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Information as the latest site of conflict in the ongoing contests about access to and sharing the benefits from exploiting genetic resources

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Abstract

Global movement and use of genetic resources remains vital to sustaining humankind. An enclosure or re-appropriation of these resources requiring regulated access and benefit sharing is evolving under the United Nations' *Convention on Biological Diversity* and related instruments. The potential to replace the physical materials with information about those materials including genetic sequence data, has fractured the carefully negotiated benefit sharing regulation complex. This article re-engages with this original grand bargain of access in exchange for benefit sharing, and the imperatives of transferring financial resources and technology from the technologically advanced North countries to the biodiversity rich South countries. Public access database terms and conditions (as opposed to public domain) and collecting societies are some of the elegant legal solutions and mechanisms to address concerns about dematerialization under the current contractual approach to benefit sharing. This article concludes, however, that the tension between enclosure of information as the genetic resource and legal information sharing requirements needs more nuanced forms of benefit sharing such as taxes or levies. This is necessary to facilitate movement of not only the physical materials but also information in the access and benefit sharing bargain.

Key words: genetic resources, benefit sharing, information, equity and fairness, CBD, dematerialization

1. Introduction

Accessing and using biological materials has been a core activity in human development and survival. Breeding plants and animals was the basis of the agricultural revolutions,¹ and chemicals accessed from nature have been the foundation of modern human and veterinary

¹ See generally Marcel Mazoyer and Laurence Roudart, *A History of World Agriculture: From the Neolithic Age to the Current Crisis* (Routledge, 2007).

medicine.² Every country has benefited, and still continues to benefit, from accessing and exploiting biological materials that have been sourced from other places around the globe.³ The ongoing access to these resources remains vital to sustain agriculture, health and the environment in the face of increasing challenges from diseases, climate change, land degradation, freshwater security and affluence.⁴ Up until relatively recently this has been essentially an unregulated activity with biological materials being freely accessed and exploited without recourse to their geographic origins.⁵ This approach changed in the 1990s, culminating in the United Nations' *Convention of Biological Diversity* (CBD)⁶ and its broad adoption by 196 countries.⁷

² See Hong-Fang Ji, Xue-Juan Li and Hong-Yu Zhang, 'Natural Products and Drug Discovery' (2009) 10 *EMBO Reports* 194 and the references therein.

³ For an illustration of global flows see, for example, Food and Agriculture Organization of the United Nations, *The Second Report on the State of the World's Animal Genetic Resources for Food and Agriculture* (FAO, 2015) pp 43-63 and the examples therein.

⁴ See Charles Lawson, *Regulating Genetic Resources: Access and Benefit Sharing in International Law* (Edward Elgar, 2012) p 1.

⁵ The 'common heritage of mankind' applied to the deep sea bed and the ocean floor beyond the limits of national jurisdiction (the Area), outer space and plant genetic resources: *United Nations Convention on the Law of the Sea* [1994] ATS 31, Arts 133, 136 and 156-169; *United Nations' Agreement Governing the Activities of States on the Moon and other Celestial Bodies* (1979) A/RES/34/68, Art 11(1); Conference of the Food and Agriculture Organisation of the United Nations, *Report of the Conference of FAO* (1983) C 1983, [285] (Resolution 8/83) respectively. The Food and Agriculture Organisation of the United Nations subsequently endorsed the proposition 'that nations have sovereign rights over their plant genetic resources': Food and Agriculture Organisation of the United Nations, *Report of the Conference of FAO* (1991) C 1991, [104] (Resolution 3/91). The CBD confirmed that nations have sovereign rights over natural resources within their boundaries with 'the authority to determine access to genetic resources rests with the national governments and is subject to national legislation': CBD, Art 15.5. See also Shawn Sullivan, 'Plant Genetic Resources and the Law: Past, Present and Future' (2002) 135 *Plant Physiology* 10, 11-12.

⁶ [1993] ATS 32 (CBD).

⁷ See <<https://www.cbd.int/information/parties.shtml>> accessed 15 April 2019.

The effect of the CBD was to recognize that countries (Nation States)⁸ have the sovereign rights (legal authority and control) over their ‘genetic resources’⁹ and that access to these resources requires prior informed consent and mutually agreed terms.¹⁰ The term ‘genetic resources’ is defined as a narrow range of biological materials comprising ‘any material of plant, animal, microbial or other origin containing functional units of heredity’.¹¹ In practice, however, the term has a very flexible meaning and those implementing the CBD generally apply the term broadly to include most biological materials and derivatives.¹² The consequence of recognizing sovereignty has been to require countries to regulate access and introduce concepts of ownership and property rights into the collection, exchange and use of genetic resources, and their parts and components.¹³ The justifications for these changes are partly economic and partly about fairness (social justice) and equity.¹⁴

⁸ These are only the Nation States entities conceived under the *Charter of the United Nations*: CBD, Art 3. See Edwin Bikundo, ‘Aligning Means and Ends to Benefit Indigenous Peoples under the *Convention on Biological Diversity* and the *Nagoya Protocol*’ in Charles Lawson and Kamallesh Adhikari (eds), *Biodiversity, Genetic Resources and Intellectual Property: Developments in Access and Benefit Sharing* (Routledge, 2018) pp 33-40.

⁹ CBD, Preamble and Arts 3 and 15.1.

¹⁰ CBD, Arts 15.4 and 15.7 (MAT) and 15.5 (PIC).

¹¹ CBD, Art 2. See also Ad Hoc Open-Ended Working Group on Access and Benefit Sharing, *Report of the Meeting of the Group of Legal and Technical Experts on Concepts, Terms, Working Definitions and Sectoral Approaches* (2008) UNEP/CBD/WG-ABS/7/2, [18] and Annex ([3]).

¹² See Ad Hoc Open-Ended Working Group on Access and Benefit Sharing, *The Concept of ‘Genetic Resources’ in the Convention on Biological Diversity and How It Relates to a Functional International Regime on Access and Benefit Sharing* (2010) UNEP/CBD/WG-ABS/9/INF/1. See also Conference of the Parties to the Convention on Biological Diversity, *Access to Genetic Resources* (1996) UNEP/CBD/COP/3/20, [35]-[37].

¹³ See Lawson, above n 4, pp 127-130.

¹⁴ See, for example, Michael Grubb, Matthias Koch, Koy Thomson, Abby Munson and Francis Sullivan, *The ‘Earth Summit’ Agreements: A Guide and Assessment* (Earthscan Publications Ltd, 1993). The CBD itself recognizes a range of other values in addition to economic values including ecological, genetic, social, scientific, educational, cultural, recreational and aesthetic values: CBD, Preamble. See also Commission on Sustainable Development, *Preparations for the Special Session of the General Assembly for the Purpose of an Overall Review and Appraisal of the Implementation of Agenda 21: Implementation of the Convention on Biological Diversity* (1997) E/CN.17/1997/11, Annex ([3]-[4]).

The economic justification is that by allowing concepts of ownership and property rights to control genetic resources there can be an exchange of benefits (monetary and non-monetary) that then allows those benefits to flow back to conservation.¹⁵ The theory here is that conservation is something that has no immediate value, and when competing for other priorities, will miss out – a market failure for biodiversity conservation.¹⁶ By placing a value on conservation, and the ability to profit from conservation, then conservation may take a higher priority when competing with other priorities.¹⁷ The result is that countries and individuals are motivated to achieve biodiversity conservation using this economic reasoning, whereas before they would not, resulting in biodiversity destruction and decline.

The fairness and equity concerns recognize that in exploiting genetic resources, some of the benefits should flow back to the predominantly poor countries of the world from where many of those resources originated.¹⁸ These concerns about fairness and equity have a long history.¹⁹ In the 1970s and 1980s there was continued agitation about the unfair and

¹⁵ See Carmen Richerzhagen, 'Effective Governance of Access and Benefit Sharing under the *Convention on Biological Diversity*' (2010) 20 *Biodiversity and Conservation* 2243, 2243-2245 and the references therein. See also Michel Trommetter, 'Biodiversity and International Stakes: A Question of Access' (2005) 53 *Ecological Economics* 573.

¹⁶ CBD, Art 11. See also Organisation for Economic Co-operation and Development, *Handbook of Incentive Measures for Biodiversity: Design and Implementation* (OECD, 1999).

¹⁷ See Timothy Swanson and Timo Goeschl, 'Property Rights Issues Involving Plant Genetic Resources: Implications of Ownership for Economic Efficiency' (2000) 32 *Ecological Economics* 75, 76-77; Joseph Janssen, 'Property Rights on Genetic Resources: Economic Issues' (1999) 9 *Global Environmental Change* 313, 315-318.

¹⁸ See, for example, Vincent Sánchez, 'The Convention on Biodiversity: Negotiation and Contents' in Vincent Sánchez and Calestous Juma (eds), *Biodiplomacy: Genetic Resources and International Relations* (ACTS Press, 1994) pp 8-9. The link between fairness and equity and conservation was expressly recognized in the Brundtland Commission's report: United Nations General Assembly, *Report of the World Commission on Environment and Development: Our Common Future* (1987) A/42/427, [16]-[26].

¹⁹ See, for examples, United Nations General Assembly, *Permanent Sovereignty over Natural Resources*, 1194th Plenary Meeting, 14 December 1962, Resolution 1803 (XVII); United Nations General Assembly, *Permanent Sovereignty over Natural Resources*, 1478th Plenary Meeting, 25 November 1966, Resolution 2158 (XXI); and so on.

inequitable distribution of natural resources (like the resources of the deep sea)²⁰ and a challenge to the paradigm that nature was there to be exploited by the first to take.²¹ By the early 1990s there was concrete understanding that international agreement was needed to change the *status quo* and that countries were the controllers of all the natural resources within their jurisdictions.²² The culmination of these moves was the CBD in 1993 with express recognition of sovereignty over genetic resources,²³ and the capacity of each country to develop their own rules about access and benefit sharing (ABS).²⁴

As a supplementary agreement to the CBD,²⁵ the *Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity* (Nagoya Protocol)²⁶ reinforces sovereignty claims,²⁷ provides more detail about the CBD's obligations and adds some additional requirements covering issues such as Traditional Knowledge associated with genetic resources.²⁸ Countries have agreed to other specialized instruments confirming sovereignty over particular classes of genetic resources. These include certain agriculturally important plants under the Food and

²⁰ See, for examples, United Nations, *Declaration of the United Nations Conference on the Human Environment* (1972) A/CONF.48/14/Rev.1, p 5 (Principle 21); United Nations General Assembly, *Declaration on the Establishment of a New International Economic Order*, Resolution 3201 (S-VI), 6th Special Session, 2229th Plenary Meeting (1974) A/RES/S-6/3201, [4]; United Nations General Assembly, *Declaration on the Establishment of a New International Economic Order*, Resolution 3202 (S-VI), 6th Special Session, 2229th Plenary Meeting (1974) A/RES/S-6/3202, [2] (I(1)); and so on.

²¹ See, for example, United Nations General Assembly, *Charter of Economic Rights and Duties of States*, Resolution 3281, 2315th Plenary Meeting (1974) A/RES/29/3281, Art 2(1).

²² Food and Agriculture Organization of the United Nations, *Report of the Conference of FAO* (1991) C 1991, [104] (Resolution 3/91).

²³ See CBD, Preamble and Arts 3 and 15.1. See generally Rane Panjabi, *The Earth Summit at Rio: Politics, Economics and the Environment* (Northeastern University Press, 1997).

²⁴ CBD, Art 15.1. See generally Panjabi, above n 23.

²⁵ See CBD, Arts 28 and 32.

