reports, as soon as practicable, and of final results and conclusions after research completion; access for the coastal State to all data and samples, including data which may be copied and samples which may be divided without detriment to their scientific value; provision to the coastal State of an assessment of data, samples and research results or assistance in their assessment or interpretation.[95] In addition, researching States are to ensure that the research results are made internationally available through appropriate national or international channels, as soon as practicable, unless the coastal State has subjected this to its prior agreement.[96]

Transboundary situations may be quite frequent in the marine environment. When MSR takes place in the EEZs or continental shelves of different coastal States, it falls on the researching State to seek consent from all coastal States concerned.[97] Other transboundary situations, however, do not seem to lend themselves to clear solution under UNCLOS, namely: biological material that is found both in the EEZ and in the high seas; organisms that are associated with sedentary species found on the outer continental shelf, but which are not sedentary themselves and may be found in the high seas; or compounds found in the high seas that have been secreted by sedentary species found in the continental shelf.[98]

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[88] United Nations, *Marine Scientific Research: A Revised Guide to the Implementation of the Relevant Provisions of the UN Convention on the Law of the Sea* (United Nations, 2010), at 19.

[89] UNCLOS, article 266.

[90] UNCLOS, article 268

[91] UNCLOS, article 269.

[92] “The exclusive economic zone is an area beyond and adjacent to the territorial sea... The exclusive economic zone shall not extend beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured”: UNCLOS, articles 55 and 57.

[93] UNCLOS, article 246(3).

[94] UNCLOS, article 246(5)(a).

[95] UNCLOS, article 249(1)(a)-(e).

[96] UNCLOS, articles 249(1)(1)(f) and 249(2).

[97] C Salpin, “The Law of the Sea: A Before and an After Nagoya?” in Morgera, Buck and Tsioumani (eds), *The Nagoya Protocol in Perspective: Implications for International Law and Implementation Challenges* (Martinus Nijhoff, 2013) 149, at 172-174.

[98] Ibid., at 173.

Compliance: UNCLOS specifically requires researching States to inform immediately the coastal State of any change of intent ("major change in the research programme") and the coastal State has the right to require the cessation of research activities in case of major changes.[99] Disputes about MSR are to be settled through compulsory dispute settlement procedures entailing binding decisions, with the exception of the exercise of the right of the coastal State to grant consent.[100]

Implementation challenges: It has been noted that UNCLOS does not place clear obligations with regard to MSR information-sharing, with the result that "voluntary exchange of information by the scientific community has acted as a de facto clearinghouse."[101] It should be further noted that UNCLOS provisions on MSR do not have any reference to indigenous and local communities.[102]

v. Antarctic Treaty System

Legal form: The Antarctic Treaty System (ATS), which applies to the area south of 60° South Latitude, including all ice shelves, is premised on the utilization of Antarctica exclusively for peaceful purposes and for the substantial contributions to scientific knowledge resulting from international cooperation on investigation,[103] and is designated as a natural reserve devoted to peace and science and the comprehensive protection of its environment.[104]

The 1991 Madrid Protocol on Environmental Protection to the Antarctic Treaty and the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) are silent on commercial benefits deriving from living resources in Antarctica. Bioprospecting has been considered by the ATCM since 1999. The Antarctic Treaty Consultative Parties (ATCPs) have decided that the Antarctic Treaty Consultative Meeting (ATCM) is the competent body to discuss bioprospecting,[105] and the ATS is the appropriate framework for managing the collection of biological material in the Antarctic Treaty area and for considering its use. One of the main concerns of the Antarctic Treaty Consultative Parties (ATCPs) is that commercialization may limit the free exchange of information and so adversely affect the access to scientific knowledge from Antarctica.[106] In 2009, the Parties decided that bioprospecting was adequately regulated for the time being by existing laws. Under the current ATS legal framework,

> When [bioprospecting] is considered scientific research, the research project must be evaluated before it commences for its potential to harm the environment. The proponent only has to demonstrate that the project will have a minor or transitory impact, or less than that. In these two cases, the activity will proceed unchallenged.[107] If, however, the proponent's evaluation suggests that more than a minor or transitory impact might occur, the proposal is given extra scrutiny by the proponent's State authority and by the ATCPs. But the ATCPs cannot veto the activity since its conduct is a proponent-State's right.[108] Furthermore, even though scientific observations and results from Antarctica must be shared

[99] UNCLOS, articles 249 and 253.

[100] UNCLOS, article 297.2.

[101] C Salpin, "The Law of the Sea: A Before and an After Nagoya?" in Morgera, Buck and Tsioumani (eds), *The Nagoya Protocol in Perspective: Implications for International Law and Implementation Challenges* (Martinus Nijhoff, 2013) 149, at 161.

[102] Ibid., at 169.

[103] Antarctic Treaty, articles 1-2.

[104] Madrid Protocol, article 2.

[105] Recently in Resolution 6 (2013).

[106] MW Tvedt, "Patent Law and Bioprospecting in Antarctica" (2011) 47 *Polar Record* 46, at 46-55.

[107] Madrid Protocol, article 8 and Annex I.

[108] Ibid., article 3 of Annex I.

> under the provisions of Antarctic Treaty Article III, scientists need do little more than record their research in the academic literature to fulfil this obligation. Screening and downstream processing of accessed material that might result in a commercial development occur ex situ and are not subject to the same rules of transparency. In fact, any activity post-sample collection will most likely be protected by commercial confidentiality arrangements.[109] When the activity is [not considered scientific research, it is] considered fishing, it comes under the direct regulation of the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR). The harvesting of krill for Omega-3 oil is one example. It makes no difference to CCAMLR what the catch will be used for, providing all the requisite procedures have been observed. Furthermore fishers are not in any way obliged to share the benefits of the sale of these resources.[110]

Accruing of benefits: While the System does not refer to benefit-sharing as such, it enshrines a non-monetary benefit-sharing mechanism whereby parties, to the greatest extent feasible and practicable: a) exchange information regarding plans for scientific programs in Antarctica; b) exchange scientific personnel in the Antarctica between expeditions and stations; c) exchange and make available for free the scientific observations and results from Antarctica.[111]

Allocation of benefits: The sharing of the data occurs through the national Antarctic data centres and other information systems. For instance, the Antarctic Biodiversity Information Facility, which is recognised by the Scientific Committee on Antarctic Research of the International Council of Science (that has a long-standing scientific advisory role to the ATS), aggregates terrestrial and marine Antarctic biodiversity data from various providers: all publicly available data can be searched and retrieved for users to share, adapt and make commercial use of.[112] The Facility also feeds information into global biodiversity initiatives such as the Ocean Biogeographic Information system (OBIS) and the Global Biodiversity Information Facility (GBIF).

