



Maritime Safety and Security Law Journal

Special Issue on Ocean Commons

MarSafeLaw Journal 5/2018-19



Ocean Commons:
Marine Genetic Resources and
Biodiversity Conservation in
Areas Beyond National Jurisdiction

Issue Editors

Gemma Andreone

*Institute for International Legal Studies,
National Research Council, Italy*

Vito De Lucia

*Norwegian Centre for the Law of the Sea,
UiT The Arctic University of Norway*

Managing Editors

Eleonora Heim

University of Basel, Switzerland

Victoria Mitchell

University of Greenwich, United Kingdom

Maria Orchard

University of Bristol, United Kingdom

Antonia Zervaki

University of Athens, Greece

Advisory Board

Frida Armas Pfirter
Austral University, Argentina

Giuseppe Cataldi
University of Naples L'Orientale, Italy

Aldo Chircop
Dalhousie University, Canada

Claudia Cinelli
Naval Academy of Livorno, Pisa

Annick de Marffy-Mantuano
Indemer, Monaco

Haritini Dipla
University of Athens, Greece

Erik Franckx
Vrije University, Belgium

Philippe Gautier
ICJ and Catholic University of Louvain, Belgium

Douglas Guilfoyle
Monash University, Melbourne, Australia

Tore Henriksen
University of Tromsø, Norway

Kamrul Hossain
University of Lapland, Finland

Mariko Kawano
Waseda University, Japan

Timo Koivurova
University of Lapland, Finland

Eugene Kontorovich
Northwestern University, USA

Kiara Neri
University of Lyon 3, France

Marta Chantal Ribeiro
University of Porto, Portugal

Natalino Ronzitti
LUISS Guido Carli University, Italy

Nathalie Ros
University of François-Rabelais, France

Karen Scott
University of Canterbury, New Zealand

Tullio Scovazzi
University of Milan-Bicocca, Italy

Maja Sersic
University of Zagreb, Croatia

Tullio Treves
State University of Milan, Italy

Eva Vazquez Gomez
University of Cordoba, Spain

Antonia Zervaki
University of Athens, Greece

Preface

by Vito DE LUCIA and Gemma ANDREONE

This special issue is the outcome of a workshop that was held in Rome, Italy, on 13 June, 2017.¹

The theme of the workshop, and of the special issue – ocean commons – resonates in multiple ways with the urgent need to protect our oceans. This need is increasingly evidenced by a stream of scientific publications and reports on the state of the oceans. It has also been recognized by the UN Agenda 2030 and the sustainable development goals, especially goal 14 whose focus is the conservation and sustainable use of the oceans, seas, and marine resources.

This need is especially acute in relation to those ocean areas that are located beyond national jurisdiction, and that are least known, least regulated and least protected. Indeed, until not long ago the deep sea was considered devoid of life. Yet, recent advances in knowledge have shown that not only is the deep sea rich in biodiversity, but it is also rich in *extraordinary* biodiversity, given the extreme conditions life has had to adapt to. This richness, however, is also characterized by high vulnerability and by the uniqueness of many of the deep sea ecosystems.²

Marine areas beyond national jurisdiction represent the spatial dimension of the ocean commons. Yet, their governance and legal framework suffer significant gaps, with the lack of bodies and institutions with sufficiently broad competence to designate, for example, marine protected areas or to regulate access to common resources such as marine genetic resources that were not a priority at the time of the negotiations that led to the adoption of the 1982 United Nations Convention on the Law of the Sea³, nor are effectively included in the regulatory competence of the Convention on Biological Diversity⁴ and its Nagoya Protocol on the utilization of genetic resources.⁵ Marine areas beyond national jurisdiction in many ways slip through the cracks of the regulations established by these two framework conventions. After 15 years of formal and informal work within the context and under the aegis of the UN, on 24 December 2017 the General Assembly finally launched an intergovernmental conference (IGC) with the aim of adopting a new international legally binding

1 The mentioned workshop and this publication, co-edited by Gemma Andreone and Vito De Lucia, have been funded by Cost Action 1105 Marsafenet and by Norges forskningsrad Grant nr.257631.

2 See e.g. K. Horikoshi and K. Tsujii (eds), *Extremophiles in Deep-Sea Environments*, Springer 1999

3 United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 3 (UNCLOS).

4 Convention on Biological Diversity (opened for signature 5 June 1992, entered into force 29 December 1993) 1760 UNTS 79 (CBD).

5 Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity (adopted 29 October 2010, entered into force 12 October 2014), < <https://treaties.un.org/doc/Publication/UNTS/No%20Volume/30619/A-30619-08000002802b5335.pdf> >, accessed 16 December 2019. The Protocol only regulates marine genetic resources located in areas within national jurisdiction

instrument on marine biodiversity in areas beyond jurisdiction.¹ The IGC focuses on a package deal of issues that must be addressed ‘together and as a whole’, and that reflects the so-called ‘2011 package’ proposed by the UN working group that prepared the ground for these negotiations, and further reiterated by the preparatory committee that prepared, perhaps without much success, elements to form the basis of a draft text.² This package is comprised of the following topics: marine genetic resources including the sharing of benefits, area-based management tools, including marine protected areas, environmental impact assessments, and capacity building and transfer of technology.

These negotiations aim at setting out a comprehensive and detailed legal regime for the protection of the ocean commons, in order to safeguard marine biodiversity precisely where it is least known and most vulnerable. Moreover, the conservation of biodiversity is also a necessary precondition for its sustainable use, in line with Sustainable Development Goal 14: life below water.³

The link between conservation and sustainable use is also a key aspect of the regulation of access to and utilization of marine genetic resources, so that benefits may be derived from their utilization without compromising the ecological integrity of the host marine ecosystems.

Regarding marine genetic resources, one of the crucial themes under discussion and one of the central themes engaged with in this special issue, the main concern, and indeed the area where divergence among delegations is probably greatest, is the question of whether marine genetic resources are, or should be, encompassed by the principle of the common heritage of mankind.⁴ The question has potentially great relevance for the benefit sharing arrangements that the new agreement will adopt, even though there is also a strong push by some delegations to move away from a principled debate and focus instead on the pragmatic aspects of the benefit sharing regime.

Against this background, this special issue aims at offering a legal contribution to the current debates at the IGC sessions by engaging with the question of the conservation and sustainable use of ocean commons primarily in relation to one of the four topics under negotiations, namely marine genetic resources, including the benefit sharing regime. In this respect, the contributions of this special issue address questions such as, *inter alia*, the principle of the common heritage of mankind, fair and equitable sharing and the effective need for regulating marine genetic resources.

1 UNGA, ‘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’ (24 December 2017) UN Doc A/RES/72/249 para 1.

2 Ibid para 2; UNGA, ‘Letter dated 30 June 2011 from the Co-Chairs of the Ad Hoc Open-ended Informal Working Group to the President of the General Assembly’ (30 June 2011) UN Doc A/66/119 para I.1(b), p 4-9.

3 UNGA, ‘Transforming our world: The 2030 agenda for Sustainable development’ (21 October 2015) UN Doc A/RES/70/1 p 14, 23-24.

4 The different perspectives, *de lege lata* and *de lege ferenda*, refer respectively to the two maritime zones that fall beyond national jurisdiction, the Area and the high seas.

Table of Contents

<i>Vito DE LUCIA</i> , 'The Concept of Commons and Marine Genetic Resources in Areas beyond National Jurisdiction'	1
<i>David LEARY</i> , 'Marine Genetic Resources in Areas beyond National Jurisdiction: Do We Need to Regulate Them in a New Agreement?'	22
<i>Elisa MORGERA</i> , 'Fair and equitable benefit-sharing in a new international instrument on marine biodiversity: A principled approach towards partnership building?'	48
<i>Marzia ROVERE</i> , 'The Common Heritage applied to the resources of the seabed. Lessons learnt from the exploration of deep sea minerals and comparison to marine genetic resources.'	78
<i>Francesca VARVELLO</i> , 'Looking for "Submerged Commons": Towards a New Era for Underwater Cultural Heritage?'	99
<i>Ornella FERRAJOLO</i> , 'The Common Heritage of Mankind in International Law: A Great Past but No Future?'	114

The Concept of Commons and Marine Genetic Resources in Areas beyond National Jurisdiction

Vito DE LUCIA*

Abstract

This article explores some of the ways in which marine genetic resources conceptually and normatively intersect with the concept and idea of commons. Through an analysis of the terminological ambiguities and semantic slippages characterizing the usage of the concept of commons in international law, the article addresses questions relation to the idea of global commons and to the multiple reciprocal mapping of concepts, categories and legal regimes (can the different existing inflections of the idea of commons be considered articulations of the same underlying concept? What legal categories are associated with the multiple inflections and articulations of the concept of commons? What legal regime(s) do they, or should they, refer to?) The analysis shows that the commons is best understood as a narrative, which is then unpacked, in order to illustrate how it links in multiple ways to an ensemble of legal categories and legal regimes. Finally, the article explores how do marine genetic resources fit in this conceptual and normative narrative, in order to map the applicable regimes, and examine whether, to which extent, and in what ways, marine genetic resources are, can and/or should be considered as commons.

Keywords: marine genetic resources, global commons, areas beyond national jurisdiction; BBNJ; law of the sea; common concern; common heritage of mankind; biodiversity conservation; marine biodiversity

First published online: 27 November 2018

1. Introduction

The concept of commons has gained increasing prominence in the context of international law, as areas beyond national jurisdictions have come under increasing economic and environmental pressure, and as global natural processes and even resources located in domestic jurisdictions have begun acquiring a public interest dimension. Two key examples are climate change and the conservation

* Corresponding author details: Dr. Vito De Lucia is a Postdoc fellow at the K. G. Jebsen Center for the Law of the Sea. His research fields include international environmental law and the law of the sea, with a special focus on ocean commons, biodiversity conservation and ecosystem governance.



of biodiversity, both legally characterized as common concern of humankind.¹ Moreover, even the very ecological balance of the global environment has been recognized as a common interest of the international community, or, more precisely, an ‘essential interest’ of *all* States.² Some commentators see this as the signal of an ongoing process of emergence of an ‘international public law.’³ This public inflection of international law, Ellen Hey suggests, is characterized by the superimposition of ‘common-interest normative patterns’ over more traditional ‘inter-state normative patterns.’⁴

However, the concept of commons finds in international law a multiplicity of semantic inflections, conceptual configurations and legal articulations. The very mention of commons in an international legal context immediately brings to mind the notion of the traditional global commons, that is, the high seas, the atmosphere, Antarctica and outer space. Yet, a series of other domains or areas that fall outside of national jurisdiction, as well as of resources, processes, rights regimes and even obligations, are increasingly characterized as commons. The legal regimes applicable to these ‘commons’ are however different, and sometimes significantly so. These commons in fact intersect in ambiguous, confusing and sometimes even contradictory ways⁵ with both the underlying legal categories (*res communes*, *res nullius*, *res publicae*, etc.)⁶ and the multiplicity of semantics and conceptual inflections the concept of commons may take: common areas, common good, common goods, common interest, common concern, common heritage, community of interest, common responsibility, etc. Moreover, the same resource can be enfolded by several of these inflections at once or enfolded differently in relation to its jurisdictional location.