²⁶ Conference of the Parties to the Convention on Biological Diversity, *Report of the Tenth Meeting of the Conference of the Parties to the Convention on Biological Diversity* (2010) UNEP/CBD/COP/10/27, [103] and Annex (Decision X/1, Annex 1 (Nagoya Protocol), pp 89–109).

²⁷ Nagoya Protocol, Preamble and Art 6.

²⁸ Nagoya Protocol, Art 7.

Agriculture Organisation of the United Nations' (FAO) *International Treaty for Plant Genetic Resources for Food and Agriculture* (Plant Treaty)²⁹ and certain pandemic influenza viruses under the World Health Organisation of the United Nations' (WHO) *Pandemic Influenza Preparedness Framework* (PIP Framework).³⁰ A related mechanism under the United Nations Law of the Sea Convention is presently being negotiated.³¹

The Plant Treaty and the PIP Framework complement the existing CBD and Nagoya Protocol arrangements by creating separate regulatory arrangements for access and benefit sharing for specific classes of genetic resources that would otherwise be considered under the CBD and Nagoya Protocol.³² The Plant Treaty addresses, in part, the outstanding matters concerning plant genetic resources that remained after the CBD about the need to deal specifically with agricultural genetic resources.³³ While the PIP Framework responded to concerns that viruses should not be taken without recognizing the kinds of controls advocated by the CBD following Indonesia's announcement to withhold the H5N1 influenza virus

²⁹ [2006] ATS 10 (Plant Treaty). See also UNEP/CBD/COP/10/27, above n 26, [103] and Annex (Decision X/1, Preamble).

³⁰ World Health Organisation, *Pandemic Influenza Preparedness: Sharing of Influenza Viruses and Access to Vaccines and Other Benefits*, Sixty-Fourth World Health Assembly (2011) WHA64.5 (PIP Framework).

³¹ See General Assembly, *Resolution adopted by the General Assembly on 24 December 2017 – 72/249. International legally binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction* (2018) A/RES/72/249.

³² Both the Plant Treaty and the PIP Framework are likely to be 'specialised international access and benefit sharing instruments' to which the Nagoya Protocol does not apply and that co-exist with the CBD: see Nagoya Protocol, Preamble and Art 4.4. See also Thomas Greiber, Sonia Peña Moreno, Mattias Åhrén *et al.*, *An Explanatory Guide to the Nagoya Protocol on Access and Benefit-sharing*, IUCN Environmental Policy and Law Paper No. 83 (IUCN, 2012) pp 35 and 42.

³³ See *Interrelationship Between the Convention on Biological Diversity and the Promotion of Sustainable Agriculture* (1992) 31 I.L.M. 846, Resolution 3. See also Food and Agriculture Organization of the United Nations, *Report of the Conference of FAO* (2001) C 2001, [58] (Resolution 3/2001, Adoption of the International Treaty on Plant Genetic Resources for Food and Agriculture and Interim Arrangements for its Implementation); Conference of the Parties to the Convention on Biological Diversity, *Report of the Second Meeting of the Conference of the Parties to the Convention on Biological Diversity* (1995) UNEP/CBD/COP/2/19, [125] and p 68 (Decision II/15).

specimens.³⁴ Each of these schemes envisions an agreement between the resource holder and the party seeking access, being an individually negotiated agreement under the CBD³⁵ and the Nagoya Protocol,³⁶ or a standard material transfer agreement under the Plant Treaty³⁷ and PIP Framework.³⁸

The purpose of this article is to return to the grand bargain of the CBD of access to genetic resources in exchange financial resources and technology in the context of the current debates about information and the concern that benefits might be more efficiently and effectively captured where information about the physical genetic resources is used without any of the benefit sharing obligations.³⁹ This undermines the CBD's economic and fairness and equity objectives and represents the latest site of conflict in the ongoing negotiated compromises about benefit sharing.

The article is structured as follows. Part 2 address the context for ABS as the 'grand bargain' under the CBD, Part 3 defines the ABS 'problem' posed by information and the existing arrangements for dealing with information under the various agreements, and Part 4

³⁴ See Endang Sedyaningsih, Siti Isfandari, Triono Soendoro and Siti Fadilah Supari, 'Towards Mutual Trust, Transparency and Equity in Virus Sharing Mechanisms: The Avian Influenza Case of Indonesia' (2008) 37 *Annals of the Academy of Medicine Singapore* 482, 484-487 and the references therein.

³⁵ CBD, Art 15.

³⁶ Nagoya Protocol, Art 6.

³⁷ See Plant Treaty, Arts 12.4 and 15.1; Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture, *First Session of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture* (2006) IT/GB-1/06/Report, [12] (Resolution 2/2006) and Appendix G.

³⁸ See PIP Framework, Art 5.4 and Annexes 1 and 2.

³⁹ Ad Hoc Technical Expert Group on Digital Sequence Information on Genetic Resources, *Fact-Finding and Scoping Study on Digital Sequence Information on Genetic Resources in the Context of the Convention on Biological Diversity and the Nagoya Protocol* (2018) CBD/DSI/AHTEG/2018/1/3; Intergovernmental Technical Working Group on Forest Genetic Resources, Draft Exploratory Fact-Finding Scoping Study on 'Digital Sequence Information' on Genetic Resources for Food and Agriculture (2018) CGRFA/WG-FGR-5/18/Inf.11; Pandemic Influenza Preparedness (PIP) Framework Advisory Group Technical Working Group (TWG) on the Sharing of Influenza Genetic Sequence Data, *Optimal Characteristics of an Influenza Genetic Sequence Data Sharing System under the PIP Framework* (WHO, 2016) available at <http://www.who.int/influenza/pip/advisory_group/twg_doc.pdf?ua=1> accessed 15 April 2019 (PIP TWG).

considers legal solutions and mechanisms to enhance the ABS contract model of benefit sharing, and alternatives such as collecting societies and taxes or levies. The article concludes in Part 5 that this is an opportune moment when rethinking the role and place of information within the ABS transaction to also re-engage with better ways of achieving benefit sharing other than through the high transaction costs of contracting, such as through a levy or tax. These alternatives also deliver on at least some of the fairness (social justice) and equity goals of the grand bargain of access in exchange for benefits.

2. The context for ABS under the CBD

The CBD was a diplomatic compromise that ‘delicately balances ... four main pillars: conservation of genetic resources, technological development, regulated access to genetic resources and international equity’.⁴⁰ This is a significant context for understanding the implementation of the CBD because the CBD was negotiated contemporaneously with Agenda 21 and operates as an instrument for the implementation of sustainable development, that is now enshrined in the *Sustainable Development Goals*.⁴¹ ABS was viewed at the time as an exchange between governments of the developed North and the developing South (labelled the ‘Group of 77’ during the negotiations),⁴² and framed as co-operation in conservation efforts by the South in exchange for recognition of national sovereignty over genetic resources, the transfer of technology and the transfer of finances.⁴³ Access to these genetic resources depended on these demands being met with the physical genetic resources being the objects of the transaction.⁴⁴ This crystallised in the CBD’s conception of ABS set out

⁴⁰ Vincent Sánchez and Calestous Juma, ‘Introduction’ in Sánchez and Juma, above n 18, p 1.

⁴¹ See also E/CN.17/1997/11, above n 14, Annex ([3]). See also Sánchez, above n 18, pp 8-9.

⁴² Noting, of course, that the CBD itself draws this distinction between developed and developing countries. For example, the Preamble provides, in part: ‘*Acknowledging further* that special provision is required to meet the needs of developing countries, including the provision of new and additional financial resources and appropriate access to relevant technologies’: CBD, Preamble. See also CBD, Arts 8(m), 9(e), 12, 16.4, 17.1, 18.2, 19.1 and 20.

⁴³ Hanne Svarstad, ‘National Sovereignty and Genetic Resources’ in Sánchez and Juma, above n 18, p 45; Lyle Glowka, Françoise Burhenne-Guilmin, Hugh Synge *et al.*, *A Guide to the Convention on Biological Diversity* (IUCN, 1994) pp 5-6; and so on.

⁴⁴ See, for example, Svarstad, above n 43, pp 46-49.

in the CBD's objectives as the transfer of genetic resources ('appropriate access to genetic resources') from the South to the North in exchange for finances ('appropriate funding') and technology including biotechnology ('appropriate transfer of relevant technologies') from the North to the South.⁴⁵ The CBD text then provides a regulatory framework for Contracting Parties to take 'legislative, administrative or policy measures, as appropriate' to achieve 'sharing in a fair and equitable way' both the benefits from commercializing and other utilization and the results of research and development.⁴⁶ The benefits from the North were to include access to and transfer of technology including biotechnology⁴⁷ and including 'under fair and most favourable terms, including on concessional and preferential terms where mutually agreed',⁴⁸ financial resource transfers,⁴⁹ and a financial mechanism to provide financial resources to the South.⁵⁰ The obligation to take 'legislative, administrative or policy measures, as appropriate'⁵¹ recognized that many of these benefits from the technologically advanced North are held by private non-state parties and potentially beyond the reach of the North Contracting Parties to control.⁵²

⁴⁵ CBD, Art 1. See also Svarstad, above n 43, pp 48-49.

⁴⁶ CBD, Art 15.7.

⁴⁷ See CBD, Arts 16 and 19.

⁴⁸ CBD, Arts 16.1. See Conference of the Parties to the Convention on Biological Diversity, *Report of the Conference of the Parties to the Convention on Biological Diversity on the Work of its Ninth Meeting* (2008) UNEP/CBD/COP/9/29, [228] and Annex 1 (Decision IX/14 (Technology Transfer and Cooperation)).

⁴⁹ CBD, Art 20.2.

⁵⁰ CBD, Art 21.1.

⁵¹ CBD, Art 15.7.

⁵² CBD, Art 16.4. See also Fran Humphries, 'Technology Transfer of Aquatic Genetic Resources Under the Convention on Biological Diversity and the Nagoya Protocol: "Sponging" Off Patent Law Defences' (2016) 39 *University of New South Wales Law Journal* 234, 239; Glowka *et al.*, above n 43, p 82. See also Conference of the Parties to the Convention on Biological Diversity, *Measures to Promote and Advance the Distribution of Benefits from Biotechnology in Accordance with Article 19* (1998) UNEP/CBD/COP/4/21, [30]-[35]. There is a considerable literature addressing the disquiet about these finally agreed provisions: see, for examples, Daniel Robinson, *Confronting Biopiracy: Challenges, Cases and International Debates* (Routledge, 2010); Graham Dutfield, *Intellectual Property, Biogenetic Resources and Traditional Knowledge* (Earthscan, 2010); Peter Drahos with John Braithwaite, *Information Feudalism: Who Owns the Knowledge Economy* (Routledge, 2017); and so on.

The best practice example of ABS at the time of the CBD negotiations,⁵³ that was considered illustrative of how the CBD might be operationalised,⁵⁴ was the agreement between the National Biodiversity Institute of Costa Rica (INBio)⁵⁵ and the United States pharmaceutical company Merck.⁵⁶ Under this agreement, INBio helped Merck collect possible valuable chemicals from Costa Rica's rainforests that might be developed into materials with pharmaceutical and agricultural applications.⁵⁷ In exchange for access to Costa Rica's rainforests Merck agreed to pay INBio US\$1.1 million plus a five per cent royalty of the sales of any resulting products and INBio also agreed to pay 10 per cent of the initial payment and 50 per cent of any royalties towards conservation activities in Costa Rica.⁵⁸ In addition to the monetary payments Merck also transferred technology including laboratory equipment and supplies, training, and so on.⁵⁹ The effect of this agreement on the CBD negotiations was to

⁵³ See Leslie Roberts, 'Chemical Prospecting: Hope for Vanishing Ecosystem?' (1992) 256 *Science* 1142.