In 2005 the Antarctic Treaty Consultative Meeting recommended the exchange of information on bioprospecting activities and that the collection of biological specimens for bioprospecting requires prior notification through the Electronic Information Exchange System (EIES),[113] under pre-existing obligations related to giving notice in advance of 'all expeditions to and within Antarctica, on the part of its ships or nationals, and all expeditions to Antarctica organized in or proceeding from its territory'[114] and sharing information on environmental protection via the EIES.

Implementation challenges: EIES has been scarcely used for the exchange of information on bioprospecting activities,[115] so in 2013 the ATCPs stressed the need for improved data and information on biological prospecting.[116]

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[109] J Jabour and D Nicol, "Bioprospecting in Areas Outside National Jurisdiction: Antarctica and the Southern Ocean" (2003) 4 *Melbourne Journal of International Law* 76.

[110] J Jabour, " Economic Activities in Antarctica: Resources and Legal Regimes" in E Morgera and K Kulovesi (eds), *Research Handbook on Natural Resources and International Law* (Edward Elgar, forth 2016).

[111] Antarctic Treaty, article III.

[112] R Puig-Marcó, "Access and benefit sharing of Antarctica's Biological Material" (2014) 17 *Marine Genomics* 73, at 76.

[113] Resolution 7 (2005) 'Biological Prospecting in Antarctica', ATCM XXVIII, Stockholm.

[114] Antarctic Treaty, article VII(5).

[115] R Puig-Marcó, "Access and benefit sharing of Antarctica's Biological Material" (2014) 17 *Marine Genomics* 73, at 75.

[116] XXXVI ATCM Resolution 6 (2013), Biological Prospecting in Antarctica.

Key findings

- Regardless of the legally binding nature of the instrument underpinning multilateral benefit-sharing, there is a clear trend towards ultimately having recourse to standard contractual clauses. The degree to which these clauses are open, if at all, to negotiations varies from one framework to another (non-negotiable under the ITPGR; negotiable to some extent under the WHO SMTA2 and the ISA);
- There is a clear trend towards accruing and sharing non-monetary benefits in the delay/absence of accruing monetary ones;
- There is no clear trend in ensuring the financial viability of multilateral benefit-sharing mechanisms. Only the WHO has put in place a system of mandatory contributions (annual partnership contribution), whereas the ISA and the ITPGR both currently rely on voluntary contributions (but see the intersessional process under the ITPGR to introduce mandatory contributions under section III.i below);
- While all benefit-sharing mechanisms are geared towards the realization of fairness and equity, there is no clear trend in providing international guidance on how to realize fairness and equity vis-a-vis beneficiaries. The WHO PIP Framework is the only one to provide a benchmark for equity (principles based on public health risk and needs), although the ISA is moving towards a more need-based approach to sharing non-monetary benefits through guidelines that act as a benchmark for the assessment of contractors' proposals;
- Information-sharing as a form of non-monetary benefit-sharing is generally left to voluntary and decentralized initiatives (ISA, MSR under UNCLOS, Antarctic Treaty System), although the Antarctic Treaty System is attempting to use pre-existing centralised systems to this end;
- With regard to scientific cooperation and capacity-building as forms of non-monetary benefit-sharing, in the more developed multilateral benefit-sharing systems (ISA, WHO and ITPGR), there is a trend towards a centralized approaches with the international institution playing a facilitative and brokering role; whereas in other contexts (MSR and Antarctic Treaty System), this is left to bilateral initiatives;
- There appears to be very little experience with regard to traditional knowledge in the context of multilateral benefit-sharing, with the exception of the ITPGR.

III. Potential relevance of ongoing work undertaken by other processes

The most relevant ongoing work under other international processes is currently being undertaken under the ITPGR with regard to improving the Multilateral System, under the International Seabed Authority with regard to the development of multilateral monetary benefit-sharing from mining in the Area, and under the United Nations General Assembly with regards to a new legally binding instrument that is expected to include benefit-sharing from the use of marine genetic resources in areas beyond national jurisdiction. In addition, work under the CGRFA, IPBES and the Committee on Social, Cultural and Economic Rights with regard to the human right to science may be of relevance to the issues covered under Article 10, particularly traditional knowledge. The following sections will seek to identify specific relevant developments that may be linked to the trends and gaps identified in the previous sections.

i. ITPGR

Under the ITPGR there are two streams of ongoing work, at different stages, of interest to Article 10 of the Protocol: the intersessional process to enhance the functioning of the Multilateral System and the development of a Global Information System (GLIS).[117]

First, a process is under way under the ITPGR, focusing on enhancing the functioning of the Multilateral System, through the development of measures to increase user-based payments and contributions to the benefit-sharing fund and also 'additional measures to enhance the functioning of the MLS', possibly leading to a revision of the SMTA, an amendment to the Treaty, or the development a protocol to the Treaty.[118] The ITPGR Governing Body, at its sixth session held in October 2015, focused on the need for putting user-based income on a sound and predictable footing to achieve agreed targets, particularly through an effective subscription system that reduces transaction costs and provides legal certainty for users. To that end, it decided to extend the mandate of a working group for 2016-2017 to elaborate a full draft revised SMTA, focusing especially on the development of a subscription system and aiming to avoid the necessity of any other legal instrument, primarily through a revision of Article 6(11) (alternative system of payments) of the SMTA, and elaborate a complete proposal for an appropriate legal instrument, if it is deemed necessary. According to commentators:

> a subscription system would replace, or complement, the current payment obligations after commercialization with an upfront regular payment of fees for access to materials in the MLS. It could also reduce transaction costs arising out of tracking obligations, and increase legal certainty if it includes a termination clause that clearly specifies at what point users are no longer obliged to provide payments or other forms of benefit-sharing.[119]

The possible development of options to adapt coverage of the MLS, including a possible expansion of Annex I, has been raised as one of the 'additional measures to enhance the functioning of the MLS'.[120] Some regions believed that the expansion should cover all plant genetic resources for food and agriculture; others believed the expansion is dependent on measures to increase user-based payments.[121] Specifically, it was discussed whether the possible expansion of the Treaty's crop coverage should concern a defined list of crops or all plant genetic resources for food and agriculture.[122] In this connection, the ITPGR Governing Body mandated the working group to elaborate options for adapting the MLS coverage based on different scenarios and income projections. In addition, the working group is to consult with existing and potential SMTA users on the attractiveness of proposals.[123] Finally, the working group is to consider issues regarding genetic information associated with the material accessed from the MLS, which refers to an emerging trend of information technologies making physical access to the genetic material unnecessary.

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[117] The development of a platform for the co-development and transfer of technologies could also be considered ongoing work of interest to Article 10 of the Protocol, in as far as it may be considered a system of voluntary benefit-sharing that is likely to be gradually integrated into a multilateral benefit-sharing system. Given the early stages of work in this regard under the Treaty, however, this item has not been discussed more in detail in the present study. See Implementation of the Programme of Work on Sustainable Use of Plant Genetic Resources for Food and Agriculture, IT/GB-6/15/12 (2015); and IT/GB-6/15/Res 4.

[118] IT/GB-6/15/6 Add.1 and Rev.1 (2015).

[119] S Gagnon et al., "Summary of the Sixth Session of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture" (2015) 9:565 *Earth Negotiations Bulletin.*

[120] Expansion of the Access and Benefit-sharing Provisions of the International Treaty: Legal Options, IT/OWG-EFMLS-3/15/Inf.4 Rev.1 (2015).

[121] Expansion of the Access and Benefit-sharing Provisions of the International Treaty: Legal Options, IT/OWG-EFMLS-3/15/Inf.4 Rev.1 (2015).

[122] Possible Objectives and Elements of a Protocol to the International Treaty, IT/OWG-EFMLS-4/15/Inf.4 (2015); see also Synoptic Study 2: Policy and Legal study on the Feasibility and Effects of Changes to the Multilateral System, IT/OWG-EFMLS-2/14/4 (2014).

[123] IT/GB-6/15/Res 1.

The ITPGR Governing Body, at its sixth session held in October 2015, also adopted the vision on the GLIS, stating that the GLIS integrates and augments existing systems to create the global entry point to information and knowledge for strengthening the capacity for PGRFA conservation, management and utilization. This is to implement ITPGR Article 17, which requires parties to:

> cooperate to develop and strengthen a global information system to facilitate the exchange of information, based on existing information systems, on scientific, technical and environmental matters related to plant genetic resources for food and agriculture, with the expectation that such exchange of information will contribute to the sharing of benefits by making information on plant genetic resources for food and agriculture available to all Contracting Parties. In developing the Global Information System, cooperation will be sought with the Clearing House Mechanism of the Convention on Biological Diversity.

According to commentators, the GLIS could offer an incentive for users to access plant genetic resources for food and agriculture through the Multilateral System, by providing information about potentially valuable traits, and contextual data about interactions between traits, phenotypes and environmental conditions to users.[124]

ii. ISA

Under the ISA there are two streams of ongoing work of interest to Article 10 of the Protocol: the development of a monetary benefit-sharing modality in the Area; and a preliminary study towards the development of benefit-sharing modalities from non-living resources in the outer continental shelf.

a. Monetary benefit-sharing from mining in the Area

With the commercial exploitation of deep seabed resources expected to commence within the next ten years, the Authority has started consideration of draft regulations for the exploitation of minerals in the Area, including the nature of and mechanism for the payments to be made by contractors during this phase of operations. A report on the development of the regulatory framework produced for the 2013 session of the Authority envisages as a menu of options for consideration: a form of royalty payment and it highlights a number of different possibilities, including (a) royalties based on units of volume or weight; (b) royalties based on value of sales; (c) hybrid royalties; (d) profit-based royalties.[125] It also raises the underlying question of striking a balance between benefitting mankind as a whole, including future generations, fostering commercially viable and sustainable exploitation, including reasonable economic returns, and ensuring environmental and health safety of operations. The report also proposes the development of a hybrid social business model that explicitly sets an expectation that corporate responsibility for operations in the Area will pursue specific positive social impacts and returns, and specific baseline financial returns.

The Authority is also expected to consider the development of "an appropriate mechanism [for the sharing of financial and other economic benefits] on a non-discriminatory basis […]" taking into particular consideration "the interests and needs of developing States and peoples who have not gained full independence or other self-governing status."[126] So far it has been suggested that the monies could be directed to the Endowment Fund (see section II.ii above) or other types of development and/or marine

[124] S Gagnon et al., "Summary of the Sixth Session of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture" (2015) 9:565 *Earth Negotiations Bulletin*, at 12-13.

[125] Towards the development of a regulatory framework for polymetallic nodule exploitation in the Area, ISBA/19/C/5 (2013).

[126] UNCLOS, article 140.

environmental protection projects, possibly through other international institutions, such as the World Bank.[127]

With regards to the next steps in the process, a zero draft of exploitation regulations and standard contract terms is expected to be circulated to stakeholders in March 2016 and presented to the ISA Council in July 2016, with financial modelling for proposed financial terms and payment mechanism also to be developed sometime before December 2016.

b. Benefit-sharing from the exploitation of non-living resources in the outer continental shelf

A different provision under UNCLOS provides for benefit-sharing from the exploitation of non-living resources in areas within national jurisdiction, through a multilateral mechanism. Coastal States are to "make payments or contributions in kind in respect of the exploitation of the non-living resources of the continental shelf beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured."[128] UNCLOS Article 82 is considered an "international servitude" in the form of a royalty concerning an activity within national jurisdiction.[129] It applies to all types of non-living natural resources, including oil, gas, and mineral resources located on the outer continental shelf. This provision has so far remained "dormant,"[130] but the ISA has commissioned studies to clarify its normative content.