One exemplary instance of the latter case is offered by marine genetic resources. At the time of writing, the annual session of the United Nations General Assembly (UNGA) on Oceans and Law of the Sea has just concluded. One of the central points on the agenda was the report of the Preparatory

1 Respectively, United Nations Framework Convention on Climate Change (adopted 9 May 1992, entered into force 21 March 1994) 1771 UNTS 107 (UNFCCC) preamble, recital 1, and Convention on Biological Diversity (adopted 5 June 1992, entered into force 29 December 1993) 1760 UNTS 79 (CBD) preamble, recital 3.

2 *Gabcikovo-Nagymaros Project (Hungary v Slovakia)* (Judgment) [1997] ICJ Rep 7 [53]. See also ‘Eighth Report on State responsibility by Mr. Roberto Ago, Special Rapporteur - the internationally wrongful act of the State, source of international responsibility (part 1)’ (1980) UN Doc A/CN.4/318/Add.5-7, 27 [33].

3 Bruno Simma, ‘Universality of International Law from the Perspective of a Practitioner’ (2009) 20 EJIL 265, 268; Vaughan Lowe, ‘The Politics of Law-Making: Are the Method and Character of Norm Creation Changing?’ in Michael Byers (ed), *The Role of Law in International Politics. Essays in International Relations and International Law* (OUP 2000); Ellen Hey, ‘International Institutions’ in Daniel Bodansky, Jutta Brunnée and Ellen Hey (eds), *The Oxford Handbook of International Environmental Law* (OUP 2008).

4 Ellen Hey, quoted in Jutta Brunnée, ‘Common Areas, Common Heritage, and Common Concern’ in Bodansky, Brunnée and Hey (n 3) 552. See also Hey (n 3).

5 See eg Kathryn Milun, *The Political Uncommons: The Cross-cultural Logic of the Global Commons*, (Ashgate 2011).

6 See, in particular, Alberto Miele, “‘Res Publica’”, “‘Res Communis Omnium’”, “‘Res Nullius’”: Grozio e le Fonti Romane sul Diritto del Mare’ (1998) 26 Index 383.



Committee (PREPCOM), submitted in July 2017.⁷ UNGA had established the PREPCOM in 2015, with the mandate to prepare substantive recommendations on the elements of a draft text of an international legally binding instrument (ILBI) under the Convention on the Law of the Sea (UNCLOS), on the conservation and sustainable use of marine biological diversity in areas beyond national jurisdiction (ABNJ).⁸ On 24 December 2017, UNGA adopted a resolution convening a formal intergovernmental conference to negotiate and adopt an ILBI on such urgent theme.⁹ One of the four topics included in the negotiating agenda is marine genetic resources (MGRs), including the sharing of benefits arising from their utilization. Key issues under discussion with regard to MGRs, throughout the BBNJ process,¹⁰ and especially during the PREPCOM meetings,¹¹ involve the nature of MGRs, the regime that does and/or should govern them, and important definitional aspects. Interestingly, in the PREPCOM report, MGRs figure prominently in section B, which outlines the items on which negotiating delegations could reach neither consensus nor convergence of views in the course of the four preparatory meetings.¹² In particular, ‘further discussions’ are deemed required and necessary in relation to the question of whether MGRs could or should be considered the common heritage of mankind (CHM), or whether they do (and should) fall under the freedom of the high seas regime. The resolution of this juxtaposition is likely to affect in important ways the legal regime of MGRs in ABNJ, both from a principled and from a practical perspective.¹³

Against this background, this article will explore some of the ways in which MGRs conceptually and normatively intersect with, and are articulated through, the concept of commons. The terminological ambiguities and semantic slippages characterizing the usage of the concept of commons in international law, however, lead naturally to a number of preliminary questions. What are global

7 UNGA, ‘Report of the Preparatory Committee established by General Assembly resolution 69/292: Development of an 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’ (2017) UN Doc A/AC.287/2017/PC.4/2 (PREPCOM Report).

8 UNGA Res ‘Development of an 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’ (19 June 2015) UN Doc A/RES/69/292 [1(a)].

9 UNGA Res ‘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’ (24 December 2017) UN Doc A/72/249.

10 Which can be said to have started with the establishment of the Ad Hoc Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction: UNGA Res 59/24 ‘Oceans and the law of the sea’ (17 November 2004) UN Doc A/RES/59/24.

11 For a review of the steps of the BBNJ process up to PREPCOM II see, eg Ronán Long and Mariamalia Rodríguez Chaves, ‘Anatomy of a New International Instrument for Marine Biodiversity beyond National Jurisdiction’ (2015) 23(6) Environmental Liability 213; see also Earth Negotiations Bulletin (ENB), ‘Summary of the Fourth Session of the Preparatory Committee on Marine Biodiversity beyond Areas of National Jurisdiction’ (Volume 25, Number 141, 24 July 2017).

12 Section B in fact ‘highlights some of the main issues on which there is divergence of views’, PREPCOM Report (n 7) [38(a)].

13 Section B included also other, more specific points related to MGRs, such as the nature of MGRs, clearly linked to the previous point of divergence, and other questions linked to benefit sharing, access and the appropriate forum for addressing questions related to intellectual property rights: *ibid* Section B, 17.



commons? Can the different existing inflections of the idea of commons be considered articulations of the same underlying concept? What legal categories are associated with the multiple inflections and articulations of the concept of commons? What legal regime(s) do they, or should they, refer to? What type of resources can, or should, be qualified as commons? Exploring some of these questions will serve to prepare the terrain for exploring the legal status of MGRs, the relevant legal regime(s), and discuss these questions in the context of the ongoing BBNJ process.

The article is structured as follows. Section 2 explores the concept of commons in international law, in order to illustrate many, if not all, of its articulations and semantic as well as legal inflections. The discussion leads to re-characterizing the commons as a narrative, rather than as a concept. The idea of narrative, I suggest, is forgiving, and its flexible contours are better able to accommodate the many inflections and articulations of the commons. Section 3 unpacks the narrative of the commons, in order to illustrate how the same narrative links in multiple ways to an ensemble of legal categories and legal regimes. Section 4 discusses MGRs, their legal status and regime(s), and examine whether, to which extent, and in what ways, MGRs are, can and/or should be considered as commons. Finally, section 5 draws some conclusions.

2. Unpacking the Concept of the Commons in International Law

The concept of the commons traverses international law in multiple ways, both diachronically and synchronically. It traverses international law's historical development, intertwined with the antagonistic concept of *proprium*, in both its private and public forms: ownership and sovereignty.¹⁴ It traverses international law's conceptual and theoretical space, through a series of normative vectors that deploy the conceptual and semantic referent of the 'commons' in different, and sometimes incompatible, ways.¹⁵ It traverses, finally, international law's structural framework in problematic ways through the emerging ecological paradigm, which unsettles the linear spatial and legal boundaries of international law and points to an inherent, unavoidable ecological commonality modern international law

14 The relation between *communis* and *proprium* embodies a biopolitical dialectic (always oscillating back and forth in a Nietzschean way, never resolved in a Hegelian synthetic fashion) crucial to modernity (see in this respect Roberto Esposito, *Bíos: Biopolitics and Philosophy* (University of Minnesota Press 2008), and unfolds in a multiplicity of ways in the thought and work of many key international jurists in the early stages of modern international law, see eg Gustavo Gozzi, *Diritti e Civiltà. Storia e Filosofia del Diritto Internazionale* (Il Mulino 2010). However, modern international law has been said to embody and operationalize a juridical logic that leads to the 'uncommoning' (that is, the colonial and, subsequently, commercial appropriation) of the global and regional commons, Milun (n 5) 49.

15 On this particular question, see eg Milun (n 5) especially chapter 2.



may not be fully able to accommodate, despite ongoing attempts.¹⁶ Additionally, resources and areas beyond national jurisdiction (that is, global commons) are increasingly at the centre of legal debates in light of their (potential or actual) economic and ecological significance. This is evident from key international legal regimes (such as the climate regime)¹⁷ and from novel negotiating processes (such as the BBNJ process).¹⁸ In this respect, ideas of commons, in their various articulations, are located, as aptly observed, at the 'juncture of legal framework, sovereign discretion, collective interest and normative obligation,'¹⁹ and provide 'a site within which disputes about development and conservation are being played out.'²⁰

With regards to the law of the sea, global commons have a special significance. Indeed, two key areas framed traditionally (and despite their significantly different legal regimes), as commons, are *marine* areas: the high seas and the deep-sea bed in areas beyond national jurisdiction (the 'Area').²¹ It is, however, within the context of international environmental law that the concept of commons has had its most significant expansion in recent decades.²² Indeed, some commentators have noted how '[t]he environmental protection agenda has successfully recast "the commons" in terms of *global* commons,' which in turn has become 'a powerful political tool, but also an accurate depiction of the interdependence of ecological systems.'²³

16 Ecology seems to demand a re-design of the international legal grid of sovereign jurisdictions (or lack thereof) around notions of ecosystem relations, in this sense expanding significantly the notion of 'sharedness'. This is becoming especially apparent in the context of transboundary water resources, where the interests of non-riparian States begin to be recognized in light of the ecological interest these States may have in the resource (see eg Convention on the Protection and Use of Transboundary Watercourses and International Lakes (adopted 17 March 1992, entered into force 6 October 1996) 1936 UNTS 269 and Convention on Wetlands of International Importance especially as Waterfowl Habitat (adopted 2 February 1971, entered into force 21 December 1975) 996 UNTS 245. Concepts such as common concern also try to bring into international environmental law a 'public law' dimension (see eg Brunnée (n 4)).