⁵⁴ See Conference of the Parties to the Convention on Biological Diversity, *Access to Genetic Resources and Benefit Sharing: Legislation, Administrative and Policy Information* (1995) UNEP/CBD/COP/2/13, Annex I (p 31). See also Walter Reid, Sarah Laird, Rodrigo Gamez *et al.* (eds), *Biodiversity Prospecting: Using Genetic Resources for Sustainable Development* (World Resources Institute, 1993) pp 1-2; Elissa Blum, 'Making Biodiversity Conservation Profitable: A Case Study of the Merck/INBio Agreement' (1993) 35 *Environment: Science and Policy for Sustainable Development* 16, 37-39; Michael Coughlin, 'Using the Merck-INBio Agreement to Clarify the Convention on Biological Diversity Recent Development' (1993) 31 *Columbia Journal of Transnational Law* 337, 357-372; Roger Sedjo, 'Property Rights, Genetic Resources, and Biotechnological Change' (1992) 35 *Journal of Law and Economics* 199, 209-210; and so on.

⁵⁵ See Rodrigo Gámez, Alfio Piva, Ana Sittenfeld *et al.*, 'Costa Rica's Conservation Program and National Biodiversity Institute (INBio)' in Reid *et al.*, above n 54, pp 53-67.

⁵⁶ See, for examples, Peter Aldhous, "'Hunting Licence" for Drugs' (1991) 353 *Nature* 290, 290; Ana Sittenfeld and Rodrigo Gámez, 'Biodiversity Prospecting by INBio' in Reid *et al.*, above n 54, pp 69-97; Ana Luz Porzecanski, Robin Sears, Taran Grant *et al.*, *Access to Genetic Resources: An Evaluation of the Development and Implementation of Recent Regulation and Access Agreements*, Environmental Policy Studies Working Paper #4 (Columbia University, 1999) pp 18-23 available at <<https://www.cbd.int/doc/case-studies/abs/cs-abs-agr-rpt.pdf>> accessed 15 April 2019.

⁵⁷ Svarstad, above n 43, pp 53-54. See also Kelly Day-Rubenstein and George Frisvold, 'Genetic Prospecting and Biodiversity Development Agreements' (2001) 18 *Land Use Policy* 205.

⁵⁸ Svarstad, above n 43, p 54.

⁵⁹ UNEP/CBD/COP/2/13, above n 54, Annex I (p 31); Ana Sittenfeld and Annie Lovejoy, 'Biodiversity Prospecting Frameworks: The INBio Experience in Costa Rica' in Lakshman Guruswamy and Jeffrey McNeely (eds), *Protection of Global Biodiversity: Converging Strategies* (Durham University Press, 1998) p 237.

confirm that biodiversity had significant economic values and that ABS contracts were a suitable mechanism for delivering *both* the technologically advanced North Contracting Parties' (North) access to resources *and* the biodiversity rich South Contracting Parties' (South) desires for generating economic development as financial resources and technology transfer.⁶⁰

The important point for our analysis was that benefits were conceived as those needed by the South according to their circumstances without necessarily specifying the exact form and content of likely benefits. In the negotiation of the CBD, however, the kinds of benefits were clearly contemplated to be new and additional financial resources provided by the North to the South, the mechanisms to review and manage those financial resources, fair and favourable conditions for access to technology by the South, and the commitment of the North to actually deliver these benefits to the South.⁶¹ Critical to these negotiations under the principle of common but differentiated responsibility advocated by the CBD are the technologically advanced North Contracting Parties' fulfilment of their commitments.⁶² More importantly, however, the CBD reflected a new biodiversity order characterized by a 'general movement of enclosure or re-appropriation of nature by States and local populations'.⁶³ This

⁶⁰ This may also have provided unrealistic expectations about the likely benefits that might flow from benefit sharing: Thomas Kursar, Catherina Caballero-George, Todd Capson *et al.*, 'Securing Economic Benefits and Promoting Conservation Through Bioprospecting' (2006) 56 *BioScience* 1005, 1006. This North-South framing reflects a broader orientalism: see Andreas Kotsakis, 'The Historical Roots of the North-South Dynamic in Biodiversity Conservation and its Imprint on the Convention on Biological Diversity' in Jona Razzaque and Eliza Morgera, *Biodiversity and Nature Protection Law* (Edward Elgar, 2017) pp 44-55; Larry Lohmann, 'Green Orientalism' (1993) 23 *The Ecologist* 202, 203.

⁶¹ Intergovernmental Negotiating Committee for a Convention on Biological Diversity, *Report of the Intergovernmental Negotiating Committee for a Convention on Biological Diversity on the Work of its Sixth Negotiating Session/Fourth Session of INC* (1992) UNEP/Bio.Div/N6-INC.4/4, [4]. See also Ad Hoc Working Group of Legal and Technical Experts on Biological Diversity, *Report of the Ad Hoc Working Group of Legal and Technical Experts on Biological Diversity on the Work of its Second Session* (1991) UNEP/Bio.Div/WG.2/2/5, [3] and [17].

⁶² CBD, Art 20.4. See also E/CN.17/1997/11, above n 14, [12].

⁶³ Philippe Le Prestre, 'The *Convention on Biological Diversity*: Negotiating the Turn to Effective Implementation' [1992] *ISUMA: Canadian Journal of Policy Research* 92, 98.

was and remains a fundamental reordering of power and control over genetic resources and the authority to decide on their uses and exploitation.

The failure of the technologically advanced North to fulfil their commitments to financial resources and the transfer of technology,⁶⁴ and the potential for country regulation to limit access to genetic resources through enclosure or re-appropriation⁶⁵ creates a dynamic for ongoing contestation between the South and North.⁶⁶ This becomes significant because the South possess the greater portion of global genetic (and biological) resources, including those in the wild and those of value in agriculture,⁶⁷ and the pressing needs of industrial and technological solutions to address diseases, climate change, land degradation, freshwater security and affluence that require access to these resources by the North and the application of their technology.⁶⁸ Framed this way, ABS is not a technical legal engagement, but rather a political conflict field about environmental and distributional dimensions (between South and

⁶⁴ See, for example, Sánchez, above n 18, p 14. And where benefits have been delivered there remains contentions about their allocations: see, for example, Reji Joseph, 'International Regime on Access and Benefit Sharing: Where Are We Now?' (2010) 12 *Asian Biotechnology and Development Review* 77, 89 and the references therein.

⁶⁵ See, for example, Charles Lawson, 'Patents and Access and Benefit Sharing Contracts: Conservation or Just More Red Tape?' (2011) 30 *Biotechnology Law Report* 197.

⁶⁶ This might also be characterised as a new conflict between North and South as the North accesses more science and technology with the capacity to enjoy the benefits technologically, economically and culturally, while the South is marginalised through new processes of exclusion: Ulrich Brand, Christoph Görg, Joachim Hirsch and Markus Wissen, *Conflicts in Environmental Regulation and the Internationalisation of the State: Contested Terrains* (Routledge, 2008) pp 28-29.

⁶⁷ See, for a then contemporary authority, Jack Kloppenburg and Daniel Lee Kleinman, 'Seed Wars: Common Heritage, Private Property, and Political Strategy' (1987) 95 *Socialist Review* 6, 10-14. See also Marleni Ramirez, Rodomiro Ortiz, Suketoshi Taba *et al.*, 'Demonstrating Interdependence on Plant Genetic Resources for Food and Agriculture' in Michael Halewood, Isabel López Noriega and Selim Louafi (eds), *Crop Genetic Resources as a Global Commons: Challenges in International Law and Governance* (EarthScan, 2013) pp 39-61.

⁶⁸ See Sarah Laird and Rachel Wynberg, *Bioscience at a Crossroads: Implementing the Nagoya Protocol on Access and Benefit Sharing in a Time of Scientific, Technological and Industry Change* (Secretariat of the Convention on Biological Diversity, 2013) pp 4-6. See also Michael Halewood, Tinashe Chiurugwi, Ruairaidh Sackville Hamilton *et al.*, 'Plant Genetic Resources for Food and Agriculture: Opportunities and Challenges Emerging from the Science and Information Technology Revolution' (2018) 217 *New Phytologist* 1407.

North), the rights of marginalized peoples including Indigenous Peoples and local communities,⁶⁹ biodiversity conservation and its governance, and so on.⁷⁰ It is '[t]he idea of the "reconciliation" of "North" and "South" and of "ecology" and "economy", which characterizes the concept of sustainable development'.⁷¹ More broadly, ABS is now a specific listed element of the United Nations' *Transforming our World: The 2030 Agenda for Sustainable Development* that replaced the *Millennium Development Goals* from 2016 and comprises the *Sustainable Development Goals* (SDGs).⁷² The SDGs address ABS in the goals directed to ending hunger and protecting, restoring and promoting sustainable use of the environment.⁷³ Most importantly for present purposes, however, the role of the SDGs is to balance economic, social and environmental dimensions including ending poverty and hunger, protecting the planet from degradation, harmonizing economic, social and technological progress with nature, and addressing the needs of the poorest and most vulnerable.⁷⁴ In essence these are fairness and equity objectives that are sought to be achieved through economic development, and the current iteration follows a series of earlier milestones about imperatives for sharing the economic development of the North with the South.⁷⁵ The economic objectives no longer appear as a significant justification for ABS leaving only the fairness and equity objectives as the foundation for benefit sharing.

⁶⁹ The CBD now considers that the phrase 'indigenous and local communities' (Preamble and Art 8(j) (and Arts 17.2 and 18.4)) should be read as 'Indigenous Peoples and local communities' without any change to the legal effect: Conference of the Parties to the Convention on Biological Diversity, *Report of the Eighth Meeting of the Ad Hoc Open-Ended Inter-Sessional Working Group on Article 8(j) and Related Provisions of the Convention on Biological Diversity* (2013) UNEP/CBD/COP/12/5, [95] and Annex 1 (Recommendation 8/6, [5(b)]).

⁷⁰ Brand *et al.*, above n 66, p 3. See also Ulrich Brand and Christoph Görg, 'Regimes in Global Environmental Governance and the Internationalization of the State: The Case of Biodiversity Politics. International' (2013) 1 *International Journal of Social Science Studies* 110, 116-118.

⁷¹ Brand *et al.*, above n 66, p 54.

⁷² United Nations General Assembly, *Transforming our World: The 2030 Agenda for Sustainable Development* (2015) A/RES/70/1.

⁷³ A/RES/70/1, above n 72, [2.5] and [15.6].

⁷⁴ A/RES/70/1, above n 72, Preamble.

⁷⁵ See, for examples, United Nations General Assembly, *Millennium Development Goals* (2000) A/RES/55/2; United Nations, *Johannesburg Declaration on Sustainable Development* (2002) A/CONF.199/20; United Nations General Assembly, *Report of the United Nations Conference on Environment and Development* (1992)

The positions of the North and South now appear to have become entrenched. Some North members are particularly concerned that implementation of the CBD should not contradict trade laws under the World Trade Organization agreements.⁷⁶ Meanwhile the South's interests are more diverse appearing politically as the Group of 77 and China, although fracturing at times because of their different interests with some more economically advanced than others, some holding more biodiversity than others, and so on.⁷⁷ Acknowledging this fracturing, the South generally favours detailed rules for sustainable development and the ongoing implementing of the CBD.⁷⁸ The Conference of the Parties has agreed on voluntary guidelines for benefit sharing.⁷⁹ These, however, proved insufficient because of the concerns about benefit sharing (often framed in terms of 'biopiracy')⁸⁰ with the South Contracting Parties proposing these guidelines 'be used through a negotiation process to develop an international legally binding instrument on access to genetic resources and fair and equitable sharing of the benefits arising out of their utilization'.⁸¹ These further

A/CONF.151/26, Annexes I (*Rio Declaration on Environment and Development*) and II (*Agenda 21*); World Commission on Environment and Development, *Our Common Future* (Oxford University Press, 1987); Independent Commission on Disarmament and Security Issues, *Common Security: A Blueprint for Survival* (Simon and Schuster, 1982); Independent Commission on International Development Issues, *North-South: A Program for Survival* (MIT Press, 1980); and so on. This is now a much broader debate: see, for example, Matthew Rimmer, 'The *Trans-Pacific Partnership* and Sustainable Development: Access to Genetic Resources, Informed Consent, and Benefit Sharing' in Lawson and Adhikari, above n 8, pp 151-184.