UNCLOS is quite detailed with regard to the accruing of benefits, by providing that: the payments and contributions shall be made annually by coastal States with respect to all production at a site after the first five years of production at that site; for the sixth year, the rate of payment or contribution shall be 1 per cent of the value or volume of production at the site; the rate shall increase by 1 per cent for each subsequent year until the twelfth year and shall remain at 7 per cent thereafter; production does not include resources used in connection with exploitation; and a developing State which is a net importer of a mineral resource produced from its continental shelf is exempt from making such payments or contributions in respect of that mineral resource. Issues that remain to be clarified, however, concern the obligation for States to notify the ISA the date of commencement of production, the nature of resources exploited and location of exploitation, the preferred form of discharge of the obligation (by payments or in-kind contributions, with the latter being a share of the volume of the produced natural resource), as well as issues of commercial sensitivity. It has been suggested to develop a model agreement between ISA and the State (the nature of which will, therefore, be that of an international treaty),[131] with the State likely passing the financial burden to producers in the form of a royalty payment to the licensing authority.[132]

With regard to the distribution of benefits, UNCLOS only states that the payments or contributions shall be made through the Authority, which shall distribute them to UNCLOS Parties on the basis of equitable sharing criteria, taking into account the interests and needs of developing States, particularly the least developed and the land-locked among them. The Authority is therefore not the recipient beneficiary of the payments, it rather acts as a trustee of UNCLOS State Parties, and UNCLOS does not provide any indication of the goals that should be pursued in using the funds.[133] It has been argued, however, that according to the object and purpose of UNCLOS, such an objective should be understood in light of the Millennium Development Goals, integrated coastal and ocean management and climate change

[127] J Harrison, "Who benefits from the exploitation of non-living resources on the seabed? Operationalizing the benefit-sharing provisions in the UN Convention on the Law of the Sea" (2015), available at http://www.benelexblog.law.ed.ac.uk/2015/07/01/who-benefits-from-the-exploitation-of-non-living-resources-on-the-seabed-operationalizing-the-benefit-sharing-provisions-in-the-un-convention-on-the-law-of-the-sea/.

[128] UNCLOS, article 82.

[129] Issues Associated with the Implementation of Article 82 of the United Nations Convention on the Law of the Sea, International Seabed Authority Technical Study No. 4 (2009), at xi.

[130] Ibid, at xi.

[131] Ibid, at 43.

[132] Ibid, at 25.

[133] Ibid at 42.

adaptation.[134] With regard to the governance of distribution, it has been pointed out that this could lead to the development of a novel distribution process within the Authority (as benefits arising from Article 82 are separate and different from those arising from the Area under the common heritage regime[135]), the utilization of existing international or regional mechanisms, and the possible linking with the Kyoto Protocol Adaptation Fund. That said, it was also emphasized that payments under UNCLOS Article 82 should not be characterised as the delivery of official development assistance.[136] With regard to equitable criteria, it has been argued that the same equitable criteria to be developed under the common heritage regime could be used in the context of Article 82, and that the ISA may need to develop, drawing on existing indices, a composite index to rank potential beneficiary States, with reference to the objects and purposes of UNCLOS. It was further pointed out that a model agreement could also be necessary for the distribution of funds.[137]

iii. CGRFA

Since 2007 the FAO Commission on Genetic Resources for Food and Agriculture has reviewed arrangements and policies on uses and exchanges of genetic resources in different subsectors of food and agriculture. These subsectors include animal, aquatic, forest and microbial genetic resources.[138] Following the adoption of the Nagoya Protocol, the Commission engaged in assessing whether distinctive features of the different sectors and sub-sectors of genetic resources for food and agriculture may require distinctive solution and in particular specific ABS modalities 'taking into account the full range of options, including those presented in the Nagoya Protocol.'[139]

In 2013, the Commission considered it premature to negotiate an international agreement or agreements on ABS for genetic resources for food and agriculture, and rather proposed to engage in further work towards the development of a voluntary tool to facilitate domestic implementation of ABS for different sub-sectors of genetic resources for food and agriculture, taking into account relevant international instruments on ABS, and considering stakeholder groups' voluntary codes of conduct, guidelines and best practices in relation to ABS for all sub-sectors of genetic resources for food and agriculture.[140]

In 2015, the CGRFA endorsed elements to facilitate domestic implementation of ABS measures for different subsectors of genetic resources for food and agriculture, with brief references to transboundary genetic resources and shared traditional knowledge.[141] The elements acknowledge that when there are multiple countries of origin, multilateral solutions should be sought; and that there is a need for guidance

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[134] Ibid, at 42.

[135] Ibid at 23.

[136] Ibid at 52.

[137] Ibid at 57.

[138] 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, at 116. See FAO, *The Use and Exchange of Animal Genetic Resources for Food and Agriculture* (FAO, 2009) ; FAO, *The Use and Exchange of Aquatic Genetic Resources for Food and Agriculture* (FAO, 2009) ; FAO, *The Use and Exchange of Forest Genetic Resources for Food and Agriculture* (FAO, 2009); and FAO, *The Use and Exchange of Microbial Genetic Resources for Food and Agriculture* (FAO, 2009).

[139] CGRFA, "Report of the thirteenth regular session of the Commission on Genetic Resources for Food and Agriculture" (2011) CGRFA-13/11/Report, paragraph 60 and Appendix D(1).

[140] CGRFA, "Report of the fourteenth regular session of the Commission on Genetic Resources for Food and Agriculture" (2013) CGRFA-14/13/DR, paragraph 40(xv).