17 Climate change having been defined in 2009 (by UN Secretary General Ban Ki-moon) and in 2014 (by Prince Charles of Wales) as the 'greatest challenge' humanity faces, see respectively Jon Swaine, 'Ban Ki-moon warns of catastrophe without world deal on climate change' (*The Telegraph*, 10 August 2009) <www.telegraph.co.uk/news/earth/environment/climatechange/6004553/Ban-Ki-moon-warns-of-catastrophe-without-world-deal-on-climate-change.html> accessed 1 April 2018, and Emily Godsen, 'Prince Charles: climate change is the greatest challenge facing humanity' (*The Telegraph*, 22 September 2014) <www.telegraph.co.uk/news/uknews/prince-charles/11110457/Prince-Charles-climate-change-is-the-greatest-challenge-facing-humanity.html> accessed 1 April 2018.

18 UN Doc A/RES/69/292 (n 8) see in particular [1].

19 Duncan French, 'Common Concern, Common Heritage and Other Global(-ising) Concepts: Rhetorical Devices, Legal Principles or a Fundamental Challenge?' in Michael Bowman, Peter Davies and Edward Goodwin (eds), *Research Handbook in Biodiversity Law* (Edward Elgar 2016) 334.

20 Jane B Holder and Tatiana Flessas, 'Emerging Commons' (2008) 17(3) *Social & Legal Studies* 299, 304.

21 United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 3 (UNCLOS) art 1(1)(1) states in this respect that the Area 'means the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction'.

22 Where the concept of commons plays for example a key role in framing issues and problems, Holder and Flessas (n 20) esp 304ff.

23 *ibid* 304.



The broad discursive reach of the concept of the commons, as well as its semantic field and its critical legal significance remain, however, politically and legally ambiguous,²⁴ and arguably under problematized.²⁵ Additionally, the concept and language of the commons is also problematically used to refer to a variety of incommensurable legal categories and legal regimes,²⁶ and is deployed in ambiguous, imprecise, and sometimes even contradictory ways,²⁷ as a number of semantic and conceptual slippages affects its deployment. The concept is for example, equally deployed in relation to open access²⁸ and closed²⁹ legal regimes. Moreover, the concept of commons is associated in various and sometimes ambiguous or imprecise ways with a number of (Roman) legal categories.³⁰

The category that probably has been more persistently associated with the global commons is that of *res communes omnium*. The category indicates a set of things – goods – common to all (*communes omnium hominibus*),³¹ that is, not falling under ownership of any individual, nor of any particular political community). Traditionally *res communes* are the air, flowing water, the sea and its shores.³² *Res communes* are openly, and legitimately, accessible by anyone, although the use must not impair an equivalent use by others.³³ They can be regulated, but it is usually recognized that the category admits no lawful appropriation. In this respect, medieval jurists distinguished between ownership (unlaw-

24 Obviously, the doctrinal literature on, respectively, common heritage and common concern is voluminous. However, there is arguably little critical legal scholarship on these themes nor comprehensive studies on the notion of commons in international law. For an exception, see Milun (n 5) esp chapter 2. See also, particularly in relation to law of the sea and the Grotian tradition, Miele (n 6).

25 The distinction between common good and common goods has received very little attention and thus remains under-explored. However, the two concepts, as recent scholarship shows, refer to two distinct and possibly antagonistic theoretical and normative horizons, see eg Maria Rosaria Marella, 'La Parzialità dei Beni Comuni contro l'Universalismo del Bene Comune' (*EuroNomade*, 6 May 2014) <www.euronomade.info/?p=2282> accessed 23 March 2016. See also, specifically on global commons, Milun (n 5). Moreover, resources considered common (whether common heritage or common concern) refer to a generic and universal referent (i.e. 'mankind' or 'humankind') whose conceptual and political delineation is, from a critical legal perspective, problematic. For a problematization of the use of humanity (or humankind) as a universal referent, see, in particular, Anna Grear, 'Deconstructing Anthropos: A Critical Legal Reflection on "Anthropocentric" Law and Anthropocene "Humanity"' (2015) 26(3) *Law and Critique* 225.

26 In this sense probably referring to two distinct knowledge domains: economics and law.

27 Milun (n 5) 31 observes, for example, how the CBD at once defines nature (i.e. biodiversity) as a commons (common concern) and sets the conditions for its appropriation.

28 Such as the high seas and the atmosphere (through its genealogical relation with the concept of *res communes omnium*). The linkage with open access regimes is what enables the folding of the concept of commons under a narrative of resource management 'tragedy'. For a seminal articulation of the argument, see Garret Hardin, 'The Tragedy of the Commons' (1968) 162(3859) *Science* 1243.

29 Such as the deep-sea bed, Antarctica or outer space (constructed as a common heritage of humankind and relating genealogically to the roman legal concept of *patrimonium* and, more remotely, possibly to the institute of *consortium ercto non cito*).

30 On this see, in particular, Miele (n 6).

31 Thus Celsus, D. 43.8.1.

32 'Et quidem naturali iure omnium communia sunt illa: aer, aqua profluens, et mare, et per hoc litora maris', Marcianus, D. 1.8.2(1).

33 An idea that in modern law of the sea was captured by the concept of 'reasonable regard' in the 1958 Convention on the High Seas (adopted 29 April 1958, entered into force 30 September 1962) 450 UNTS 11, and 'due regard' later in UNCLOS.



ful), use (open to all) and jurisdiction (reserved to the emperor).³⁴ The category of *res communes omnium* was, importantly, the legal basis for Grotius' theoretical argument for the freedom of the sea, and indeed the category maps closely, though not entirely, with the current regime regulating the high seas.³⁵ *Res communes omnium* is however intertwined in persistently confusing ways with the concept of common heritage of mankind,³⁶ with the category of *res nullius*,³⁷ and with the category of *res publicae*.³⁸ In relation to the former, an unfortunate equivalence still persists between common heritage³⁹ and *res communes omnium*,⁴⁰ despite the fact that common heritage is rather linked to the legal category of *patrimonium*,⁴¹ which falls under the broader category of *res in commercium*.⁴² In relation to *res nullius*, Milun observes that, in international law, the rhetoric of *res communes* – that is the framing discourse of global commons – is ambiguously conflated and often transformed into a practice based on the category of *res nullius*.⁴³ However, Milun, like arguably most contemporary commentators, does not address the fact that *res communes omnium* and *res nullius* have both the theoretical capacity to underpin particular inflections of the concept of commons.

The category of *res nullius*, and its associated terrestrial articulation *terra nullius*,⁴⁴ has provided key intellectual resources, a legitimating discourse and persuasive legal arguments underpinning the colonial enterprise rationalized through international law.⁴⁵ It also constitutes an important, if perhaps misguided, point of departure in at least *some* discussions of the idea of global commons. Vogler for example, who has written an influential book on global commons from an international relations perspective, suggests an equivalence between global commons, open access, *res nullius* and

34 'quod mare est commune quo ad usum, sed proprietas est nullius, sicut aer est communis usu, proprietas tamen est nullius [...] sed iurisdictio est Caesaris et sic ista tria sunt diversa, s[cilicet] proprietas, usus, et iurisdictio et protectio', Baldus, 'Pandectarum seu Digestum vetus iuris civilis tomus primus', Venetiis 1581, p 51, quoted in Alessandro Dani, 'Il Concetto Giuridico di "Beni Comuni" tra Passato e Presente' (2014) 6 (Paper 7) *Historia et ius* 1, 8-9.

35 UNCLOS Part VII 'The High Seas'.

36 Aaron X Fellmeth and Maurice Horwitz, *Guide to Latin in International Law* (OUP 2009) esp 250.

37 Milun (n 5) chapter 2.

38 Miele (n 6); we have seen also how international legal scholars have observed how the increasing significance of the concept of commons is the signal of an ongoing shift to public-interest patterns of normativity (Hey (n 3)).

39 For a lengthy treatment, see Kemal Baslar, *The Concept of the Common Heritage of Mankind in International Law* (Kluwer Law 1998). For a more recent general overview, see John E Noyes, 'The Common Heritage of Mankind: Past, Present, and Future' (2011-12) 40 *Denver Journal of International Law & Policy* 447. See also Brunnée (n 4). The concept of common heritage has been described as simultaneously 'all too often subject to imprecise and incautious usage' and 'little short of revolutionary' (when translated into legal regimes, Michael Bowman, 'Environmental Protection and the Concept of Common Concern of Mankind' in Malgosia Fitzmaurice, David Ong and Panos Merkouris (eds), *Research Handbook on International Environmental Law* (Edward Elgar 2010) 500.

40 Thus, Miele (n 6), but also Baslar (n 39) and Milun (n 5). For the inclusion of common heritage under the category of *res communes*, see eg Fellmeth and Horwitz (n 36) 250; indeed, the authors consider, oddly, the modern idea of common heritage and the roman legal category of *res communes* to encompass together 'the high seas, Antarctica, or celestial bodies': *ibid* 250.

41 See eg Mariachiara Tallacchini, *Diritto per la Natura. Ecologia e Filosofia del Diritto* (Giappichelli 1996).

42 The specificity of common heritage being rather the collective subject and holding title to common heritage resources, and the special governance arrangements.

43 Milun (n 5) 6.

44 An 'infamous' category in the history of international law, especially as seen from the perspective of postcolonial and decolonial studies and TWAIL scholarship, see eg Antony Anghie, *Imperialism, Sovereignty and the Making of International Law* (CUP 2004).

45 See eg *ibid* and Milun (n 5).



a primordial state of nature.⁴⁶ Yet neither *res nullius* nor open access are necessarily the ‘original characteristic’⁴⁷ of the commons, contrary to Vogler’s suggestion (which somehow follows Hardin’s own conflation of commons and unregulated open access).⁴⁸

What is important to note for our purposes though, is that while the category of *res nullius* refers to things that do not belong to anyone, it does not offer any normative indication, in and of itself, about whether or not said things may be lawfully appropriated. To understand the proprietary regime of a thing, therefore, something else is needed, another category that can interact with the category of *res nullius* in order to further define the legal regime of that particular thing. To clarify by way of an example, the general category of *res nullius* includes also the sub-categories of *res sacrae*, *res religiosae*, and *res sanctae*.⁴⁹ None of them can be appropriated by anyone: they already belong, respectively, to the Gods, to the defunct (for example, in the case of a tomb), and to the Roman people (though under divine protection). Thus, they must remain *in nullius bonis*, as they are *extra commercium*, and cannot belong to the *patrimonium* of any private individual. Indeed, the category of *res extra commercium* has a crucial place in the systematic taxonomy of things in Roman law. For reasons of space, and to avoid lengthy digressions, we cannot address this role here.⁵⁰ What is important for present purposes, however, is that there is a historical, juridical and logical connection between global commons and their double character of not being capable of appropriation by a single individual/State and being *extra commercium*.⁵¹

The category of *res nullius* however, has a second, more familiar, dimension.⁵² Indeed, it is a key concept in relation to resources that, even when located in areas governed by a regime of *res communes omnium*, can be appropriated. One example is that of marine living resources, where there is a material and legal cleavage between the idea of a fisheries or of a fish species, and the individual components.⁵³ The former is a *corpus ex distantibus*, and as such is perhaps best characterized as a *res nullius in bonis, sed universitatis*, that is, as not belonging to any individual person but to the

46 John Vogler, *The Global Commons: Environmental and Technological Governance* (2nd ed, Wiley 2000) 4.

47 *ibid.*

48 Vogler, moreover, also considers that this problematic openness of global commons, have been avoided in international law of the sea through the concept of common property (which Vogler equates, even more problematically with *res communis omnium*): *ibid.*

49 Thus, Marcianus, D. 1.8.6.2: ‘Sacrae res et religiosae et sanctae in nullius bonis sunt’.

50 But see eg Paolo Maddalena, ‘L’Ambiente e le sue Componenti come Beni Comuni di Proprietà Collettiva della Presente e delle Future Generazioni’ (Diritto all’Ambiente, 29 December 2011) <www.dirittoambiente.net/file/vari_articoli_270.pdf> accessed 1 April 2018.