⁷⁶ Brand *et al.*, above n 66, pp 64-65.

⁷⁷ Brand *et al.*, above n 66, p 67.

⁷⁸ Brand *et al.*, above n 66, pp 65-67.

⁷⁹ Conference of the Parties to the Convention on Biological Diversity, *Report of the Sixth Conference of the Parties to the Convention on Biological Diversity* (2002) UNEP/CBD/COP/6/20, [342] and Annex I (Decision VI/24A, pp 253-269 (*Bonn Guideline on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising Out of Their Utilization*)).

⁸⁰ See, for example, Joseph, above n 64. See also United Nations General Assembly, *Convention on Biological Diversity*, Resolution 57/260, 78th Plenary Meeting, 20 December 2002 (2003) A/RES/57/260, [7]-[9]; A/CONF.199/20, above n 75, [44(o)] (Plan of Implementation). For an illustration of 'biopiracy' concerns about benefit sharing see, for example, Robinson, above n 52.

⁸¹ UNEP/CBD/COP/6/20, above n 79, [340].

negotiations eventually led to the Nagoya Protocol.⁸² Interestingly though, the Nagoya Protocol was a ‘compromise deal’ that has failed to deliver on binding commitments for benefit sharing or evidence for fair and equitable sharing even though this was an integral part of the early negotiations – ‘the loss has been so huge that the developing [South countries] are nowhere near where it wanted to be’.⁸³ At best the Nagoya Protocol established a commitment to introduce mechanisms for monitoring and enforcing contractual agreements for benefit sharing.⁸⁴ The current outcome of this political conflict is that, as a generalization, the North resists further implementation while the South seeks further rules-based implementation through more and more binding agreements.⁸⁵ Put slightly differently, the contentions over the CBD might be reduced to: ‘[t]he South wants the technology and the North *wants* the South to have it. But while the South sees itself as a potential partner, the North looks south and sees only paying customers’.⁸⁶

⁸² Conference of the Parties to the Convention on Biological Diversity, *Report of the Seventh Conference of the Parties to the Convention on Biological Diversity* (2004) UNEP/CBD/COP/7/21, [347] and Annex (Decision VII/19D, [1], p 300). See Lawson, above n 4, pp 137-149.

⁸³ Joseph, above n 64, 87 and 92. For a flavour of the negotiations and some of the positive outcomes for Indigenous Peoples see Kabir Bavikatte and Daniel Robinson, ‘Towards a People’s History of the Law: Biocultural Jurisprudence and the Nagoya Protocol on Access and Benefit Sharing’ (2011) 7 *Law, Environment and Development Journal* 35.

⁸⁴ Nagoya Protocol, Art 18.3.

⁸⁵ Recent examples include: Conference of the Parties to the Convention on Biological Diversity, *Report of the Conference of the Parties to the Convention on Biological Diversity on its Thirteenth Meeting* (2016) CBD/COP/13/25, [210] and Decision XIII/18 (p 129 – *Mo’otz Kuxtal Voluntary Guidelines*); UNEP/CBD/COP/10/27, above n 26, [103] and Annex (Decision X/1, Annex 1 (Nagoya Protocol), pp 89–109) and [417] and Annex (Decision X/42 – *Tkarihwaï:ri Code of Ethical Conduct*); UNEP/CBD/COP/7/21, above n 82, [292] and Annex (Decision VII/16F – *Akwe:Kon Guidelines*); UNEP/CBD/COP/6/20, above n 79, [342] and Annex I (Decision VI/24A, pp 253-269 (*Bonn Guideline on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising Out of Their Utilization*)); and so on.

⁸⁶ David Tilford, ‘Saving the Blueprints: The International Legal Regime for Plant Resources’ (1998) 30 *Case Western Reserve Journal of International Law* 373, 419.

There are some good examples where contracts have been struck between resource providers and bioprospectors under the CBD that have delivered significant benefits.⁸⁷ Despite these favourable incidents, as a generalization, it is probably fair to say that benefit sharing from accessed genetic resources has been disappointing.⁸⁸ This reflects a number of problems with the existing arrangements: high transaction costs in concluding contracts, uncertain property rights in provider countries partly through lack of CBD-implementing regulation and imperfect competition with large numbers of sellers and few buyers.⁸⁹ Additional problems are information asymmetries as providers and bioprospectors suffer information deficiencies such as being unable to value a material or track a material's uses, poor administrative institutional capacity to control compliance and enforce contracts, and so on.⁹⁰ Further:

To a large degree, the expectations of what bioprospecting can bring are both unrealistic and misdirected. Most bioprospecting activities do not yield commercial products, many do not use traditional knowledge and in most cases – particularly those involving partnerships with companies in research-intensive industries –

⁸⁷ See UNEP/CBD/COP/2/13, above n 54, Annex I. See also Sarah Laird and Rachel Wynberg, *Access and Benefit Sharing in Practice: Trends in Partnerships Across Sectors*, CBD Technical Series No 38 (Secretariat of the Convention on Biological Diversity, 2008); Robinson, above n 52.

⁸⁸ See, for examples, Nicholas Pauchard, 'Access and Benefit Sharing under the Convention of Biological Diversity and Its Protocol: What Can Some Numbers Tell Us about the Effectiveness of the Regulatory Regime?' (2017) 6 *Resources* 11; Anitha Ramanna-Pathak, 'Benefit Sharing: Reframing India's Policy' (2017) 58 *Plant Genetic Resources* 277; Balakrishna Pisupati and Sanjay Bavikatte, 'Access and Benefit Sharing as an Innovative Financing Mechanism' (2014) 16 *Asian Biotechnology and Development Review* 53. This may also account, at least in part, for the motivations to extend ABS to information: see Gerd Winter, 'Knowledge Commons, Intellectual Property and the ABS Regime' in Evanson Chege Kamau and Gerd Winter (eds) *Common Pools of Genetic Resources: Equity and Innovation in International Biodiversity Law* (2013) Routledge, 2013) pp 285-302.

⁸⁹ Richerzhagen, above n 15, 2246-2248.

⁹⁰ See Richerzhagen, above n 15, 2248-2251. See also Sarah Laird and Rachel Wynberg, 'Locating Responsible Research and Innovation Within Access and Benefit Sharing Spaces of the Convention on Biological Diversity: The Challenge of Emerging Technologies' (2016) 10 *Nanoethics* 189 and the references therein; Aseffa Seyoum and Eric Welch, 'Ex Post Use Restriction and Benefit Sharing Provisions for Access to Non-plant Genetic Materials for Public Research' (2015) 17 *Applied Economic Perspectives and Policy* 667 and the references therein.

benefits are most significant in the research or discovery phase ... Bioprospecting is therefore far more likely to help build scientific and technological capacity in biodiversity-rich countries than it is to alleviate rural poverty or improve biodiversity conservation and its contributions to the latter tend to be through the generation of critical scientific information rather than large sums of money ... But despite this reality, there remain high expectations and a deeply embedded belief that bioprospecting represents the proverbial goose that will deliver the golden egg.⁹¹

Under the Plant Treaty there are also renewed concerns about the quantum of benefits available including financial benefits to the Benefit Sharing Fund and how these might be enhanced.⁹² Meanwhile the subscription system under the PIP Framework is delivering key financial resources for the WHO preparedness system but not more broadly to providers.⁹³ These experiences of benefit sharing do not satisfy the expectation of the South from their CBD bargain of access to physical resources ('appropriate access to genetic resources') from the South to the North in exchange for finances ('appropriate funding') and technology including biotechnology ('appropriate transfer of relevant technologies') from the North to the South.⁹⁴ This failure to actually deliver is now driving the focus on tangible financial resources and perhaps overlooking the considerable non-monetary benefits that are being

⁹¹ Rachel Wynberg and Sarah Laird, 'Bioprospecting, Access and Benefit Sharing: Revisiting the "Grand Bargain"' in Rachel Wynberg, Doris Schroeder and Roger Chennells (eds), *Indigenous Peoples, Consent and Benefit Sharing: Lessons from the San-Hoodia Case* (Springer, 2009) pp 78-79 (references not included).

⁹² See Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture, *Seventh Session of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture* (2017) IT/GB-7/17/Report, [26], [27] and Appendix A.2 (Resolutions 2/2017). See also Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture, *Report on Implementation of the Funding Strategy* (2017) IT/GB-7/17/13; Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture, *Report of the Ad Hoc Advisory Committee on the Funding Strategy* (2017) IT/GB-7/17/12; Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture, *Sixth Session of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture* (2015) IT/GB-6/15/Report, [28] (and the documents cited therein) and Appendix A.1 (Resolution 1/2015).

⁹³ See World Health Organisation, *Review of the Pandemic Influenza Preparedness Framework* (2017) A70/17, [2] and Annex (pp 16-19 and 55-83).

⁹⁴ CBD, Art 1.

delivered under each of the CBD, the Nagoya Protocol, the Plant Treaty or the PIP Framework.⁹⁵

The North and South framing of the conflict at the CBD forum is, undoubtedly, too simplistic as there are other key actors including private sector companies and businesses, non-governmental organizations, social movements and Indigenous Peoples and local communities.⁹⁶ The important insight from these generalizations in this article and the various analyses of the competing interests in the CBD forum,⁹⁷ however, is that access is not really the focus of conflict and it is more properly ascribed to the appropriation and distribution of the benefits – the South expected financial resources and technology and these have not materialized. The next part shows how reframing information as a ‘genetic resource’ derivative within the ABS transaction (so that the information becomes a distinct commodity with a value that ABS attempts to translate into definable benefits) has enlivened the original grand bargain.

3. Defining the ABS information ‘problem’?

‘Digital sequence information’ (DSI) in the CBD, Nagoya Protocol and Plant Treaty⁹⁸ and ‘genetic sequence data’ (GSD) in the PIP Framework⁹⁹ is just the latest site of conflict in the ongoing negotiated compromises about benefit sharing.¹⁰⁰ This is a significant issue and likely

⁹⁵ For an analyses of non-monetary benefits and modelling see, for example, Nina Moeller and Clive 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).

⁹⁶ See Brand *et al.*, above n 66, pp 68-77.

⁹⁷ Various studies have investigated the political economy of ABS negotiations: see, for examples, Brand *et al.*, above n 66; Gian Delgado Ramos, ‘Biopiracy and Intellectual Property as Cornerstones of Technological Rule: The Example of Mexico’ (2001) 242 *Das Argument* 481; and so on.

⁹⁸ Noting the inconsistent uses of terminology with no universally agreed definition: see *Ad Hoc* Technical Expert Group on Digital Sequence Information on Genetic Resources, *Report of the Ad Hoc Technical Expert Group on Digital Sequence Information on Genetic Resources* (2018) CBD/DSI/AHTEG/2018/1/4, [23] and Annex; CBD/DSI/AHTEG/2018/1/3, above n 39, [63]-[82]; CGRFA/WG-FGR-5/18/Inf.11, above n 39, pp 32-41.