[141] CGRFA-15/15/Report, Appendix B; A Tsioumanis and E Tsioumani, "Latest developments relating to benefit-sharing under the Commission on Genetic Resources for Food and Agriculture" (2015), available at http://www.benelexblog.law.ed.ac.uk/2015/04/27/benefit-sharing-under-the-commission-on-genetic-resources-for-food-and-agriculture/.

on cases of shared traditional knowledge. It has been argued that the elements "provide technical guidance on how to implement relevant international obligations rather than clarifying their normative content."[142] The CGRFA also requested to continue elaborating subsector-specific ABS elements, including consideration of the role of traditional knowledge associated with genetic resources for food and agriculture and their customary use, with a view to reporting to the Commission at its next session.

iv. BBNJ process under the United Nations General Assembly

Due to growing international concern about the increasing pressure posed by existing and emerging human activities on unique forms of life in areas beyond national jurisdiction, a working group was established in 2004 by the United Nations General Assembly to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction.[143] The Working Group concluded its work in 2015.[144] On the basis of its recommendations, the General Assembly in 2015 called for the development of an international, legally-binding instrument under UNCLOS on the conservation and sustainable use of marine biological diversity in areas beyond national jurisdiction (ABNJ).[145] The Assembly established a preparatory committee to make substantive recommendations on the elements of a draft text of such an instrument. Negotiations will address the topics identified as a package agreed upon in 2011: the conservation and sustainable use of marine biological diversity of ABNJ; marine genetic resources, including on the sharing of benefits; and measures such as area-based management tools, including marine protected areas, environmental impact assessments and capacity building and the transfer of marine technology.[146] The General Assembly is expected to decide on launching an intergovernmental negotiating conference to adopt the new instrument by the end of 2017.

Besides principled divergence among States participating in the debates under the Working Group as to whether marine genetic resources in areas beyond national jurisdiction should be regulated under the high seas regime or the common heritage regime, a few ideas have emerged about the possible features of benefit-sharing in that context. Proposals include: developing mechanisms for data-sharing, such as open-access gene pools; developing codes of conduct; establishing mechanisms for cooperation and sharing of information and knowledge resulting from research on marine genetic resources; facilitating access to samples; fostering developing countries' participation in public-private partnerships; and establishing a public trusteeship to distribute royalties and benefits from marine genetic resources of areas beyond national jurisdiction.[147]

Several other questions have been identified but not addressed in the process: the definition of marine genetic resources and its differentiation from marine living resources; the need for controls on or

[142] C Chiarolla, "Agriculture and Biodiversity Conservation" in J Razzaque and E Morgera (eds), *Encyclopedia of Environmental Law: Biodiversity* (Edward Elgar, forthcoming 2016).

[143] United Nations General Assembly resolution 59/24.

[144] UN document A/69/780 (2015).

[145] United Nations General Assembly resolution 69/292 (2014).

[146] United Nations General Assembly resolution 66/231 (2011).

[147] United Nations, "Transmittal letter dated 9 March 2006 from the Co-Chairpersons of the Working Group to the President of the General Assembly" (UN document A/61/65, (2006)); "Letter dated 15 May 2008 from the Co-Chairpersons of the Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction addressed to the President of the General Assembly" (UN document A/63/79 (2008)); "Letter dated 16 March 2010 from the Co-Chairpersons of the Ad Hoc Open- ended Informal Working Group to the President of the General Assembly" (UN document A/65/68 (2010)); "Letter dated 5 May 2014 from the Co-Chairs of the Ad Hoc Open-ended Informal Working Group to the President of the General Assembly" (UN document A/69/82 (2014)); "Letter dated 25 July 2014 from the Co-Chairs of the Ad Hoc Open-ended Informal Working Group to the President of the General Assembly" (UN document A/69/177 (2014)); "Letter dated 13 February 2015 from the Co-Chairs of the Ad Hoc Open-ended Informal Working Group to the President of the General Assembly" (UN document A/69/780 (2015)). See also C Salpin, "Marine Genetic Resources in Areas beyond National Jurisdiction" in E Morgera and K Kulovesi (eds), *Research Handbook on Natural Resources and International Law* (Edward Elgar, forthcoming 2016).

conditions for access to marine genetic resources; the need to apply benefit-sharing also to non-commercial research; the identification of who would be required to share benefits (the end user, the State of the end user, the seller, the State of the seller); the identification of beneficiaries and of criteria for the distribution of benefits; the possible use of traditional knowledge associated with marine genetic resources in areas beyond national jurisdiction; and the linkage between benefit-sharing and the conservation of marine biodiversity. The preparatory committee is scheduled to meet from 28 March to 8 April 2016 and from 29 August to 12 September 2016.

v. IPBES

While unrelated to multilateral benefit-sharing, IPBES may be of relevance to the issues covered under Article 10. Two streams of work under IPBES are of relevance to traditional knowledge.[148] First, IPBES established in 2012 a task force on procedures, approaches and participatory processes for working with indigenous and local knowledge systems, in order to, *inter alia*, develop procedures and approaches for working with indigenous and local knowledge (ILK) systems. At the first meeting of the task force in 2014, five work streams were agreed, including to: undertake piloting of preliminary approaches and procedures for working with indigenous and local knowledge systems in assessments; support the establishment of a participatory mechanism to facilitate linkages between indigenous peoples and local communities and scientists; and establish a roster and network of experts in indigenous and local knowledge to support the Platform's work.

The interim approaches and procedures that have been developed in order to integrate ILK into ongoing regional and thematic assessments[149] include: putting indigenous peoples and local communities and their places first; finding mutual goals, benefits and benefit-sharing; recognising and supporting rights and interests; recognising and respecting diverse worldviews underpinning ILK systems; establishing mutual trust and respect and an equitable intercultural space for dialogue; ensuring free, prior and informed consent; recognizing and respecting intellectual and cultural rights; practicing reciprocity, giving back and capacity building; ensuring culturally appropriate storage of and access to information; and utilising formal and informal agreements and statements. The interim procedures foresee: mobilising indigenous and local knowledge holders and researcher/practitioners through networks; convening local to global dialogue workshops during diverse phases of IPBES assessments; recognising 'community' understanding of social structures and identifying groups or individuals with specialized knowledge; considering gender and gender-specific knowledge; supporting local studies, multiple scales and cross-scale linkages; respecting ILK systems' validation procedures; and building dialogue addressing uncertainty between ILK and science.