51 *ibid* esp 6.

52 Grotius indeed also understood this double inflection of the notion of *res nullius*. Grotius in fact distinguished those *res nullius* that can never be appropriated, from those *res nullius* that, not having ‘been marked out for common use’, could become the object of private ownership (these would be for example individual wild animals, denoted in Roman law as *res ferae*), Hugo Grotius, *The Freedom of the Seas or The Right Which Belongs to the Dutch to take part in the East Indian Trade* (Ralph van Deman Magoffin tr, OUP 1916) 28.

53 A cleavage also operative in relation to biodiversity and its components



whole relevant (international, in our case) community.⁵⁴ The individual components, on the other hand, belong to the category of *res ferae*, wild animals that falls within the category of *res in commercium*, and can be lawfully appropriated through capture.⁵⁵ This distinction is perhaps best appreciated through the regime regulating the conservation and utilization of marine living resources in the EEZ. In the EEZ coastal States in fact, while having sovereign rights to those resources, are also under a set of obligations regarding both their conservation and the utilization vis-à-vis third States and the international community. I am not suggesting this is in any way controversial (though this broader understanding of *res nullius*, faithful to Roman law, may be from a contemporary perspective). On the contrary. My point is merely that these are some of several illustrative examples of how the narrative of the commons maps to a number of different legal categories.⁵⁶ Moreover, and by contrast, the same legal category may map to a commons or to a privately appropriable good.

3. From Concept to Narrative

In addition to what has been discussed thus far, there is an ongoing expansion of the semantic reach of the concept of commons in a multiplicity of directions. This further stretches the concept in ways that, I suggest, exceeds the ability of the concept to remain useful. This expanding reach is then more appropriately accommodated by referring to a *narrative* of the commons, insofar as its forgiving, flexible contours can capture the many inflections and articulations of the commons. While traditional global commons refer to spaces or areas beyond national jurisdiction (as already identified as the high seas, the atmosphere, Antarctica and outer space), a multiplicity of novel articulations – juridical, but also moral and rhetorical – have appeared in recent decades. These make use of the semantics of the commons, but due to their heterogeneity, are better appreciated as articulations of a broad narrative, rather than a precise deployment of a single well-delineated concept. The same consideration applies to the variability of the relationship between the (global) commons and the underlying legal categories, of which I have presented a brief illustration in the previous section. This multiplicity of semantic inflections, moreover, ambiguously refers to a different set of legal regimes. Thus, the high seas⁵⁷ and the atmosphere are subject to a regime underpinned by the idea of freedom. The Area⁵⁸

54 Of course, there is also the question of physical non-excludability, see eg Richard Barnes, *Property Rights and Natural Resources* (Hart 2009) esp 22ff, and Kevin Gray, 'Property in Thin Air' (1991) 50 Cambridge Law Journal 252, esp 269.

55 This distinction between the whole and its components is operating within the context of the CBD, where biodiversity as such is a common concern of humankind, while the individual components can be lawfully appropriated, subject only to the condition of sustainable use.

56 We have identified three: *res communes omnium*; *patrimonium*; *res nullius*. There is, further, a variety of partial overlaps or confusions, as well as normative claims, with other categories of Roman law such as *res in publico uso* or *res publicae*, which, however, cannot be discussed here, again for reason of space and to avoid unnecessary digressions. See respectively Andrea Di Porto, *Res in Usu Publico e Beni Comuni. Il nodo della Tutela* (Giappichelli 2013) and Miele (n 6).

57 UNCLOS arts 87 and 116.

58 UNCLOS art 136, see also Preamble, recital 6.



and the Moon⁵⁹ are subject to a regime of common heritage. The concept of common heritage is also variously associated with Antarctica (albeit in a *sui generis* manner),⁶⁰ with plant genetic resources,⁶¹ with the human genome,⁶² and even with human rights.⁶³ Outer space, moreover, while governed by a regime of freedom, is also considered as a common interest, and presents some of the characters associated with common heritage, particularly in its *sui generis* Antarctic articulation.⁶⁴ Whales⁶⁵ and biodiversity⁶⁶ are, in general, subject to both a regime of sovereignty and one of common concern or interest. Additionally, as mentioned, the discourse of the commons has gained increasing prominence in the context of international environmental law. Indeed, both climate change⁶⁷ and the conservation of biodiversity are considered global commons by way of their characterization as the

59 The 1979 Moon Treaty, however, explicitly declares the moon to be 'common heritage of mankind' (art 11): Agreement Governing Activities of States on the Moon and Other Celestial Bodies (adopted 5 December 1979, entered into force 11 July 1984) 1363 UNTS 3.

60 In The Antarctic Treaty (adopted 1 December 1959, entered into force 23 June 1961) 402 UNTS 71, preamble, there is no explicit mention of 'common heritage', but there is equivalent language, as Antarctica is characterized as the province of all mankind, like outer space. For a review of the different positions as regards Antarctica, and the differences between areas under frozen claims, and unclaimed areas, see eg Christopher Joyner, *Antarctica and the Law of the Sea* (Martinus Nijhoff 1992). See also eg Edward Guntrip, 'The Common Heritage of Mankind: An Adequate Regime for Managing the Deep Seabed?' (2003) 4 Melbourne Journal of International Law 376. However, outer space is subject to a regime of freedom (with the limitation of peaceful utilization), while Antarctica is subject to a strict regime that prohibits most activities, and carefully regulates the few uses that are allowed (eg scientific research and more recently tourism). It is also worthy of note that some commentators consider that the Antarctic Treaty system is rather based on the principle of common concern, see eg Dina Shelton, 'Common Concern of Humanity' (2009) 1 Iustum Aequum Salutare 33.

61 Thus, Edwin Egede, 'Common Heritage of Mankind' in Anthony Carty (ed), *Oxford Bibliographies Online: International Law* (OUP 2014), but for a contrary opinion, see Ikechi Mgbefji 'Beyond Rhetoric: State Sovereignty, Common Concern, and the Inapplicability of the Common Heritage Concept to Plant Genetic Resources' (2003) 16(4) Leiden Journal of International Law 821. Plant genetic resources, however, are expressly defined as a common concern, International Treaty on Plant Genetic Resources for Food and Agriculture (adopted 3 November 2001, entered into force 29 June 2004) 2400 UNTS 303 (PGRFA Treaty), preamble, recital 3. In this respect, I imagine that Egede follows Baslar, who authored a crucial work on common heritage, and suggested that common heritage and common concern are two sides of the same idea, if not the same concept, one applicable in ABNJ, and the other in areas within national jurisdiction, see Baslar (n 39) 106.

62 Egede (n 61).

63 *ibid.*

64 See UNGA Res 1721 (XVI) (20 December 1961) where the international community recognized 'the common interest of all mankind to peaceful uses of outer space' (preamble, recital 1), a recognition reiterated in UNGA Res 1962 (XVIII) (13 December 1963) 'Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space'. The consideration of outer space as a common interest was included also in the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (adopted 27 January 1967, entered into force 10 October 1967) 610 UNTS 205 (OST Treaty), which characterizes outer space as a 'common interest' (preamble, recital 2). The OST Treaty, however, lays out that both exploration and scientific investigation of outer space shall be free for all States (art I). Yet the OST Treaty also speaks of outer space as the 'province of all mankind' (art I) and lays out a prohibition of appropriation (art II), and of 'peaceful purposes' (art IV) as regards its utilization, characters often associated with a common heritage regime, or perhaps more broadly, idea.

65 See International Convention for the Regulation of Whaling (adopted 2 December 1946, entered into force 10 November 1948) 161 UNTS 72.

66 See UNGA Res 1721 (XVI) where the international community recognized 'the common interest of all mankind to peaceful uses of outer space' (preamble, recital 1), a recognition reiterated in UNGA Res 1962 (XVIII).

67 The UN General Assembly indeed recognized that 'climate change is a common concern of mankind, since climate is an essential condition which sustains life on earth', UNGA Res 'Protection of global climate for present and future generations of mankind' (6 December 1988) UN Doc A/RES/43/53 [1]; the UNFCCC recognizes the 'change in the Earth's climate and its adverse effects' as a common concern, preamble, recital 1.



‘common concern of humankind’,⁶⁸ a concept which may or may not be distinguished from common interest.⁶⁹ Plant genetic resources are also defined as a common concern.⁷⁰ Moreover, the ecological balance of the global environment has been recognized as a common concern of the international community, or, more precisely, an ‘essential interest’ of all States.⁷¹ Common concern in this respect is a concretization of the novel public logic of publicization of international law Ellen Hey describes,⁷² yet it shows how the concept of common and of public (by contrast precisely delineated and distinguished in the Roman legal taxonomy of things) overlap in possibly problematic ways.⁷³ Finally, the narrative of the commons is also deployed in relation to international freshwater through the notion of ‘community of interest’,⁷⁴ and global cooperation is tied to the narrative of the commons by way of the concept of ‘common but differentiated responsibility’.⁷⁵

To complicate matters further, each of these inflections refers back, in a variety of sometimes ambiguous or imprecise ways, to underlying Roman legal categories that have been used to construct arguments, buttress claims or otherwise lend legitimacy to novel political and legal articulations.⁷⁶

4. MGRs as Commons?

The two preceding sections have prepared the terrain for exploring whether, to which extent and in what ways MGRs intersect with and are enfolded by the narrative of the commons. Yet what I have illustrated in the preceding sections is admittedly a complex, and perhaps even confusing, picture. The question to ask now is how do MGRs fit in this picture? What sort of commons are MGRs? Are they commons at all? Should they be? What is their legal nature? Under which legal category do they belong? What legal regime is applicable, and under which material and legal circumstances?⁷⁷ This

68 CBD preamble, recital 3.

69 The two terms are sometimes used interchangeably, eg by Bowman (n 39); Bowman also underlines how both terms have a generic and ‘narrative’ usage early on and acquire a more specific legal meaning with the Rio Conventions (ibid).