⁹⁹ PIP Framework, Arts 4.2 (‘genetic sequence’) and 5.2.

¹⁰⁰ See Conference of the Parties to the Convention on Biological Diversity, *Decision Adopted by the Conference of the Parties to the Convention on Biological Diversity: 14/20 Digital Sequence Information on Genetic*

to have a broader impact as increasingly the physical materials of ‘genetic resources’ are substituted by information – this is where there is sufficient knowledge about the physical materials that further knowledge derived from the physical material is not required (dematerialization).¹⁰¹ The challenge from DSI and GSD is that the benefit sharing obligations of ABS may no longer apply where there is a break in the legal chain between the source of the physical genetic resources and the application of information derived from those physical resources. This is because the contract model of ABS contemplated by the CBD (and the Nagoya Protocol, the Plant Treaty and the PIP Framework) assumes there is an enforceable legal chain of obligations linking the original resource provider with the party eventually deriving benefits that can then be shared back to the resource provider. The problem is that accessing information about the physical material may not be subject to those legal obligations because the obligations have not been imposed on users of the information. Without those obligations there is no benefit sharing required for utilizing (or using in the case of the Plant Treaty)¹⁰² information (knowledge) derived from access genetic resources. The quintessential example would be accessing DNA sequence information about a genetic resource on a publicly accessible database of sequences, using that accessed DNA sequence information to derive some benefit such as manufacturing and selling a vaccine developed using DNA sequence information. As there is no contractual connection between the party accessing the DNA sequence information and the party holding the physical genetic resources

Resources (2018) CBD/COP/DEC/14/20, Decision 14/20; Conference of the Parties to the Convention on Biological Diversity, *Report of the Conference of the Parties to the Convention on Biological Diversity on its Thirteenth Meeting* (2016) UNEP/CBD/COP/13/25, [321] and Decision XIII/16 ([1]); IT/GB-7/17/Report, above n 92, [43] and Appendix (Resolution 13/2017, [2]); A70/17, above n 93, Annex (pp 25-26 and 48-54).

¹⁰¹ The ‘dematerialization’ of the use of genetic resources being ‘the increasing trend for the information and knowledge content of genetic material to be extracted, processed and exchanged in its own right, detached from the physical exchange of the ... genetic material: Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture, *Fifth Session of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture* (2013) IT/GB-5/13/Report, Appendix I.2. See also CGRFA/WG-FGR-5/18/Inf.11, above n 39, pp 33-34. See also *Ad Hoc Technical Expert Group on Digital Sequence Information on Genetic Resources, Synthesis of Views and Information on the Potential Implications of the Use of Digital Sequence Information on Genetic Resources for the Three Objectives of the Convention and the Objective of the Nagoya Protocol* (2018) CBD/DSI/AHTEG/2018/1/2, [80]-[89].

¹⁰² See Plant Treaty, Arts 1.1 and 13.2.

from which the DNA sequence information was derived, then there are no benefit sharing obligations attached to the use of that DNA sequence information. The concern here is that the user is obtaining the benefits without any sharing back to the resource providers.

The CBD provides, independent of ABS contracting, a general obligation applying to all the CBD's objectives for the exchange of information about the 'results of technical, scientific and socio-economic research', 'training and surveying programmes', 'specialized knowledge', '[I]ndigenous and traditional knowledge as such and in combination with the technologies ["that are relevant to the conservation and sustainable use of biological diversity or make use of genetic resources"]',¹⁰³ and 'where feasible, include repatriation of information'.¹⁰⁴ There is also a Clearing House Mechanism 'to promote and facilitate technical and scientific cooperation'.¹⁰⁵ The Clearing House Mechanism is considered to be essential to implementing the CBD¹⁰⁶ and is currently being realized through a decentralised collection of information hubs (databases and websites) and national government websites with very little formal regulation.¹⁰⁷ The separate and centrally located Nagoya Protocol Access and Benefit Sharing Clearing House is also being developed as a part of the CBD's Clearing House Mechanism, although it applies more narrowly to only the ABS arrangements and not the broader CBD ambit of ABS, information sharing and technology transfer.¹⁰⁸ Both the CBD's Clearing House

¹⁰³ CBD, Arts 16.1 and 17.1.

¹⁰⁴ CBD, Art 17.2.

¹⁰⁵ CBD, Art 18.3. See <<http://www.chm-cbd.net>> accessed 15 April 2019.

¹⁰⁶ See UNEP/CBD/COP/10/27, above n 26, [217] and Annex (Decision X/15, pp 163-165).

¹⁰⁷ See Ad Hoc Open-Ended Working Group on Review of Implementation of the Convention, *Progress Report on the Clearing House Mechanism* (2014) UNEP/CBD/WGRI/5/3/Add.2; Conference of the Parties to the Convention on Biological Diversity, *Progress Report on Technical and Scientific Cooperation and the Clearing House Mechanism* (2014) UNEP/CBD/COP/12/11. The main direction for the Clearing House Mechanism is in the implementation of the *Strategic Plan for Biodiversity 2011-2020* and the achievement of the *Aichi Biodiversity Targets*: see Conference of the Parties to the Convention on Biological Diversity, *Report of the Twelfth Meeting of the Conference of the Parties to the Convention on Biological Diversity* (2013) UNEP/CBD/COP/12/29, [149] and Decision XII/2, (pp 12-18).

¹⁰⁸ UNEP/CBD/COP/10/27, above n 26, [103] and Annex (Art 14(1); Decision X/1, pp 85-109). See also Open-Ended Ad Hoc Intergovernmental Committee for the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization, *Report of the Third Meeting of the Open-*

Mechanism and the Nagoya Protocol Access and Benefit Sharing Clearing House are primarily directed to information about laws, regulations, policies and governmental reports with links to national government websites, and very little information about genetic resources themselves in the clearing houses. The linked sites, and sites linked to those sites do, however, often set out information about the genetic resources.¹⁰⁹ The CBD website's terms of use provide, in part, 'permission ... to download and copy the information, documents and materials ... for the User's personal, non-commercial use, without any right to resell or redistribute them or to compile or create derivative works therefrom', and subject to other terms and conditions including that '[t]his Site may contain links and references to third-party web-sites. The linked sites are not under the control of the Secretariat, and the Secretariat is not responsible for the content of any linked site'.¹¹⁰ The Nagoya Protocol Access and Benefit Sharing Clearing House is subject to the same terms of use as the CBD's Clearing House Mechanism.¹¹¹

While the CBD and the Nagoya Protocol promote open and accessible information exchanges, they do leave the terms and conditions of ABS (being prior informed consent and mutually agreed terms) to be determined by the resource holder and the bioprospector. Both the Plant Treaty and the PIP Framework impose slightly different information obligations to the

Ended Ad Hoc Intergovernmental Committee for the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (2014) UNEP/CBD/COP/12/6, [51]-[58]; Open-Ended Ad Hoc Intergovernmental Committee for the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization, *Report on Progress in the Implementation of the Pilot Phase of the Access and Benefit Sharing Clearing-House* (2014) UNEP/CBD/ICNP/3/6.

¹⁰⁹ See, for example, the Australian Government's Department of Environment and Energy website that sets out information about national strategies for biodiversity conservation, regulation and links to other websites that hold research and publications about research that includes information about genetic resources: Department of Environment and Energy, *Biodiversity* <<http://www.environment.gov.au/biodiversity>> accessed 15 April 2019.

¹¹⁰ Secretariat of the Convention on Biological Diversity, *Terms of Use* <<https://www.cbd.int/terms>> accessed 15 April 2019.

¹¹¹ See Secretariat of the Convention on Biological Diversity, *Access and Benefit Sharing Clearing-house* <<https://absch.cbd.int>> accessed 15 April 2019.

transfers of the physical materials. The Plant Treaty and its SMTA operate together to regulate the exchanges of shared plant materials including various information obligations placed on the Plant Treaty's Contracting Parties and the parties to the SMTA to make information available.¹¹² This information is, at least in part, an essential element of the benefit sharing.¹¹³ Central to this arrangement is a Global Information System (GLIS) to allow the information about plant materials to be collected, made available and shared with all potential users of the Plant Treaty materials.¹¹⁴ Other elements of the GLIS are as an early warning system to safeguard threatened materials¹¹⁵ and to assist the Commission on Genetic Resources for Food and Agriculture to periodically assess the state of the world's genetic resources.¹¹⁶ The kinds of information engaged by the GLIS includes 'catalogues and inventories, information on technologies, results of technical, scientific and socio-economic research, including characterization, evaluation and utilization, regarding those plant genetic resources for food and agriculture' that is not confidential.¹¹⁷

In practice the Plant Treaty requires facilitated access to the physical plant materials and this includes '[a]ll available passport data'¹¹⁸ and 'any other associated available non-confidential descriptive information'¹¹⁹ subject to any laws limiting disclosure,¹²⁰ and any relevant international agreements and national laws.¹²¹ The SMTA then imposes this obligation on the Provider of the plant materials.¹²² The Recipient's obligation is to both pass on the same SMTA

¹¹² See Plant Treaty, Art 12.3(c).

¹¹³ See Plant Treaty, Art 13.2(a).

¹¹⁴ Plant Treaty, Art 17.

¹¹⁵ Plant Treaty, Art 17.2.

¹¹⁶ Plant Treaty, Art 17.3. See, for example, Food and Agriculture Organisation of the United Nations, *Second Report on the State of the World's Plant Genetic Resources for Food and Agriculture* (FAO, 2010).

¹¹⁷ Plant Treaty, Art 13.2(a).

¹¹⁸ The 'passport data' is essentially identifying information that allows the correct material to be properly exchanged: see A Alercia, S Diulgheroff and M Mackay, *FAO/Bioversity Multi-Crop Passport Descriptors (MCPD V.2)* (Food and Agriculture Organization of the United Nations and Bioversity International, 2012).

¹¹⁹ Plant Treaty, Art 12.3(c).

¹²⁰ Plant Treaty, Art 12.3(c).

¹²¹ Plant Treaty, Art 12.3(f).

¹²² IT/GB-1/06/Report, above n 37, Appendix G (Arts 3, 5(b) and (d) and Annex 1).

terms and conditions to subsequent recipients including the information provisions,¹²³ and if the materials are conserved, or subjected to further research and development, then some information must be passed on to the GLIS.¹²⁴ For ‘conserved’ materials this is limited to any ‘associated available non-confidential descriptive information’,¹²⁵ and for ‘research and development’ materials this is ‘all non-confidential information’.¹²⁶ The outcome of this scheme is that non-confidential information about the plant materials is made available through the GLIS.¹²⁷

The GLIS is a pointer to a decentralised network of databases and websites and these databases and websites can impose terms and conditions on users accessing the information and data.¹²⁸ For example, Genesys is a gateway from which plant materials from gene banks around the world can be easily found and ordered.¹²⁹ Genesys provides links to the distributed databases across national, regional and international gene bank databases enabling simultaneous searches across many databases.¹³⁰ The result is that Genesys provides passport information together with phenotype data and environmental data, and includes

¹²³ IT/GB-1/06/Report, above n 37, Appendix G (Art 6.4).

¹²⁴ IT/GB-1/06/Report, above n 37, Appendix G (Arts 5(b) and 6.3 (conservation) and Art 6.9 (research and development)).

¹²⁵ IT/GB-1/06/Report, above n 37, Appendix G (Arts 5(b) and 6.3).

¹²⁶ IT/GB-1/06/Report, above n 37, Appendix G (Art 6.9).

¹²⁷ See Charles Lawson, ‘Information Intellectual Property and the Global Information System for Plant Genetic Resources for Food and Agriculture’ (2015) 26 *Australian Intellectual Property Journal* 27.