Second, IPBES established a task force on knowledge and data in 2012, which has developed a Knowledge, Information and Data Plan including provisions on traditional knowledge in IPBES assessments and on the "rights and attribution" to knowledge holders. The Plan recognises that "the custodians of data and knowledge essential to the Platform's work programme are many and diverse, and the programme can only be delivered through collaboration. Consequently, the plan will [inter alia] recognize the needs and interests of custodians of data and knowledge, such as access rights and intellectual property rights."[150] The task force is also working on a strategy including a specific section on 'rights and attribution,' which is expected to focus on developing guidelines for "handling the rights of knowledge holders, including issues of transparency, acknowledgement, recognition, intellectual property, access, and respect for indigenous knowledge."[151]

[148] This section draws on C Chiarolla and A Savaresi, "Indigenous Challenges under IPBES: Embracing Indigenous Knowledge and Beyond" (forthcoming).

[149] IPBES/3/INF/2 (2014), Annex II.

[150] IPBES/3/4 (2014), Annex, para 12(b).

[151] IPBES/3/INF/3 (2014), Annex I, para. 9.

Both streams of work may provide useful examples of guarantees and practical approaches when dealing with traditional knowledge at the multilateral level, as well as practical options for involving indigenous peoples and local communities in that connection.

vi. Right to science

The human right to science is embedded in a vast number of global and regional human rights treaties,[152] and in its original formulation in the Universal Declaration on Human Rights contains a reference to sharing in the benefits of scientific advancements.[153] In 2001 the United Nations Special Rapporteur in the field of cultural rights highlighted that the scope, normative content and obligations of States with regard to the human right to science remain underdeveloped. She suggested that the right to science encompasses: the right to access the benefits of science by everyone without discrimination; the opportunity for all to contribute to scientific research; the obligation to protect all persons against negative consequences of scientific research or its applications on their food, health, security and environment; and the obligation to ensure that priorities for scientific research focus on key issues for the most vulnerable.[154] In this connection, the Rapporteur also underscored the need for further clarification of the modalities and role of benefit-sharing vis-à-vis technology transfer. She pointed to an implied obligation for developing countries to prioritize the development, import and dissemination of simple and inexpensive technologies that can improve the life of marginalized populations rather than innovations that disproportionately favour educated and economically affluent individuals and regions; and to a corresponding obligation for industrialized countries to comply with their international legal obligations through provisions of aid, as well as development of international collaborative models of research and development for the benefit of developing countries and their populations.[155] Finally, the Rapporteur pointed to the United Nations Declaration on the Rights of Indigenous Peoples on the need for "adopting measures to ensure the right of indigenous peoples to maintain, control, protect and develop their intellectual property over traditional knowledge".[156]

In November 2013, the Committee on Social, Cultural and Economic Rights agreed to carry out background research on the right to science, which may lead to a future formal process for the development of a General Comment in that regard.[157] This work may be relevant for the Nagoya Protocol Article 10 in as far as a series of non-monetary benefits may contribute to the realization of the right to science, such as research funding; sharing of research and development results; collaboration, cooperation and contribution in scientific research and development programmes; collaboration, cooperation and contribution in education and training; admittance to ex situ facilities of genetic resources and to databases; technology transfer, and research directed towards priority needs, such as health and food security, and IPRs.[158] This work may also be relevant for the Nagoya Protocol in that it may serve to clarify international legal standards related to scientific cooperation, information-sharing, capacity

[152] International Covenant on Economic, Social and Cultural Rights, article 15; Charter of the Organization of American States, article 38; American Declaration on the Rights and Duties of Man article XIII and Additional Protocol to the American Convention on Human Rights in the Area of Economic, Social and Cultural Rights, article 14; and Arab Charter on Human Rights, article 42.

[153] Article 27(1).

[154] Report on the Right to Enjoy the Benefits of Scientific Progress and its Applications (UN document A/HRC/20/26 (2012)), paragraphs 1, 25, 30-43.

[155] Ibid, paragraphs 64-69.

[156] Report of the Special Rapporteur in the field of cultural rights (UN document A/69/286 (2014)), paras. 54-55.

[157] Report of the fiftieth and fifty-first sessions of the Committee on Economic, Social and Cultural Rights (UN document E/2014/22-E/C.12/2013/3 (2014)), para. 74. M Mancisidor, "Is There Such a Thing as a Human Right to Science in International Law?" *ESIL Reflections* (2015), available at http://www.esil-sedi.eu/node/896.

[158] Nagoya Protocol, Annex.

building and technology transfer as forms of non-monetary benefit-sharing, and possibly also the role of traditional knowledge in that connection.

Key findings

- The ITPGRFA is considering the development of a subscription system to ensure predictability of funds for multilateral benefit-sharing. This appears relevant for addressing the unpredictability of multilateral benefit-sharing systems relying on voluntary funding (such as the ITPGRFA and ISA in section II.i and iii above), and could be compared with the mandatory payments under the WHO PIP Framework (section II.ii above);
- The ITPGRFA is considering a more institutionalized approach to multilateral support for information-sharing and capacity building (a need that has been highlighted in section II above). This appears relevant also to explore opportunities for linking different databases (as suggested by the literature in section I.ii above).
- Equitable criteria for benefit-sharing are to be developed by the ISA in two different multilateral benefit-sharing mechanisms, and possibly under the negotiations of a new implementing agreement under UNCLOS. This appears relevant to explore different options for providing international guidance on fairness and equity in benefit-sharing (similarly to the WHO PIP Framework, section II.ii above);
- Elaboration on the role of traditional knowledge in the context of benefit-sharing opportunities may be provided in the context of the CGRFA and possibly under the negotiations of a new implementing agreement under UNCLOS. This appears relevant to explore opportunities to gain understanding and experience with regard to traditional knowledge in the context of multilateral benefit-sharing (in addition to that of the ITPGRFA, see section II.1 above). In addition, ongoing work in the framework of IPBES may provide useful examples of guarantees and practical approaches when dealing with traditional knowledge at the multilateral level, as well as practical options for involving indigenous peoples and local communities in that connection.
- The ongoing discussions on the content of the human right to science appear relevant to clarify international legal standards related to scientific cooperation, information-sharing and technology transfer as forms of non-monetary benefit-sharing, be that through centralized/diffused, multilateral/bilateral, mandatory/voluntary approaches (see section II above).