70 PGRFA Treaty, preamble, recital 3.

71 Gabčíkovo-Nagymaros (n 2).

72 Hey (n 3).

73 See esp Miele (n 6).

74 Indeed, the PCIJ recognized how the community of interest in a navigable river becomes the basis for a common legal right, *Territorial Jurisdiction of the International Commission of the River Oder* [1929] PCIJ Series A No 23, 27. See also Stephen McCaffrey, *The Law of International Watercourses: Non-Navigational Uses* (2nd edn, OUP 2007).

75 Particularly in the context of the climate regime. See eg UNFCCC preamble and art 3.

76 This latter use of Roman law as a source of legitimacy was already widespread during the middle ages on the part of glossators. In such cases substantive (as opposed to formal) fidelity to the Roman legal categories or concepts was not a primary concern, see eg Paolo Grossi, *L'Ordine Giuridico Medievale* (Laterza 2006).

77 On the various proposals that have been put forward and discussed within the context of the BBNJ process as regards the legal regime that does or should encompass MGRs see eg Natalie Y Morris-Sharma, ‘Marine Genetic Resources in Areas beyond National Jurisdiction: Issues with, in and outside of UNCLOS’ (2017) 20(1) Max Planck Yearbook of United Nations Law Online 71.



section will endeavour to address some of these questions in two steps. First, I will briefly outline current definitions of MGRs and the state of the relevant debates (for example in relation to the scope and inclusivity of existing definitions), within the two primary contexts of reference, the CBD and the BBNJ process. This is important in order to understand both the limits of the subject matter and the complexities and uncertainties involved. The second step will review the ways in which the narrative of the commons and MGRs intersect and interact.

In the legal framework set out in the CBD, genetic resources are one of three levels of biological diversity. The CBD distinguishes in this respect ‘diversity within species, between species and of ecosystems,’⁷⁸ where ‘within species’ indicates diversity at the genetic level. Moreover, the CBD offers a definition of both genetic material and genetic resources. Genetic material means ‘any material of plant, animal, microbial or other origin containing functional units of heredity.’⁷⁹ The expression genetic resources, on the other hand, refers to ‘genetic material of actual or potential value.’⁸⁰ The difference between genetic material and genetic resources, in other words, hinges on economic value.

These definitions, however, are only a starting point, as there remains a number of open questions being considered and debated both within the context of the CBD and the Nagoya Protocol, and in the BBNJ process. One of these questions is whether the definition of genetic material does, or should, include also the notion of derivatives. A derivative is, according to Article 2(e) of the Nagoya Protocol, ‘a naturally occurring biochemical compound resulting from the genetic expression or metabolism of biological or genetic resources, even if it does not contain functional units of heredity.’⁸¹ A second and more difficult question is whether the definition of genetic resources should include genetic sequence data, that is, the genetic information in a digitalized form.

The material scope of the definition of genetic resources is indeed a controversial and contested matter, which remains under discussion in both the context of the Nagoya Protocol and the BBNJ process.⁸² However, the status of the discussion is significantly different. In the positive regime established under the Nagoya Protocol, genetic resources include both genetic material, as defined in the CBD, and derivatives, as defined in the Nagoya Protocol itself. The scope of the inclusion of derivatives is however limited, as it does not include those naturally occurring biochemical com-

78 CBD art 2.

79 CBD art 2.

80 CBD art 2. In this respect, Art 2 also explicitly includes genetic resources within the broader definition of biological resources.

81 Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity (adopted 29 October 2010, entered into force 12 October 2014) UNEP/CBD/COP/DEC/X/1 (Nagoya Protocol) art 2(e).

82 The key point of contention being the possibility that, should digital sequence data NOT be included in the relevant definitions, the entire benefit sharing agreement may be largely bypassed given the increasing importance of genetic sequence data in the development of commercial products based on MGRs, as well as the lack of material information of the origin of the genetic sequence data.



pounds that are accessed *independently* of genetic resources.⁸³ Digitalized genetic information on the other hand, are not currently included in the definition, albeit debates are still ongoing.⁸⁴ The Nagoya Protocol is, however, only competent to regulate genetic resources that are located in areas within national jurisdiction, so its relevance for the purpose of this article, and for the BBNJ process more in general, is primarily that of a starting point for discussion,⁸⁵ though it does not in any way exhaust or pre-empt definitional discussions under the BBNJ process, where, for example, the question of derivatives remains open.⁸⁶

The second context of relevance in relation to the identification of the legal regime for MGRs is, evidently, UNCLOS, which establishes the rules governing living marine resources in the different maritime zones, including areas beyond national jurisdiction. UNCLOS is indeed the legal framework of reference for the current BBNJ process, and hence for debating and deciding questions related to the legal regime of MGRs in ABNJ. As of yet, no definition has been agreed upon.⁸⁷ There is arguably a certain likelihood that relevant definitions will refer to, or incorporate, the definitions already available in the CBD. However, it is also true that there is a significant distance, among delegations, in relation to the question of whether to include, for the purposes of the benefit-sharing architecture to be adopted under the future BBNJ agreement, derivatives and, most especially, genetic sequence data, in the definitional scope of MGRs.⁸⁸ Relatedly, there are different ideas as regards whether the definitional questions, and the inclusivity of the definitional scope, should be agreed upon within a single negotiating context (namely the Nagoya Protocol); or whether discussions should be maintained separate, with the (unfortunate) consequence of a likely heterogeneity of the definitions adopted in the different contexts and legal regimes.

Having briefly reviewed the current questions related to the definitional scope of MGRs, it is now time to turn to the main question this section aims to address, that is, how the narrative of the commons encompasses, intersects and interacts with MGRs. Since MGRs are but one of the three levels of

83 This can be inferred by a combined reading of Art 15 of the CBD and Art 2 of the Nagoya Protocol: Thomas Greiber and others, 'An Explanatory Guide to the Nagoya Protocol on Access and Benefit-sharing' (2012) IUCN Environmental Policy and Law Paper No 83, 70.

84 See eg COP Decision XIII/16 'Digital sequence information on genetic resources', CBD/COP/DEC/XIII/16, which established an Ad Hoc Technical Expert Group on Digital Sequence Information on Genetic Resources with the mandate to assess '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 and implementation to achieve these objectives' [1].

85 Indeed the definitions of both the CBD and the Nagoya Protocol have been referred and included by many delegations in submissions and also in the Chair's draft non-papers throughout the PREPCOM, as well as in the 'Chair's streamlined non-paper on elements of a draft text of an international legally-binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction'; 6 <www.un.org/depts/los/biodiversity/prepcom_files/Chairs_streamlined_non-paper_to_delegations.pdf> accessed 1 April 2018.

86 eg Japan and USA suggested a definition of genetic material that does not include derivatives (nor genetic sequence data, that is digitalized information), eventually reflected in Chair's streamlined non-paper (n 85) 6 [40]. This definition was also included as option 3: *ibid* 6-7.

87 Though there are several options on the table, Chair's streamlined non-paper (n 85) 6-7.

88 *ibid*.



biodiversity, it will be expedient to begin by looking at how the narrative of the commons intersects more generally with biodiversity *tout court*. In order to do that, we need to briefly look at the early stages of the CBD negotiations, as indeed already prior to the intergovernmental conference that led to the adoption of the CBD, the narrative of the commons was an important and controversial element in relation to how to frame the legal status of biodiversity.

The first steps towards the adoption of the CBD were taken in 1987, when the Governing Council of the United Nations Environment Programme (UNEP) decided to call upon UNEP to convene an Ad Hoc Working Group of Experts on Biological Diversity to explore the ‘the desirability and possible form of an umbrella convention to rationalize current activities in [the field of biological diversity], and to address other areas which might fall under such a convention.’⁸⁹ The proposal for a comprehensive instrument came from the United States,⁹⁰ ironically the only country, together with Andorra and the Holy See, which is not a Party to the CBD today.⁹¹

The three objectives of the CBD reflect the set of competing interests that emerged during the negotiations. These competing interests aligned along a North-South split and reflected conflicting ideas as regards where the emphasis of the CBD should lie: conservation or use; access to genetic resources or benefit sharing. These competing interests were further reflected in the discussions regarding the legal characterization of biodiversity. Delegations discussed many of the articulation of the concept of commons during the pre-negotiating phase, and namely common heritage, common responsibility, common interest and common concern. The concept of common heritage was, however, very quickly problematized as it was understood to entail certain legal implications that were deemed unacceptable, by developing countries in particular, as it was seen to impinge on their sovereignty over what were forcefully defended as domestic resources.⁹² It was eventually the notion of common concern that gained consensus.⁹³

89 Decision 14/26 ‘Rationalization of international conventions on biological diversity’ in UNEP, Report of The Governing Council on the Work of its Fourteenth Session, 8-19 June 1987, General Assembly Official Records: Second Session Supplement No. 25 (A/42/25).

90 Fiona McConnell, *The Biodiversity Convention. A Negotiating History* (Kluwer Law International 1996) 5.

91 The US has signed but not ratified the CBD. However, the US participates to the work of the CBD. The main point of contention for the US was the question of intellectual property rights; see in this respect eg R Jajakumar Nayar and David Ong, ‘Developing Countries, “Development” and the Conservation of Biological Diversity’ in Michael Bowman and Catherine Redgewell (eds), *International Law and the Conservation of Biological Diversity* (Kluwer Law International 1996).

92 *ibid.*

93 It was indeed considered a ‘fundamental principle’ that ‘the conservation of biological diversity was a common concern of all people. This principle required the participation of all countries and all peoples in a global partnership. It implied inter-generational equity and fair burden sharing. The common concern called for a balance between the sovereign rights of nations to exploit their natural resources and the interests of the international community in global environmental protection; Report of the Ad Hoc Working Group of Legal and Technical Experts on Biological Diversity on the Work of its Second Session (7 March 1991) UNEP/Bio.Div/WG.2/2/5, 4 [17].