¹²⁸ See Charles Lawson, Heath Burton and Fran Humphries, ‘The Important Place of Information in the Evolving Legal and Policy Framework for the Conservation and Sustainable Use of the World’s Plant Genetic Resources for Food and Agriculture’ (2018) 40 *European Intellectual Property Review* 243.

¹²⁹ GENESYS, *Welcome to Genesys – The Global Gateway to Genetic Resources* available at <<https://www.genesys-pgr.org>> accessed 15 April 2019. PostgreSQL, MS SQL, Oracle and MySQL are supported by most operating systems and web browsers, but have little interoperability between vendors. This paper does not address the potential losses arising out of utilizing an incompatible system.

¹³⁰ See Caroline Ker, Selim Louafi and Myriam Sanou, ‘Building a Global Information System in Support of the International Treaty on Plant Genetic Resources for Food and Agriculture’ in Halewood *et al.*, above n 67, pp 298-300.

information from other gene banks, research institutions and smaller networks.¹³¹ The information is supplied to Genesys according to agreements between the distributed databases (such as EURISCO,¹³² NPGS,¹³³ and so on) and the Crop Trust.¹³⁴ The key terms and conditions for users of Genesys include ‘a perpetual, revocable, worldwide, royalty free, non-exclusive and non-transferable license’ to use the information from Genesys for lawful purposes, to not ‘copy, reproduce, republish, post, broadcast, transmit, or adapt, in full or in substantial part’ the Genesys information in any way that would ‘unreasonably prejudice the legitimate interests’ of the proprietors of Genesys.¹³⁵ Further, any access to and use of Genesys information ‘does not entitle you to any copyright or other intellectual property right or other proprietary interest in’ Genesys information or Genesys.¹³⁶ Most importantly, the information is provided ‘without any warranty of any kind, either express, implied, or arising by statute, custom, course of dealing, or trade usage’ and the users are also required to acknowledge Genesys including acknowledging that ‘[a]ll intellectual property rights (including copyright) in the [accessed information] are owned and retained by the [contributing distributed databases]’.¹³⁷ The effect of this legal arrangement is to require the users of Genesys to trace the sources of the information and then deal with the originators.¹³⁸

¹³¹ GENESYS, *Frequently Asked Questions – Where Does the Data Come From?* available at <<https://www.genesys-pgr.org/content/about/frequently-asked-questions>> accessed 15 April 2019.

¹³² ‘EURISCO’ at the European Cooperative Programme for Plant Genetic Resources available at <<http://www.ecpgr.cgiar.org/resources/germplasm-databases/eurisco-catalogue>> accessed 15 April 2019.

¹³³ National Plant Germplasm System (NPGS) at the United States Department of Agriculture’s Agricultural Research Service (USDA-ARS) available at <<https://www.ars-grin.gov/npgs>> accessed 15 April 2019.

¹³⁴ GENESYS, *Terms and Conditions of Use* available at <<https://www.genesys-pgr.org/content/legal/terms>> accessed 15 April 2019.

¹³⁵ GENESYS, *Terms and Conditions of Use*, above n 134.

¹³⁶ GENESYS, *Terms and Conditions of Use*, above n 134.

¹³⁷ GENESYS, *Terms and Conditions of Use*, above n 134.

¹³⁸ Genesys also illustrates the added properties of information aggregations that might be relevant in considering benefit sharing obligations: the increased benefits when information from different sources that by itself is of little value is combined to reveal new information that is valuable, and the increased benefits of considering information that is of no present value that saves the expense that would otherwise be incurred were that information not available, such as accessing plant genotypes and phenotypes with environmental information in a plant breeding program to reject possible plant crosses that if they had been made would have involved considerable expense and likely proved undesirable (dry hole risks).

Under the PIP Framework, providers of human clinical specimens, influenza virus isolates, extracted RNA, cDNA, and influenza candidate vaccine viruses¹³⁹ to WHO-coordinated network of laboratories¹⁴⁰ authorise sharing 'information as agreed in the Influenza Virus Traceability Mechanism'.¹⁴¹ The Influenza Virus Traceability Mechanism is the computer system for tracking the transfers and movements of physical materials into, within and out of the WHO network of laboratories.¹⁴² Where the physical materials are analyzed within the WHO network of laboratories the '[g]enetic sequence data and analyses arising from that data' is shared.¹⁴³ This is because 'greater transparency and access concerning influenza virus genetic sequence data is important to public health' and that 'there is a movement towards the use of public domain or public access databases such as GenBank and GISAID respectively'.¹⁴⁴ The WHO-coordinated network of laboratories are then required to 'submit genetic sequence data to GenBank and GISAID or similar database in a timely manner consistent with the [SMTA]',¹⁴⁵ and this requirement is restated in the SMTA 1.¹⁴⁶ GISAID (Global Initiative on Sharing All Influenza Data) is an expansion of existing networks within the international scientific community to form a consortium that has agreed to share their sequence data that is deposited in GenBank as soon as possible after analysis and validation, and with a maximum delay of six months.¹⁴⁷ There are now a number of databases that might satisfy the PIP Framework requirements,¹⁴⁸ and like the Plant Treaty GLIS, each of these databases has user terms and conditions. For example, GenBank data users are advised that:

¹³⁹ PIP Framework, Arts 2.1(i) and 4.1.

¹⁴⁰ PIP Framework, Art 5.1.1.

¹⁴¹ PIP Framework, Art 5.1.3(ii).

¹⁴² PIP Framework, Art 4.4.

¹⁴³ PIP Framework, Art 5.2.1. See also World Health Assembly, *Pandemic Influenza Preparedness: Sharing of Influenza Viruses and Access to Vaccines and Other Benefits* (2014) A67/36 Add.1, Annex ([4]-[5]).

¹⁴⁴ PIP Framework, Art 5.2.2.

¹⁴⁵ PIP Framework, Annexes 4 ([9]) and 5([9]).

¹⁴⁶ PIP Framework, Annex 1 ([5.1.1]).

¹⁴⁷ See Peter Bogner, Ilaria Capua, David Lipman and Nancy Cox, 'A Global Initiative on Sharing Avian Flu Data' (2006) 442 *Nature* 981.

¹⁴⁸ The main databases are: NCBI Influenza Virus Resource available at <<http://www.ncbi.nlm.nih.gov/genomes/FLU/FLU.html>>; Global Initiative on Sharing Avian Influenza Data

[National Center for Biotechnology Information] places no restrictions on the use or distribution of the GenBank data. However, some submitters may claim patent, copyright, or other intellectual property rights in all or a portion of the data they have submitted. [National Center for Biotechnology Information] is not in a position to assess the validity of such claims, and therefore cannot provide comment or unrestricted permission concerning the use, copying, or distribution of the information contained in GenBank.¹⁴⁹

In contrast to GenBank, and reflecting the use of terminology in the PIP Framework between the ‘public domain’ GenBank and the ‘public access’ GISAID,¹⁵⁰ the GISAID was intended to address the problem that ‘Public Domain archives, where access and use of data takes place anonymously, neither offered any protection of the owners’ intellectual property rights to the data, [nor] any other valuable incentive to incentivize the sharing of data’.¹⁵¹ The concern for GISAID appears to have been that scientists would be reluctant to rapidly share information if they could not be credited for their contribution or others might publish their results without their consent.¹⁵² The GISAID public access solution is a license between GISAID and its users of ‘a non-exclusive, worldwide, royalty-free, non-transferable and revocable license to access and use’ the database and information in the database according to its license terms.¹⁵³ The license terms address both information providers and information users, with providers agreeing to ‘a non-exclusive, worldwide, royalty-free, and irrevocable license to collect, store, reproduce, access, modify, display, distribute, coordinate, arrange, and otherwise use’ of the information provided to GISAID although this ‘does not transfer any

(GISAID) EpiFlu Database available at <<http://www.gisaid.org>>; Influenza Research Database available at <<http://www.fludb.org>>; Influenza Sequence and Epitope Database available at <<http://influenza.korea.ac.kr/ISED2>>; Influenza Virus Database available at <<http://influenza.psych.ac.cn>>; and OpenFlu Database available at <<http://openflu.vital-it.ch>> accessed 15 April 2019.

¹⁴⁹ GenBank, *GenBank Data Usage* available at <<http://www.ncbi.nlm.nih.gov/genbank>> accessed 15 April 2019.

¹⁵⁰ PIP Framework, Art 5.2.2. See also PIP TWG, above n 39, Annex 2 (p 25).

¹⁵¹ Freunde von GISAID e.V., *About Us* available at <<https://www.gisaid.org/about-us/history>> accessed 15 April 2019.

¹⁵² Freunde von GISAID e.V., *About Us*, above n 151.

¹⁵³ Freunde von GISAID e.V., *GISAID EpiFlu™ Database Access Agreement*, [2] available at <<https://www.gisaid.org/registration/terms-of-use>> accessed 15 April 2019.

other rights or ownership interests' in the information.¹⁵⁴ Users also agree to be authorized,¹⁵⁵ not to distribute the information to any unauthorized third party.¹⁵⁶ In addition, users agree to use the information 'to author, co-author or publish results obtained from your analyses' of any information 'provided that any such published results acknowledge' the laboratory where the physical materials were first obtained and the laboratory where the information was generated.¹⁵⁷ The authorization is achieved through a registration process collecting some information about the users and agreement to the GISAID terms of use followed by identity verification and approval.¹⁵⁸

The key points in this analyses so far about the information obligations is that the CBD, the Nagoya Protocol, the Plant Treaty and the PIP Framework all provide that information about the genetic resources be, at least to some extent, included in databases and accessible to users of those databases.¹⁵⁹ The CBD's and Nagoya Protocol's mutually agreed terms might also include terms and conditions requiring information be lodged with a database repository¹⁶⁰ like the Plant Treaty and PIP Framework.¹⁶¹ Put simply, though, the CBD, the Nagoya Protocol, the Plant Treaty and the PIP Framework all promote information being dealt with separately and distinctly from the physical genetic resources that are a part of the ABS transaction. Reframing information as a 'genetic resource' derivative within the ABS transaction (so that the information becomes a distinct commodity with a value that ABS attempts to translate into definable benefits) is a fundamental change that has enlivened the

¹⁵⁴ Freunde von GISAID e.V., *GISAID EpiFlu™ Database Access Agreement*, above n 153, [2(a)].

¹⁵⁵ Freunde von GISAID e.V., *GISAID EpiFlu™ Database Access Agreement*, above n 153, [2(b)].

¹⁵⁶ Freunde von GISAID e.V., *GISAID EpiFlu™ Database Access Agreement*, above n 153, [2(d)].

¹⁵⁷ Freunde von GISAID e.V., *GISAID EpiFlu™ Database Access Agreement*, above n 153, [2(c)].

¹⁵⁸ Freunde von GISAID e.V., *Registration* available at <<https://www.gisaid.org/registration/register>> accessed 15 April 2019.

¹⁵⁹ CBD, Art 18.3 (Clearing House Mechanism); Nagoya Protocol, Art 14.1 (Access and Benefit Sharing Clearing House); Plant Treaty, Art 17 (GLIS); PIP Framework, Arts 5.1.3 (Influenza Virus Traceability Mechanism) and 5.2.2 (GenBank, GISAID or public domain or public access database).

¹⁶⁰ CBD, Art 15.4; Nagoya Protocol, Art 6.3(g).

¹⁶¹ Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture, *First Session of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture* (2006) T/GB-1/06/Report, Appendix G (Art 6(9)); PIP Framework, Art 5.2.

original grand bargain with the potential that benefits may actually flow as originally anticipated. The next part considers whether information as a derivative within the ABS transaction is likely to deliver benefits focusing on the problem of maintaining a legal chain of obligations between the resource provider and the information end user (the contract model) and then other mechanisms to enhance existing benefit sharing arrangements (and beyond).