IV. Case studies

The following case studies are related to ex situ and in situ genetic resources, traditional knowledge associated with genetic resources, and transboundary situations. The following sub-sections will seek to identify experiences or lessons learned that may be linked to the trends and gaps identified in the previous sections.

i. Potato Park

The Potato Park in the Peruvian Andes was established in 1998 by six Quechua communities, the Asociación ANDES and the International Institute for Environment and Development (IIED), as an Agrobiodiversity Conservation Area dedicated to the protection of the native potato via indigenous territoriality traditions.[159]

[159] This section builds upon E Tsioumani, "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" (SSRN 2014), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2524337.

The Potato Park is founded upon a series of agreements. Following the signing of a repatriation agreement with the International Potato Centre (a CGIAR centre) in 2004 leading to the return of 410 native potato varieties to the communities and prohibiting the patenting of these varieties and related knowledge, an agreement established among the six communities that communally manage the park was concluded. This inter-community agreement aims to ensure the equitable sharing of seeds and monetary benefits derived from the repatriation, and of revenues derived from other economic activities in the park (gastronomy and ecotourism initiatives, and the production and selling of medicinal plants, potatoes and crafts), to avoid potential conflicts amongst the communities. An inter-community Potato Guardians group (comprised of elected individuals of highly specialised knowledge in native potatoes) ensures stewardship of potato diversity and collaborative research with scientists.

The inter-community 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 provide 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. It sets out the rules for access by outsiders to the Park's genetic resources and traditional knowledge and for equitable benefit-sharing. National- and local-level policy support has secured the communities' land and resource rights and has enabled this model of community-based land and resource management.[160] The endogenous development model promoted in the Potato Park 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 domesticated environment, the wild environment and the "spiritual world."[161]

This case illustrates 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.[162] In addition, the Potato Park has been among the beneficiaries of funding from the ITPGRFA benefit-sharing fund.[163] Furthermore, the Potato Park communities have voluntarily placed their potato collections in the ITPGRFA Multilateral System[164] and they have also sent duplicates of all samples to the Svalbard Global Seed Vault,[165] to secure availability of their varieties for future generations.[166]

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[160] 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), available at http://pubs.iied.org/pdfs/G03340.pdf; and M Tapia and B Tobin, "Guardians of the Seed: The Role of the Andean Farmers in the Caring and Sharing of Agrobiodiversity" in EC Kamau and G Winter (eds), *Common Pools of Genetic Resources: Equity and Innovation in International Biodiversity Law* (Routledge, 2014), 79.

[161] Ibid.

[162] Peruvian Constitution, article 89. See M Tapia and B Tobin "Guardians of the Seed: The Role of the Andean Farmers in the Caring and Sharing of Agrobiodiversity", in EC Kamau and G Winter (eds), *Common Pools of Genetic Resources: Equity and Innovation in International Biodiversity Law* (Routledge, 2014) 79, at 90.

[163] ITPGRFA Secretariat, Report on the First Round of the Project Cycle of the Benefit-sharing Fund (FAO, 2013).

[164] 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), 19.

[165] M Kinver, "Svalbard Seed Vault to Take Peruvian Potato Samples" (BBC News, 17 February 2011), available at www.bbc.co.uk/news/science-environment-12493970.

[166] M Tapia and B Tobin "Guardians of the Seed: The Role of the Andean Farmers in the Caring and Sharing of Agrobiodiversity", in EC Kamau and G Winter (eds), *Common Pools of Genetic Resources: Equity and Innovation in International Biodiversity Law* (Routledge, 2014) 79, at 87.

ii. World Federation for Culture Collections

The WFCC is a formal network of public-service culture collections, which serves to organize the distribution of high-quality microorganisms. It collectively distributes over 1.2 million publicly available research samples on a yearly basis both in developing and developed countries, with over 200,000 new samples being collected in situ from all regions and being deposited each year into the collections. The exchanges are based on a tracking system with unique numerical identifiers that are recorded in public catalogues to record the exchange history of a sample, including information on where the sample was collected when indicated.[167] Typically, distribution is under non-exclusive property rights conditions, with participants being driven by reputational and social identity motivation, as well as personal values.[168]

The WFCC is increasingly using formal agreements for these exchanges. Notably, one of its members, the European Culture Collections Organization (ECCO) has adopted a standard MTA in 2009 to make its material available under the obligation for the recipient to negotiate a benefit-sharing agreement in case of commercial use directly with the country of origin prior to such use. The collection is therefore not involved in the benefit-sharing negotiations with the country of origin. In the case of non-commercial use, the collections do not exercise any restrictions on the use of derivatives. Recipients are allowed to transfer the material under the same conditions to third parties involved in legitimate exchanges (i.e. between scientists working in the same laboratory or between partners in different institutions collaborating on a defined joint project for non-commercial purposes).

The core elements of the ECCO MTA are used in an increasing number of collections, even outside the ECCO: the WFCC promotes their use by reference, but only a few collections explicitly mention the need to negotiate benefit-sharing with countries of origin in case of commercial use.[169] It has been estimated that the present situation thus represents a step in moving towards a global microbial commons: there is still a need to include a reference in deposit forms to formal prior informed consent by recognized national authorities or integrating explicitly benefit-sharing obligations over modified materials.[170]

Key finding

- The case studies provide evidence of stakeholders' voluntary initiatives that can contribute to multilateral benefit-sharing or complement them (see section I.ii above).