In this respect, MGRs, as one element of biodiversity,⁹⁴ are a common concern of humankind,⁹⁵ even though the precise scope of their definition remains unsettled. Yet their concrete legal regime varies significantly according to their bio-geographical and jurisdictional location, as well as with their movements across locations.⁹⁶ According to general international law,⁹⁷ and to the specific provisions contained in the CBD,⁹⁸ MGRs located within the territory of a State are subject to its sovereignty. In relation to marine areas outside of the territorial sea, including marine areas beyond national jurisdiction, it is, however, UNCLOS that more comprehensively sets out the legal regime for MGRs. In this respect, we need to distinguish between several maritime zones. In the Exclusive Economic Zone, which extends from the end of the territorial sea and up to 200 nautical miles in a seaward direction, coastal States have sovereign rights over living resources in the EEZ.⁹⁹ It appears reasonable that MGRs should be included in the notion of living resources,¹⁰⁰ and thus be subject to the same legal regime.

Concerning resources located in the continental shelf,¹⁰¹ States have exclusive sovereign rights only for mineral and other non-living natural resources and for sedentary living resources (Article 77), albeit different obligations exist in relation to the so-called extended continental shelf, that is, that portion of the continental shelf which extends beyond the 200 nautical miles limit.¹⁰² To the extent that genetic material is embedded in sedentary species, States have then exclusive rights of exploitation. However, is it not inconceivable that there may exist species that are not sedentary within the meaning of the definition of sedentary species contained in Article 77, and yet still belong to the seabed, rather than to the water column (in which case they would be subject to the regime of the relevant section of the water column, i.e. territorial sea or EEZ). In that case, it becomes essential to determine the applicable regime.

94 CBD art 2.

95 Or rather, it is their conservation that is a common concern: CBD preamble, recital 3.

96 This is indeed a well-known problem with respect to any marine resources, see eg Jung-Eun Kim, 'The Incongruity between the Ecosystem Approach to High Seas Marine Protected Areas and the Existing High Seas Conservation Regime' (2013) 2 *Aegean Review of the Law of the Sea and Maritime Law* 36.

97 eg the principle of permanent sovereignty over natural resources.

98 eg Art 15, which recognizes 'the sovereign rights of States over their natural resources, the authority to determine access to genetic resources rests with the national governments and is subject to national legislation'.

99 However, these rights over marine living resources entail corresponding duties, such as the promotion of their 'optimum utilization' (art 56), and the duty to assume responsibility for their conservation through, primarily, determining a total allowable catch (art 61). If, moreover, Coastal States do not utilize the catch quota in full, they are obliged to give other States access to the remaining surplus (art 62(2)).

100 Thus, also Petra Drankier and others, 'Marine Genetic Resources in Areas beyond National Jurisdiction: Access and Benefit-Sharing' (2012) 27 *International Journal of Marine and Coastal Law* 375, 399-400.

101 That is, that portion of the ocean floor and subsoil beyond the territorial sea and within the EEZ boundary.

102 See especially UNCLOS art 82, which requires coastal States to 'make payments or contributions in kind' as a condition for the exercise of their sovereign rights of exploitation of the resources of the shelf.



The remaining maritime zones are located beyond national jurisdiction. Both are global commons, yet their legal regimes are significantly different. The Area is subject to a regime of common heritage under Part XI of UNCLOS.¹⁰³ This regime regulates the access to, and the sharing of benefits from seabed mining activities. In fact, the term ‘resources’ is specifically taken to mean, for the purposes of Part XI, ‘all solid, liquid or gaseous mineral resources,’ whether ‘at or beneath’ the seabed (Article 133). It would appear, therefore, that MGRs, being living resources, are not encompassed by the common heritage regime, and are thus subject to the regime of the high seas (i.e. freedom). This is indeed the opinion of a number of commentators,¹⁰⁴ and of a number of delegations within the context of the ongoing BBNJ negotiations.¹⁰⁵ However, the question remains debated,¹⁰⁶ and other scholars suggest that MGRs are subject to the common heritage regime.¹⁰⁷ I will not rehearse the arguments here.¹⁰⁸ It is, however, useful to underline how *both* the Area *and* its resources are common heritage of mankind.¹⁰⁹ In that respect, it can be suggested that the regime of the Area, defined as common heritage independently from its resources (which for the purposes of UNCLOS are *mineral* resources), extends naturally to other resources it may contain, save the fact that those other resources do not fall under the specific regime governing mineral resources under Part XI. Indeed, as Oude Elferink observes, the definition of the term resources as mineral resources may be valid for the purposes of Part XI only, rather than generally.¹¹⁰ In other words, there exist arguments supporting both positions.

103 Indeed, the ‘Area and its resources are the common heritage of mankind’ (art 136).

104 See eg WT Burke, ‘State Practice, New Ocean Uses, and Ocean Governance under UNCLOS’ in Thomas Mensah (ed), *Oceans Governance: Strategies and Approaches for the 21st Century* (Law of the Sea Institute, University of Hawaii 1996) 231; Robin Churchill and Vaughan Lowe, *The Law of the Sea* (3rd edn, Manchester University Press 1999) 239, in whose opinion both living and other non-mineral resources remain outside of the regime of the Area, and a such subject to the high seas regime, fn 49. Further on the different positions see Youna Lyons and Denise Cheong, ‘The International Legal Framework for the Protection and Sustainable Use of Marine Biological Diversity’ in Charles McManis and Burton Ong (eds), *Routledge Handbook of Biodiversity and the Law* (Routledge 2017) 73-74.

105 Indeed, MGRs, their legal status and the relevant legal regimes are among the most contentious issues in the BBNJ process, see eg PREPCOM Report (n 7) particularly Section B.

106 The existence of ‘divergent views’ on the matter was indeed reported by the Co-Chairpersons of the Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction, UN Doc A/63/79 [36], and divergence is still a key element of the BBNJ process, especially in relation to the legal status of MGRs, see in particular PREPCOM Report (n 7) particularly Section B.

107 See eg Tullio Scovazzi, ‘The Concept of Common Heritage of Mankind and the Genetic Resources of the Seabed beyond the Limits of National Jurisdiction’ (2007) XIV:25 Agenda Internacional 11; Drankier and others (n 100); Alex Oude Elferink, ‘The Regime of the Area: Delineating the Scope of Application of the Common Heritage Principle and Freedom of the High Seas’ (2007) 22(1) International Journal of Marine and Coastal Law 143. Others recognize the usefulness of the common heritage framework in relation to living resources of the Area, thus eg Tullio Treves, ‘Protection of the Environment on the High Sea and in Antarctica’ in Kalliopi Koufa (ed), *Protection of the Environment for the New Millennium* (Sakkoulas Publications 2002) esp 91.

108 The reader is referred to the clearest exposition of this argument, namely Oude Elferink (n 107).

109 UNCLOS art 136.

110 For a fully developed argument in this sense, see Oude Elferink (n 107) See especially his remark that art 145(b) UNCLOS mentions ‘natural resources’ hence suggesting that there are resources of the Area besides and beyond the ‘mineral resources’ defined in art 133, *ibid* 152, fn 33. Elferink also makes the argument that art 133 ‘does not provide that PART XI is only applicable to mineral resources’ (*ibid* 152), and that the definition of the term resources is not exhaustive (*ibid* 152). See also Drankier and others (n 100) esp 402-03.



The high seas maritime zone is a residual notion¹¹¹ and is governed by a regime of freedom.¹¹² MGRs that are located in the water column of the high seas are thus logically subject to a regime of freedom (indeed two activities that are directly relevant, albeit in different ways, for MGRs are explicitly listed among the high seas freedoms in Article 87: fishing and marine scientific research). We are thus faced with many different regimes applicable to the same resource (MGRs) according to its location. Additionally, as already noted, the location of MGRs is dynamic, in a variety of senses. In relation to the general capacity for motion of the relevant organisms, MGRs may appear in different maritime zones, as they move or straddle across them. MGRs may also migrate from maritime zone to maritime zone throughout their life cycle, or their regime may depend on the particular stages at which they relevant organisms are harvested.¹¹³ This dynamism, moreover, may entail iterative crossings between maritime zones in a multiplicity of senses: from various areas beyond to various areas within national jurisdiction, as well movements between different areas beyond national jurisdiction (eg between the water column and the ocean floor, or vice versa).

What has emerged thus far is that the legal regime of MGRs is quite heterogeneous. However, as already underlined, MGRs are, regardless of their particular location or legal regime, the common concern of humankind, and as such remain enfolded within the narrative of the commons. The concept of common concern, moreover, may serve, to some extent, to render the lack of homogeneity between legal regimes less problematic, as it introduces a need to balance sovereign rights to exploit MGRs and common interests to their conservation, and, arguably, to the adoption of equitable benefit sharing arrangements. As already mentioned in the introduction, common concern introduces a public dimension to the otherwise traditionally private-law inspired inter-state architecture of international (environmental) law.¹¹⁴ An additional aspect that it is useful to mention is that some commentators suggest that common concern is but a manifestation, or an articulation of the principle of common heritage, with an operational scope limited to resources under the sovereignty of a State.¹¹⁵ And while it is important to reiterate how common concern refers more precisely to the *conservation* of biodiversity (and thus of MGRs), MGRs remain in various ways enfolded within the narrative of the commons, and this circumstance has indeed specific though variable,¹¹⁶ legal implications.

In addition to the variety of legal regimes applicable to MGRs in accordance with their physical location, a further set of complexities must be briefly presented. There exist problematic lines of demarcation that in a number of cases make the neat determination of the geographical and legal space

111 The high seas encompass 'all parts of the sea that are not included in the exclusive economic zone, in the territorial sea or in the internal waters of a State, or in the archipelagic waters of an archipelagic State', UNCLOS art 86.

112 UNCLOS art 87.

113 As is the case, for example, in relation to sedentary species, whose definition as sedentary species is linked to a characteristic (their location and mobility) at a particular life stage, that is, 'at the harvestable stage', UNCLOS art 77(4).

114 Holland famously observed how the 'Law of Nations is but private law writ large': Thomas Holland, *Studies in International Law* (Clarendon Press 1898) 151; Lauterpacht would further expose the depth of this private law pedigree in his seminal *Herst Lauterpacht, Private Law Sources and Analogies of International Law* (Longman Greens and co. 1927).

115 Baslar (n 39).

116 In relation to scope and intensity of this enfolding. See French (n 19) for some preliminary reflections, not as regards MGRs specifically, but more broadly on the potential legal value of common concern.



that defines the legal regime of MGRs quite difficult. Some of these problematic lines of demarcation are geographical and/or jurisdictional. Others are related to the nature of the activities relevant to the harvesting of MGRs. Finally, others relate to the material substrate of the resource and its different legal characterization.