4. Enhancing the ABS contract model

The CBD and Nagoya Protocol ABS contract model assumes that parties to an agreement can negotiate the terms and conditions of their agreement including terms and conditions that address benefit sharing and set a price (the sum of monetary and non-monetary benefits) for the agreement. These are the prior informed consent and the mutually agreed terms.¹⁶² This sets the binding legal obligations and assumes that the original access contract terms and conditions can be enforced into the future.¹⁶³ The provider may include monetary and non-monetary benefits, such as financial measures, the transfer of technology, and so on. As a generalization contracts can deal with physical materials (like animals, seeds, DNA molecules, plants, viruses, and so on) and non-physical things (like know-how, information, confidentiality, and so on). As those materials are exploited there might be any number of intermediaries that will also be engaged through contracts with terms and conditions, again assuming that they can be enforced into the future. In each instance the terms and conditions can address information benefit sharing and the form and content of the benefits that are to be shared back to the ultimate information provider (and resource provider). Similarly, the Plant Treaty and PIP Framework pass on the same terms and conditions under their standard material transfer agreements.¹⁶⁴ As set out above, the problem is maintaining legal

¹⁶² See CBD, Arts 15.4 and 15.7 (MAT) and 15.5 (PIC); Nagoya Protocol, Arts 5 and 6.

¹⁶³ Importantly, this first access agreement (with prior informed consent and the mutually agreed terms) has consequences for all subsequent 'utilizations' (CBD, Art 15.7; Nagoya Protocol, Art 5.1), and whether the benefit sharing needs to be re-negotiated at each subsequent utilization: see Kamalesh Adhikari, 'Reconceptualising Access: Moving Beyond the Limits of International Biodiversity Laws' in Lawson and Adhikari, above n 8, pp 22-30.

¹⁶⁴ See Plant Treaty, Arts 12.4 and 15.1; IT/GB-1/06/Report, above n 37, [12] (Resolution 2/2006) and Appendix G ([6.4]); PIP Framework, Art 5.4 and Annexes 1 ([5.1.4]) and 2 ([4.4]).

obligations between the information provider and some of the ultimate consumers if information is embodied in products, processes or services. The question, however, is whether these obligations can be maintained and enforced?

The PIP Framework's distinction between the public domain and public access databases¹⁶⁵ directly illustrates issue. The public access database requires the user to complete a registration process identifying the user with verification and approval before accessing any information.¹⁶⁶ That the users are identified and have made a commitment to the legal obligations before using any information can maintain a legal chain between the original accession of the physical materials and the information about those materials. In effect, under the PIP Framework a public access database (like GISAID) means access with possible restrictions while a public domain database (like GenBank) means access without restrictions. As a model, the PIP Framework public access database GISAID operationalises the key components of an information repository that can maintain an effective legal chain of obligations – registration involving user verification and approval to access the database, setting out the terms and conditions to which the user has agreed before accessing any information, and user commitments to terms and conditions. While GISAID's terms and conditions are directed to scientist attribution and being scooped for publishing,¹⁶⁷ there is no limit to such terms and conditions also addressing benefit sharing obligations. An example of the kinds of terms and conditions that might be appropriate include the Community Cyberinfrastructure for Advanced Marine Microbial Ecology Research and Analysis (CAMERA) database term:

As a condition of my use of the CAMERA website, I acknowledge and agree that the genetic information available through the CAMERA website may be considered to be part of the genetic patrimony of the country from which the sample was obtained. As a user, I agree to: (1) acknowledge the country of origin in any

¹⁶⁵ PIP Framework, Art 5.2.2.

¹⁶⁶ See Freunde von GISAID e.V., *Registration*, above n 158.

¹⁶⁷ See Freunde von GISAID e.V., *About Us*, above n 151.

publications where the genetic information is presented; (2) contact the CBD focal point identified on the CBD website if I intend to use the genetic information for commercial purposes.¹⁶⁸

The focus of most proposals to enhance the existing benefit sharing model framed around a legal chain of obligations have proven problematic. This includes a proposed disclosure mechanism requiring disclosure of the country of origin of genetic resources, the source of relevant traditional knowledge and positive proof of benefit sharing and prior informed consent in intellectual property applications.¹⁶⁹ This has not been adopted as a global standard, although a number of countries have implemented disclosure mechanisms in their domestic laws.¹⁷⁰ Another mechanism is an international certificate of compliance to prove the legal provenance of genetic resources together with proof of prior informed consent and benefit sharing.¹⁷¹ This is now a part of the Nagoya Protocol developments to enable cross-border enforcement of ABS and prevent 'biopiracy'.¹⁷² This presumes, however, that there exists a comprehensive legislative, administrative and policy scheme in place to regulate access and impose benefit sharing. The reality is that these arrangements are not in place in most countries,¹⁷³ and where regulations have been implemented they often remain contentious and difficult to enforce.¹⁷⁴ These proposals also assume that making the existing benefit sharing model framed around a legal chain of obligations to capture more of the

¹⁶⁸ Cited in Charles Lawson, 'Patents and Access and Benefit Sharing Contracts: Conservation or Just More Red Tape?' (2011) 30 *Biotechnology Law Report* 197, 202.

¹⁶⁹ See, for example, Justin Malbon, Charles Lawson and Mark Davison, *The WTO Agreement on Trade-Related Aspects of Intellectual Property Rights: A Commentary* (Edward Elgar, 2014) pp 392-395.

¹⁷⁰ See World Intellectual Property Organisation, *Disclosure Requirements Table* (2017) available at <http://www.wipo.int/export/sites/www/tk/en/documents/pdf/genetic_resources_disclosure.pdf> accessed 15 April 2019. See also World Intellectual Property Organisation, *Key Questions on Disclosure Requirements for Genetic Resources and Traditional Knowledge* (WIPO, 2017) Annex.

¹⁷¹ See Nagoya Protocol, Arts 17.2, 17.3 and 17.4. See also Parameswaran Prajeesh, 'India Lays the Cornerstone of Biodiversity Access and Benefit Sharing System' (2017) 12 *Current Science* 24.

¹⁷² See Nagoya Protocol, Arts 6, 7 and 17.3.

¹⁷³ See Pauchard, above n 88.

¹⁷⁴ See Morten Walløe Tvedt and Ole Kristian Fauchald, 'Implementing the Nagoya Protocol on ABS: A Hypothetical Case Study on Enforcing Benefit Sharing in Norway' (2011) 14 *The Journal of World Intellectual Property* 383, 390-397.

benefits of existing transactions will address the financial resources and technology concerns of the South. As set out above, this seems unlikely because ‘the expectations of what bioprospecting can bring are both unrealistic and misdirected’.¹⁷⁵

The engagement of the CBD, Nagoya Protocol, Plant Treaty and PIP Framework with information is only in its very early stages and so far, as set out above, directed to how to apply or amend the existing arrangements. Surveying the information requirements under the CBD, Nagoya Protocol, Plant Treaty and the PIP Framework this article suggested a possible solution for DSI and GSD, and information more generally, might be through the legal obligations imposed on accessing databases. This is consistent with the existing contract models and appears to provide an elegant legal solution.¹⁷⁶ There remain, however, problems. Tracking information and its use is complicated.¹⁷⁷ This, at least in part, is because enforcement is complicated because the accessed information may be subsequently shared without legal obligations or the entity accessing the information may be hard or impossible to identify to enable enforcement of any legal obligations. These problems are further exacerbated by the fragmentation of information into networks of different users and using the information for different purposes and in different contexts. And further exacerbated by the specific CBD, Nagoya Protocol, Plant Treaty and PIP Framework information obligations that promote information exchange and fragmentation outside the ABS obligations.

Similar problems of enforcement of benefit sharing arise for intellectual property owners seeking to enforce their rights against consumers of intellectual property products, processes and services. The intellectual property owner, much like the resource holder with a physical material and potentially information about that material, wants the protected product, process and service broadly used to enhance the benefits flowing from their uses. The owners are, however, not well placed to police these uses of their protected products, processes and

¹⁷⁵ Wynberg and Laird, above n 91, p 78 (references not included).

¹⁷⁶ See CBD/DSI/AHTEG/2018/1/3, above n 39, [192]-[197].

¹⁷⁷ See A70/17, above n 93, Annex (p 54). Perhaps blockchain has a role: see Charles Lawson, Heath Burton and Fran Humphries, ‘The Important Place of Information in the Evolving Legal and Policy Framework for the Conservation and Sustainable Use of the World’s Plant Genetic Resources for Food and Agriculture’ (2018) 40 *European Intellectual Property Review* 243, 258.

services because they do not have immediate contact with users or even know who those users might be. Again this is exacerbated by the fragmentation of the bundle of rights that is intellectual property. So, for example, a copyright owner with their written work in a university library will have difficulty knowing who is accessing and copying that work and how different parts of the work may be being copied and used. A part of the solution for copyright owners has been the development of collecting societies.

Collecting societies directly address the problem that copyright owners had difficulty negotiating and collecting copyright fees and royalties and enforcing copyrights especially for ephemeral uses of their works where copying was difficult to detect. These entities function to license out copyrights, collect royalties, enforce and protect members' copyrights generally through litigation, and distribute royalties.¹⁷⁸ As an illustration, the Copyright Agency in Australia is a not-for-profit company that, among a range of activities, manages the copyrights of many authors, journalists, photographers, publishers, and so on.¹⁷⁹ Copyright owners voluntarily appoint the Copyright Agency to manage their copyright(s) and the agency's activities are performed according to the *Code of Conduct for Australian Collecting Societies*.¹⁸⁰ Of particular relevance, the Copyright Agency has also been appointed to manage the Statutory Educational license provided to educational institutions under the *Copyright Act 1968* (Cth).¹⁸¹ The statutory license schemes allow educational institutions in Australia to use copyright content without the usual permissions but subject to fair compensation. Educational institutions in Australia copy materials used for teaching purposes with an identified concern after the advent of the photocopier about the payment of royalties to the various copyright owners by those copying library materials (principally books and

¹⁷⁸ For an overview of copyright collecting societies see Daniel Gervais, 'Collective Management of Copyright: Theory and Practice in the Digital Age' in Daniel Gervais (ed), *Collective Management of Copyright and Related Rights* (2nd Edition, 2010) pp 3-10.

¹⁷⁹ See Copyright Agency, *What We Do* available at <<https://www.copyright.com.au/about-us/what-we-do>> accessed 15 April 2019.

¹⁸⁰ Copyright Agency, *Governance and Policies* available at <<https://www.copyright.com.au/about-us/governance>> accessed 15 April 2019.

¹⁸¹ See Copyright Agency, *What We Do*, above n 179.

journals).¹⁸² The proposed solution at the time was for a statutory photocopy license based on educational institutions recording their copying and paying a royalty calculated and collected by the Copyright Agency.¹⁸³ The Copyright Agency originally applied a sampling method requiring record keeping that proved laborious,¹⁸⁴ and this has been replaced with an equitable remuneration arrangement where the educational institution and the collecting society now negotiate the royalty payments (or it is determined by an independent tribunal).¹⁸⁵ The result is that the Copyright Agency negotiates with educational institutions about their uses of copyright materials and determines a suitable fee.