V. Summary of findings

Some experience has been gained so far with the development and implementation of the Nagoya Protocol at the national and regional levels that could contribute to a discussion on the need for and modalities of a global multilateral benefit-sharing mechanism under Article 10 of the Nagoya Protocol

[167] At a minimum, the source of the material if it comes from another collection which has not given this information: WFCC Guidelines Point 17.6. and the information document on access to ex situ microbial genetic resources (http://www.wfcc.info/index.php/wfcc_library/genetic_res/).

[168] This section draws from T Dedeurwaerdere, A Broggiato, S Louafi, EW Welch and F Batur, "Governing Scientific Research Commons under the Nagoya Protocol" 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) 389.

[169] T Dedeurwaerdere, A Broggiato and D Manou, "Global Scientific Reserach Commons under the Nagoya Protocol: Governing Pools of Microbial Genetic Resources" in EC Kamau and G Winter (eds.), *Common Pools of Genetic Resources: Equity and Innovation in International Biodiversity Law* (Routledge, 2014), 224.

[170] T Dedeurwaerdere, A Broggiato, S Louafi, EW Welch and F Batur, "Governing Scientific Research Commons under the Nagoya Protocol" 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) 389, at 411.

with regards to "situations in which it is not possible to provide PIC" and "contributions to conservation and sustainable use" (section I.i). In addition, a trend is emerging, in line with Article 11 of the Nagoya Protocol, to develop regional approaches to "transboundary situations" (section I.i), although academic literature has identified the risk of excluding countries that are not party to relevant regional bodies/processes. Academic literature has rather emphasized the opportunity of linking databases at the multilateral level both for the purposes of sharing information as a form of non-monetary benefit-sharing, and to facilitate the identification of relevant countries in the case of transboundary situations (section I.ii).

Academic literature has also underscored the opportunities for voluntary contributions by different stakeholders to multilateral benefit-sharing mechanisms (section I.ii). The case studies discussed in section IV provide evidence of stakeholders' voluntary initiatives that can contribute to multilateral benefit-sharing or complement them.[171]

With regard to experiences gained in other multilateral mechanisms, it should be noted at the outset that the three existing multilateral benefit-sharing mechanisms are characterized by relatively specialized ambits of application (deep seabed mining, plant genetic resources for food and agriculture, pandemic influenza viruses). Regardless of their legal basis (treaty or non-legally binding), they all rely on standard contractual clauses: the degree to which these clauses are open, if at all, to negotiations varies from one framework to another (non-negotiable under the ITPGRFA; negotiable to some extent under the WHO SMTA2 and the ISA). Under these multilateral benefit-sharing mechanisms, the sharing of non-monetary benefits has preceded that of monetary ones (section II). In addition, while all benefit-sharing mechanisms are geared towards the realization of fairness and equity, there is no clear trend in providing international guidance on how to realize fairness and equity vis-a-vis beneficiaries. The WHO PIP Framework has provided a benchmark for equity based on the principles of public health risk and needs (section II.ii), whereas the ISA is moving towards a more need-based approach to sharing non-monetary benefits through guidelines that act as a benchmark for the assessment of contractors' proposals (section II.iii). Ongoing work undertaken by other processes is clearly relevant in this connection: equitable criteria for benefit-sharing are to be developed by the ISA for two different multilateral benefit-sharing mechanisms (section III.ii), and possibly under the negotiations of a new implementing agreement under UNCLOS (section III.iv).

In exploring experiences gained in other multilateral mechanisms, there appears to be no clear trend in ensuring financial viability. The WHO has put in place a system of mandatory contributions (annual partnership contribution), whereas the ISA and the ITPGRFA both currently rely on voluntary contributions (sections II.i-iii). Ongoing work under the ITPGRFA is relevant in this connection with regard to the development of a subscription system to ensure predictability of funds for multilateral benefit-sharing (section III.i).

With regard to experiences gained in other multilateral mechanisms on information-sharing as a form of non-monetary benefit-sharing, this is generally left to voluntary and decentralized initiatives both in multilateral and bilateral systems (section III), although the Antarctic Treaty System is attempting to use pre-existing multilateral systems to this end (section III.v). Ongoing work undertaken by other processes is also relevant in this connection: in particular, the ITPGRFA is moving towards a more institutionalized approach at the multilateral level for information-sharing and capacity building (section III.i), which appears relevant to explore opportunities for linking different databases (as suggested by the literature in section I.ii above) and for taking a more structured approach to multilateral support for information-sharing as a form of benefit-sharing.

[171] Potentially, the developments ongoing under the ITPGRFA with regard to the platform for the co-development and transfer of technologies could also provide an example of voluntary initiatives that may be gradually included in a multilateral benefit-sharing mechanism (section III.i).

With regard to experiences gained in other multilateral mechanisms on scientific cooperation and capacity-building as forms of non-monetary benefit-sharing, in the more developed multilateral benefit-sharing systems (ISA, WHO and ITPGRFA), there is a trend towards more institutionalized multilateral approaches, with the international institution playing a facilitative and brokering role; whereas in other contexts (MSR and Antarctic Treaty System), this is left to bilateral initiatives (section III). Ongoing work undertaken by other processes is also relevant in this connection. The ongoing discussions on the content of the human right to science appear relevant to clarify international legal standards related to scientific cooperation, information-sharing and technology transfer as forms of non-monetary benefit-sharing, be that through institutionalized/diffused, multilateral/bilateral, mandatory/voluntary approaches (section III.vi).

Finally, there appears to be very little experience with regard to traditional knowledge in the context of other multilateral mechanisms, with the exception of the ITPGRFA (section II.i). Ongoing work undertaken by other processes is relevant in this connection. Elaboration on the role of traditional knowledge in the context of benefit-sharing opportunities may be provided, however, in the context of the CGRFA and possibly under the negotiations of a new implementing agreement under UNCLOS (sections III.iii-iv). Furthermore, ongoing work in the framework of IPBES may provide useful examples of guarantees and practical approaches when dealing with traditional knowledge at the multilateral level, as well as practical options for involving indigenous peoples and local communities in that connection (section III.v). In addition, the ongoing discussions on the content of the human right to science may provide an opportunity to clarify international legal standards on traditional knowledge (section III.vi).

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