The first set of problematic lines of demarcation relates to geographical and jurisdictional fragmentation. The key issues are whether, to which extent and under which conditions it is possible to precisely locate MGRs in a particular maritime zone. This is, as we have seen, an important question, as the location determines the applicable legal regime. As we have seen, movements between maritime zones already pose some problems. However, even more problematic are those cases where ascertaining whether a particular spatial area is, for example, part of the high seas or of the ocean floor, is difficult. One first example relates to hydrothermal vents.¹¹⁷ Hydrothermal vents are characterized by large chimneys formed by the precipitation of the minerals contained in the so-called 'smokers,' that is plumes of mineral-rich water that are expelled upwards from beneath the seafloor. Heated water may additionally also appear as diffuse flow of fluids that surrounds the vent field. There is a clear difference in the chemical composition between vent fluids and the surrounding seawater. Importantly, the large majority of the very specialized fauna that is to be found in hydrothermal vents ecosystems is localized where seawater and vent fluids mix. In this respect, it may not be entirely straightforward to establish whether organisms found in the extreme ecosystems of hydrothermal vents belong to the seabed, ocean floor and subsoil thereof, or to the superjacent water column, as the distinction between the latter and the gas chimneys of hydrothermal vents is not, from a legal perspective, entirely clear.¹¹⁸ Additionally, some commentators argue that minerals found in the smokers belong to the Area,¹¹⁹ which would lead to the conclusion that living organisms found in the smokers would have to belong to the Area also.

A similar question arises in relation to brine pools. Delineating a clear distinction between the water column and ocean brine pools located on the ocean floor, whose waters remain separated from the water column due to differences in salinity and density, may also not be straightforward, and indeed such separated waters may be considered to belong to the ocean floor. If that were to be the case, MGRs located in such brine pools would fall under the regime of the Area. Similar yet distinct questions arise in relation to the delineation of boundaries between maritime zones, for example between the high seas water column and the extended continental shelf or between the extended continental shelf and the Area.

These questions have been explored before in the literature,¹²⁰ so my aim here is not to articulate a novel argument, but rather that of illustrating the type of complexities that affect the legal status and regime of MGRs. Importantly, these interactions between different maritime zones, with distinct and incommensurable legal regimes, and especially the one between the extended continental shelf and

117 The information of hydrothermal vents contained in this section are based on Maria C Baker and others, 'An environmental perspective' in WWF/IUCN (eds), *The Status of Natural Resources on the High Seas* (WWF/IUCN 2001) 15-16.

118 See eg Drankier and others (n 100) 406ff.

119 Thus, Burke (n 104) 231.

120 See especially Oude Elferink (n 107) and Drankier and others (n 100).



the high seas, have been indeed highlighted as one of the areas that will define the future development of the law of the sea.¹²¹

Another line of demarcation that makes the delineation of a clear legal regime for MGRs difficult, having particularly in mind the benefit sharing architecture that should frame the exploitation of MGRs, is the line that separates marine scientific research and bioprospecting. This question has been debated at length in the literature,¹²² but there remain crucial uncertainties as regards both marine scientific research and bioprospecting, in terms of delineating the boundaries between the two activities, as both lack a clear and uniformly accepted definition.¹²³ This delineation is important to the extent that marine scientific research in ABNJ enjoys a regime of freedom,¹²⁴ while bioprospecting is being discussed in the BBNJ process with a view to adopting a regulatory framework concerning (mainly to restrict) access and establish rules for the sharing of benefits.¹²⁵ Yet distinguishing between them – for example in terms of ‘pure’ scientific research and ‘applied’ scientific research – may prove very difficult,¹²⁶ or even impossible.¹²⁷

A third, and final, line of demarcation that can be mentioned before moving on to drawing some concluding reflections, is the one that relates to the delineation of resources, and more precisely between fish as a commodity and fish as MGRs. The discussion within the BBNJ process is clearly oriented towards establishing a clear distinction between the two, yet the details, and the potential implications, are yet to be explored, let alone agreed upon.¹²⁸

121 Donald R Rothwell and others, ‘Charting the Future for the Law of the Sea’ in Donald R Rothwell and others (eds), *The Oxford Handbook of the Law of the Sea* (OUP 2015) 892.

122 See eg Tullio Scovazzi, ‘Protection of the Environment, Scientific Research and Bioprospecting: Some Considerations on the Role of the International Sea-Bed Authority’ (2004) 19 *The International Journal of Marine and Coastal Law* 383; Sharelle Hart, ‘Elements of a Possible Implementation Agreement to UNCLOS for the Conservation and Sustainable Use of Marine Biodiversity in Areas beyond National Jurisdiction’ (2008) IUCN Environmental Policy and Law Papers, Marine Series No 4; Louise Angélique de La Fayette, ‘A New Regime for the Conservation and Sustainable Use of Marine Biodiversity and Genetic Resources Beyond the Limits of National Jurisdiction’ (2009) 24 *The International Journal of Marine and Coastal Law* 221.

123 While marine scientific research is addressed in Part XIII of UNCLOS, there is no legal definition. As regards bioprospecting, there is no official definition, though the practice is ‘generally understood as the scientific investigation of living organisms for commercially valuable genetic and biochemical resources’, de La Fayette (n 122) 228.

124 See UNCLOS arts 256 (for the Area) and 257 (for the high seas), though subject to the limitation of art 240.

125 The regulation of access may indeed apply only in relation to bioprospecting, see Chair’s streamlined non-paper (n 85) 15, yet if there is no practical way to distinguish between the two, any regulation may prove pointless.

126 Hart (n 122) 16.

127 Scovazzi for example maintains that ‘it impossible to establish a clear-cut distinction between one activity and the other and between one purpose and the other. A research endeavour organized with the intent to increase human knowledge may well result in the discovery of commercially valuable information and vice versa’: Scovazzi (n 107) 18.

128 eg in the Chair’s streamlined non-paper (n 85) fish is addressed in two parts, under ‘use of terms’ (‘Definition must take into account the distinction between fish used for its genetic properties and fish as a commodity’), and under ‘material scope’ (in relation to ‘Fish and other biological resources used for research on their genetic properties’ it is suggested that a ‘scientifically-informed threshold would be established, whereby if a particular (fish) species is extracted or harvested for the purpose of bioprospecting for marine genetic resources beyond a certain amount (depending on species and habitat variability), it would be considered a commodity. Such threshold could be elaborated by a scientific/technical body under the instrument’), respectively 7 and 14.



5. Conclusions

In this article, I have endeavoured to explore some of the ways in which MGRs are conceptually and normatively enfolded within, and articulated through, the concept of commons. Indeed, we have seen how what I have reframed as the *narrative* of the commons traverses and envelops MGRs in a multiplicity of ways. However, regardless of the consideration of MGRs as a commons, or the ways in which the narrative of the commons enfolds MGRs, it is also important to understand the particular legal regime underlying any one inflection of the narrative of the commons with respect to MGRs. The article has thus also endeavoured to show how these two dimensions have a variable relation, and that the narrative of the commons, and some of its underlying concepts, are linked in complex ways to a variety of legal categories and legal regimes. The latter in particular vary, even significantly, in relation to the physical and legal localization of MGRs in diverse maritime zones, a location that, moreover, may vary over time for the same organism. Two questions remain, however. The first is whether the heterogeneity of legal regimes is, in fact, a problem. In other words, the question is whether the legal regime of MGRs should be determined exclusively by the maritime zone where MGRs are located, or whether, by contrast, the nature of the resource should determine the appropriate legal regime regardless of the maritime zone(s) where it is found. The second question relates to whether it is either possible, or useful, to bring MGRs under *one* inflection of the narrative of the commons, and if so, which one.

As we have seen, there are many perspectives from which to approach the question of the legal status of MGRs, as well as a divergence of views among both legal scholars and States. Indeed, the systematization and harmonization of the legal regime of MGRs is both difficult theoretically and controversial politically. What is arguably needed, is a practically useful and theoretically sound notion capable of articulating a coherent yet sufficiently flexible legal framework. The principle of common concern may be one such idea.¹²⁹ More than any other inflection of the narrative of the commons, in fact, common concern seems capable of accommodating most, if not all, the tensions inherent in the complex issues raised by MGRs. Both the (potential or actual) multiplicity of legal regimes and the difficult delineation of the MGRs in the boundary areas discussed at the end of the previous section can be addressed from the perspective of common concern, given its neutral stance as regards questions of title and/or sovereignty.

As already mentioned, MGRs (or rather, the conservation of biodiversity of which they are one constitutive element) are already a common concern of humankind. The advantage of utilizing the principle of common concern in relation to MGRs is that it is, in part, already applicable. Moreover, common concern has a broad scope, and can more easily include the multiplicity of legal regimes that are (potentially or actually) already associated with MGRs in the various maritime zones. Because the question of title is not relevant for the purposes of characterizing a resource as a common

¹²⁹ As argued for example by one of IUCN's submission to the PREPCOM process, where the principle of common concern was put forward as a 'pragmatic solution', IUCN Intervention on applicable principle to Marine Genetic Resources, PREPCOM 3.



concern (nor for the legal effects of such characterization to be effective), common concern is thus able to accommodate otherwise problematic state changes (eg the transition from juvenile to harvestable stages relevant for the legal regime of sedentary species), as well as movements across maritime zones, and, finally, situations where the association with one or another maritime zone is unclear, difficult to determine or controversial (such as the case of hydrothermal vents or brine pools).

Other advantages of the principle of common concern are that it is able to articulate a balance between the sovereign rights of nations to exploit their natural resources and the interests of the international community in global environmental protection, though this particular aspect is not so pressing for resource located in ABNJ. Moreover, and this is indeed an important aspect of common concern, the principle is a key element of a broader process of publicization of international (environmental) law. According to Birnie, Boyle and Redgwell, the concept of common concern has a crucial function towards the globalization of the scope and normative reach of international environmental law, which it can no longer be characterized 'as simply a system governing transboundary relations among neighbouring States'.¹³⁰ Similarly, Judge Weeramantry emphasized how international environmental law must be always put in relation to 'global concerns of humanity as a whole'.¹³¹ In this respect, common concern is a key element in the already mentioned process where 'common-interest normative patterns' are gaining traction vis-à-vis more traditional 'inter-state normative patterns'.¹³²

Considering MGRs as common concern may be beneficial from the particular point of view of conservation vis-à-vis the variety of legal regimes that may obtain in the different maritime zones. However, it must be kept in mind that from the point of view of resource extraction and exploitation, as already observed,¹³³ common concern may fall short of satisfying the political aims and legal requirements for a regime of access and benefit sharing.