Similar institutions might also be developed for those accessing genetic resources and those downstream users developing products, processes and services from which benefits might be expected to flow.¹⁸⁶ The form of the legal entity acting as a benefit sharing collecting society will require careful consideration. It will require a legal status in the various Contracting Party jurisdictions to negotiate the terms and conditions of agreements addressing benefit sharing and setting a price for the agreement, collect those prices, enforce and protect members' rights to benefit sharing (generally through litigation and perhaps arbitration), and distribute amounts collected. How those amounts might be allocated and distributed will need to be determined with previous useful experience from, for examples, the Plant Treaty's project funding allocations,¹⁸⁷ and distributions from the existing financial mechanism under the CBD

¹⁸² See Copyright Law Committee on Reprographic Reproduction, *Report of the Copyright Law Committee on Reprographic Reproduction* (AGPS, 1976) pp 44-55 ([6.01]-[6.74]).

¹⁸³ See *Copyright Amendment Act 1980* (Cth); Staniforth Ricketson, *The Law of Intellectual Property* (Law Book Company, 1984) pp 408-409 ([15.12]-[15.13]).

¹⁸⁴ See Explanatory Memorandum, *Copyright Amendment (Disability Access and Other Measures) Bill 2017* (Cth) (2017) p 8.

¹⁸⁵ See *Copyright Amendment (Disability Access and Other Measures) Act 2017* (Cth) ss 113N-113U.

¹⁸⁶ An earlier and similar proposal was for a Global Bio-Collecting Society that might specifically deal with traditional knowledges: see Peter Drahos, 'Indigenous Knowledge, Intellectual Property and Biopiracy: Is a Global Bio-Collecting Society the Answer' (2000) 22 *European Intellectual Property Review* 245.

¹⁸⁷ See, for example, FAO Office of Evaluation, *Evaluation of the Benefit Sharing Fund Second Project Cycle International Treaty on Plant Genetic Resources for Food and Agriculture* (FAO, 2017).

(and Nagoya Protocol) Trust Funds,¹⁸⁸ the Plant Treaty Benefit Sharing Fund¹⁸⁹ or the PIP Framework PIP Benefit Sharing System.¹⁹⁰ The likely direct benefits of such an institution would flow from gaining expertise in tracking the flows and uses of information, negotiating benefit sharing arrangements and enforcing the collection of benefits from diverse users.

One of the immediate alternatives to ABS contracts and legal solutions and mechanisms to restrict information is a tax or levy. This addresses the efficiency and effectiveness of ABS by avoiding the restrictive transaction complex of contracting that is potentially limiting the sharing and exploitation of resources including information, the problems of enforcement, and the quantum of cash and other benefits being delivered to the South.¹⁹¹ This also addresses the concern that not all information is necessarily valuable information and that valuable resources shouldn't be consumed dealing with *all* information. Currently information that is highly valued can be distinguished because it is protected through contract and intellectual property, such as trade secrecy and confidentiality, regulatory test data, and so on. Imposing a transaction cost on *all* the other information because some of it may prove valuable is incredibly inefficient and ineffective and this might be directly addressed through a tax or levy.

Payments to the Plant Treaty's Benefit Sharing Fund perhaps illustrate ways that this might be achieved. Various countries have made voluntary contributions to the Benefit Sharing Fund in the form of one-off payments¹⁹² and Norway has committed to an in perpetuity payment of 0.1 per cent of seed sales in Norway.¹⁹³ Some private sector organisations have also made contributions. For example, the French private seed sector has committed to

¹⁸⁸ CBD, Art 21; Nagoya Protocol, Art 25.2.

¹⁸⁹ Plant Treaty, Art 19.3(f).

¹⁹⁰ PIP Framework, Art 6.4.

¹⁹¹ Halewood *et al.*, above n 68, 1416, note that in controlling access to information and tracking and tracing the use of information '[o]ne can imagine the adoption of such a model eventually leading to a collapse of the ABS systems that the international community has been working to develop since the CBD came into force'.

¹⁹² See, for example, IT/GB-7/17/Report, above n 92, [28] and Appendix A.3 ([23]).

¹⁹³ See *Ad Hoc Advisory Committee on the Funding Strategy, Sixth Meeting of the Ad Hoc Advisory Committee on the Funding Strategy* (2010) IT/ACFS-6/10/Report, [7].

paying €175,000 per year to the Benefit Sharing Fund.¹⁹⁴ These payments, and the experience of subscription payments under the PIP Framework,¹⁹⁵ have contributed to the ongoing discussions about such a subscription under the Plant Treaty.¹⁹⁶ These payments and subscriptions are essentially already a tax or levy. A future tax or levy might be paid either by those accessing the resources, as is the case under the PIP Framework where influenza vaccine, diagnostic and pharmaceutical manufacturers using the WHO's system make a subscription payment (called a 'Partnership Contribution'),¹⁹⁷ or as an impost on Contracting Parties with the Norway seed sales tax providing an illustrative mechanism.¹⁹⁸

This ideal of a payment in place of complex regulation and negotiation highlights one of the CBD's negotiating complexes that was resolved at the time through careful diplomatic language.¹⁹⁹ The CBD sets out a general expectation that developing countries be given access to technology 'under fair and most favourable terms' and including 'where necessary' payments to deliver that technology.²⁰⁰ To deal with the specific concern that in the developed North this technology was predominantly owned by the private sector there was express recognition that this probably required deploying financial resources to provide and facilitate the transfer of that technology²⁰¹ (and acknowledgement of the interests of intellectual property holders).²⁰² This has not happened and may explain some of the disquiet driving the current debates about information. This also suggests that it is the financial resources of the Norths' governments that is at the core of the CBD's grand bargain, and that

¹⁹⁴ Secretariat of the International Treaty on Plant Genetic Resources for Food and Agriculture, *French Seed Sector Announces Annual Contribution to Benefit Sharing Fund* (2017) available at <<http://www.fao.org/plant-treaty/news/news-detail/en/c/1054532>> accessed 15 April 2019. See also IT/GB-7/17/Report, above n 92, [6] and Annex A.3 ([24]).

¹⁹⁵ See World Health Organisation, *PIP Partnership Contributions* (2018) available at <https://www.who.int/influenza/pip/benefit_sharing/pc_total_contributions.pdf> accessed 15 April 2019.

¹⁹⁶ IT/GB-7/17/Report, above n 92, [26] and Appendix A.2 (Resolution 2/2017, Annex 1, [1] and Annex 2, [6]).

¹⁹⁷ WHA64.5, above n 30, [6.14.3].

¹⁹⁸ See Halewood *et al.*, above note 68, 1416-1417.

¹⁹⁹ See CBD, Art 16.

²⁰⁰ CBD, Art 16.2.

²⁰¹ See CBD, Art 16.4.

²⁰² See CBD, Art 16.2.

it is really for the Norths' governments to implement their obligations were there to be a tax or levy.

Like the collecting societies, the amounts of the tax or levy and the form of the entity receiving the funds will require careful consideration. The existing CBD and Nagoya Protocol have financial mechanisms through the institutional structure of the Global Environment Facility Trust Funds,²⁰³ while the Plant Treaty has a Benefit Sharing Fund²⁰⁴ and the PIP Framework has a PIP Benefit Sharing System.²⁰⁵ These might act as a basis for collecting and then distributing the amounts of the tax or levy. Perhaps the more complicated debates will be, again like the collecting societies, about the terms and conditions of payments, the quantum of payments, and distributing the amounts collected. In the end, however, the tax or levy is a substitute for the benefits that might have been expected to flow from information, and again these are unlikely to be as significant as most Contracting Parties might expect. Recall the reality under the existing benefit sharing arrangements that 'the expectations of what bioprospecting can bring are both unrealistic and misdirected'.²⁰⁶ To be a credible alternative to the ABS contracting complex, the tax or levy would need to be a realistic comparator to the actual values of information not presently included in the ABS transactions.

5. Conclusion

The analysis in this article shows each of the CBD, Nagoya Protocol, Plant Treaty and the PIP Framework are just starting their engagement with information issues so this is an opportune time to address broader concerns about the merits of the current contract model of ABS and re-engage with the terms of the original CBD grand bargain of access in exchange for finances and technology transfers. Further, while enhanced contracting measures are elegant legal solutions, perhaps there needs to be a broader consideration of alternatives because the likely adverse effects of yet more contracting and oversight is likely to be less use and

²⁰³ CBD, Art 21; Nagoya Protocol, Art 25.2.

²⁰⁴ Plant Treaty, Art 19.3(f).

²⁰⁵ PIP Framework, Art 6.4.

²⁰⁶ Wynberg and Laird, above n 91, p 78.

exploitation of information about genetic resources.²⁰⁷ Put simply, ABS under the CBD, Nagoya Protocol, Plant Treaty and the PIP Framework is an enclosure of what previously had been available with few to no restrictions. Enhancing the existing contract context to include information about the genetic resources as a resource derivative within the ABS transaction itself is expanding this enclosure further, and beyond the original ideal of open information access and sharing. The solution here is to impose fewer restrictions on the access and use of the information and seek the benefit sharing through other mechanisms.²⁰⁸

As the analysis in this article shows, including information as a derivative within the ABS transaction is not without considerable obstacles and costs. At the same time, however, this may also address some of the outstanding ABS concerns, particularly the South's requirement for actual financial resources (cash) and technology.²⁰⁹ The fairness (social justice) and equity justifications for regulating genetic resources are compelling. The challenge, however, is to find a better mechanism. Put simply, the idea is that the transaction costs of using materials and information under the CBD, Nagoya Protocol, Plant Treaty and the PIP Framework (and other developing schemes) needs to be limited and there needs to be new thinking about the ways benefits are identified and collected because the promise of financial resources (and technology transfer) that justified sovereign control over resources and access have not

²⁰⁷ See, for examples, D Neumann, A Borisenko, J Coddington *et al.*, 'Global Biodiversity Research Tied Up by Juridical Interpretations of Access and Benefit Sharing' (2017) *Organisms Diversity and Evolution* DOI: <https://doi-org.libraryproxy.griffith.edu.au/10.1007/s13127-017-0347-1>; Eric Welch, Federica Fusib, Selim Louafic and Michael Siciliano, 'Genetic Resource Policies in International Collaborative Research for Food and Agriculture: A Study of USAID-Funded Innovation Labs' (2017) 15 *Global Food Security* 33; Daniel Cressey, 'Biopiracy Ban Stirs Red-tape Fears' (2014) 514 *Nature* 14; Isabel López Noriega, Michael Halewood, Gea Galluzzi *et al.*, 'How Policies Affect the Use of Plant Genetic Resources: The Experience of the CGIAR' (2013) 2 *Resources* 231; and so on.

²⁰⁸ The collecting society mechanisms described above provides an immediate illustration of these efficiency and effectiveness concerns. Recall the Copyright Agency originally applied a sampling method requiring record keeping that proved laborious and this was later substituted with a more efficient and effective remuneration arrangements concluded at institutional level: see Staniforth Ricketson, *The Law of Intellectual Property* (Law Book Company, 1984) pp 408-409 ([15.12]-[15.13]); Explanatory Memorandum, *Copyright Amendment (Disability Access and Other Measures) Bill 2017 (Cth)* (2017) p 8.

²⁰⁹ Wynberg and Laird, above n 91, p 78.

materialized. Addressing the fracturing effect of information as a genetic resource in the ABS transaction provides an opportune moment to re-engage with the original grand bargain of access in exchange for benefit sharing and deliver a regulatory complex that is both efficient and effective (in economic terms) *and* fair (socially just) and equitable. At this point the choice is simple. A more complicated ABS contracting matrix increasing the transaction costs of access physical materials *and* information. Or shifting the burden of benefit sharing to a more efficient and effective mechanism to simplify ABS arrangements and promote *more* equitable access and use of physical materials and information about genetic resources? Importantly, however, this might also be an opportune moment to re-engage the grand bargain and seek to deliver financial resources (cash) and technology outside the frame and context of access and benefit sharing?