These questions, however, cannot be settled here. By way of conclusion then, it shall be sufficient to observe how, like international law more broadly, MGRs are traversed by a multiplicity of conceptual and normative vectors that reproduce the tensions that exist between a narrative of the commons and a narrative of resource ownership or sovereignty, between the *communis* and the *proprium*. The same tensions are present and are under discussion within the context of the BBNJ process, and it is certainly a possibility that the legal regime applicable to MGRs that will be adopted in the new agreement will be heterogeneous, and treat MGRs located in the Area and those located in the high seas differently. Yet, in both cases, MGRs will inevitably intersect with the narrative of the commons, and that may facilitate a common architecture for benefit sharing, if not of access, and rules aimed at conserving MGRs as a common concern of humankind.

130 Patricia Birnie, Alan Boyle and Catherine Redgwell, *International Law and the Environment* (OUP 2009) 130.

131 Gabčíkovo-Nagymaros (n 2), Separate Opinion of Vice-President Weeramantry, 115.

132 Hey (n 3) 552.

133 Morris-Sharma (n 77) 90.

Marine Genetic Resources in Areas beyond National Jurisdiction: Do We Need to Regulate Them in a New Agreement?

David LEARY*

Abstract

This paper seeks to question the prevailing orthodoxy on the need for the 'package deal' on the proposed international legally-binding instrument under UNCLOS on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction to address marine genetic resources, including questions relating to access and benefit sharing. Through an examination of key documents and reports prepared over the past two decades, the first part of this paper will show that there has been little hard commercial evidence brought forward during debates at the United Nations to justify the inclusion of the marine genetic resources issue within the 'package deal'. In light of that analysis, the second part of the paper will then go on to offer some initial thoughts on the various options for regulating access and benefit sharing in relation to marine genetic resources in areas beyond national jurisdiction that have been floated during the initial phase of negotiations. In particular, the second part of this paper examines the possible elements of a draft text of an international legally binding instrument set out in the chairs non-paper considered at the 3rd session of the Preparatory Committee established by General Assembly Resolution 69/292. The paper does not seek to trace the extent to which aspects of the chairs non-paper ultimately were contained in the Prep Comm's final report to the United Nations General Assembly in late 2017. These negotiations are still ongoing and nothing definitive can be read into what was present or absent from that report. Instead, this analysis highlights which proposed elements of the international legally binding instrument would be the preferable outcome from these negotiations in light of the lack of evidence of commercial interest in marine genetic resources in areas beyond national jurisdiction.

Keywords: marine genetic resources, areas beyond national jurisdiction, international legally binding instrument

First published online: 27 November 2018

*Corresponding author details: Dr. David Leary, Associate Professor, Faculty of Law, University of Technology Sydney, Australia. Email: david.leary@uts.edu.au. The author thanks his research assistant Eric Law for assistance with this paper.



1. Introduction

On 19 June 2015, the United Nations General assembly passed Resolution 69/292¹ which committed States to develop an international legally binding instrument under the 1982 *United Nations Convention on the Law of the Sea* (UNCLOS)² on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction. Critically Resolution 69/292 mandates that the international legally binding instrument must address:

the topics identified in the package agreed in 2011, namely the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction, in particular, together and as a whole, marine genetic resources, including questions on the sharing of benefits, measures such as area-based management tools, including marine protected areas, environmental impact assessments and capacity-building and the transfer of marine technology.³

In essence, Resolution 69/292 sets up the negotiations for an international legally binding instrument under UNCLOS on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction as a 'package deal' - that is to say, all issues are to be addressed or no issues will be addressed. This approach to the negotiation of an international legally binding instrument should come as no surprise to even the most casual observer of these debates. These issues have become increasingly intertwined in the discussions at the United Nations (UN) over the past decade and a half, especially during the work of the Ad Hoc Open-ended Informal working group to study issues relating to the conservation and sustainable use of marine biological diversity in areas beyond national jurisdiction (the Ad hoc Working Group).⁴ All the issues relating to the conservation and sustainable use of biodiversity in areas beyond national jurisdiction (ABNJ) are interrelated and are best addressed as a package deal, assuming that is that each element of the package deal actually merits regulation.

This paper seeks to question the prevailing orthodoxy on the need for the 'package deal' to address the marine genetic resources (MGR) issue, including questions relating to access and benefit sharing. Through an examination of key documents and reports prepared over the past two decades, the first part of this paper will show that there has been little evidence of commercial interest brought forward during debates at the UN to justify the inclusion of the MGR issue within the 'package deal'. In light of that analysis, the second part of the paper will then go on to offer some thoughts on the various

1 UNGA Res 69/292 'Development of an 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' (19 June 2015) UN Doc A/RES/69/292.

2 United Nations Convention on the Law of the Sea (opened for signature 10 December 1982, entered in force 16 November 1994) 1833 UNTS 3 (UNCLOS).

3 UNGA Res 69/292 (n 1) para 2.

4 For a concise overview of the history of discussions on the issue see Elisa Morgera and others, 'Third session of the Preparatory Committee on Marine biological diversity beyond areas of national jurisdiction: 27 March-7 April 2017' (2017) 25(119) *Earth Negotiations Bulletin-PrepCom* 3.



options for regulating access and benefit sharing in relation to MGR in ABNJ currently on the negotiating table. In particular, the second part of this paper examines some aspects of the possible elements of a draft text of an international legally binding instrument set out in the chairs non-paper⁵ which was considered at the 3rd session of the Preparatory Committee (Prep Comm III) established by General Assembly Resolution 69/292. The analysis in the second part of this paper will highlight which proposed elements of the international legally binding instrument would be the preferable outcome from these negotiations in light of the lack of evidence in relation to commercial interest in MGR in ABNJ. It should be noted, however, that it is not the author's intention that this final part of the paper trace the extent to which aspects of the chairs non-paper ultimately were contained in the Prep Comm's final report to the UN General Assembly⁶ in late 2017. Given the negotiations for the international legally binding instrument are yet to be concluded nothing definitive can be read into what was present or absent from that report. Some of these elements may or may not ultimately be incorporated into the final international instrument. Instead, the aim of the second part of this paper is to highlight what in the author's view would be the optimal outcome on some of the key issues which have been flagged in the chairs non-paper. Whether these optimal outcomes will or will not be achieved it is too early to say.

2. 'Alternate facts' and debates on marine genetic resources

In a recent opinion piece published in *The Guardian*, cell biologist Jenny Rohn from University College London lamented:

The recent jaw-dropping performance of Donald Trump and his cronies, firing off random statements without even bothering to check whether they are true, is not as disturbing as the fact that they seem to be getting away with it. It is no longer enough for a reputable press outlet to cry foul – the corrections are shrugged off as partisan conspiracy theorists, and the exposé no longer leads to shame, or the mending of ways. Say something loud enough and often enough, and it starts to sound true. Get away with it enough, and it becomes a viable strategy.⁷

While that commentary related to attacks on science and scientists that regrettably have come to characterize what passes for policy-making in the 'post-truth world' of the Trump Presidency, it is arguable that a similar phenomenon can also be observed in debates on MGR at the UN over the past decade and a half. That is to say, certain 'alternate facts' relating to the level and extent of com-

5 UN, 'Chair's non-paper on elements of a draft text of an 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' (2017) <www.un.org/depts/los/biodiversity/prepcom_files/Chair_non_paper.pdf> accessed 9 May 2017 (UN Paper).

6 UNGA, 'Report of the Preparatory Committee established by General Assembly resolution 69/292: Development of an 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' (2017) UN Doc A/AC.287/2017/PC.4/2.

7 Jenny Rohn, 'Scientists can't fight 'alternate facts' alone' *The Guardian* (London, 25 January 2017) <www.theguardian.com/science/occams-corner/2017/jan/25/alternative-facts-experts-scientists-fight-alone-humanities> accessed 27 April 2017.



mercial interest in MGR in ABNJ have repeatedly been asserted loud enough and often enough that they have now come to be accepted as fact even though the supporting evidence for these claims is woefully lacking.

The ‘alternate facts’ that I am referring to here are repeated assertions that there is huge industry interest in the commercialization of MGR from ABNJ; that numerous products are already on the market or are very close to commercial sale; and that massive profits are already being reaped by developed country companies without any equitable sharing of these benefits with developing countries. These ‘alternate facts’ in turn are used to justify the need for the proposed legally binding instrument to address access and benefit sharing in relation to MGR in ABNJ.

What evidence is there to support the ‘alternate facts’? In this paper three key sources will be examined: the Annual Reports of the UN Secretary-General on Oceans and the Law of the Sea (2.1); reports, documents and presentations made as part of the UN Open-ended Informal Consultative Process on Oceans and the Law of the Sea (UNICPLOS) and the Ad Hoc Working Group (2.2-2.3); and key academic and scholarly studies published over the past decade and a half (2.4).

2.1 Annual Reports of the UN Secretary-General on Oceans and the Law of the Sea

A useful place to start our search for evidence supporting these ‘alternate facts’ is to review the annual reports of the UN Secretary-General to the UN General Assembly. While scholarly engagement with the marine genetic resources issue began in 1996 with the publication of Lyle Glowka’s seminal paper on marine scientific research, genetic resources and the Area,⁸ the first discussion of the issue in the UN Secretary-General’s report was in 1995. The 1995 report observed:

In the field of marine biology, new discoveries of marine creatures dwelling on or in seabed ooze, often miles deep, thriving in pitch darkness under an enormous pressure, have led experts radically to revise upwards their rough estimates of the number of species of all types of marine life from 200,000 to between 10 million and 100 million, which is the same as the range projected by the possible total number of terrestrial species. The newly recognized creatures are considered important because of their *possible commercial value* as well as because of their role in maintaining the earth’s ecological balance. The *potential commercial value* of the new organisms lies in their great genetic diversity. The aim is to use their exotic genes to develop new drugs, catalysts and agents that can break down wastes...[G]rowing attention is being paid to investigations on the commercial uses of exotic undersea and deep earth species. For example, a company based in San Diego, California is looking for bacterial enzyme adapted to high temperature and intense pressures that *might be industrially useful*. ... Some of the microbes are already being scanned for antibiotics and agents that might help fight diseases. Japanese biologists have begun a major effort to retrieve microbes from the deep, and perhaps to make a new drugs and tools for genetic engineering.⁹

8 Lyle Glowka, ‘The Deepest of Ironies: Marine Scientific Research, Genetic Resources and the Area’ (1996) 12 *Ocean Yearbook* 154.

9 Report of the Secretary-General, ‘Oceans and the law of the sea’ (1995) UN Doc A/50/713, paras 240-43 (emphasis added).



Several points are worth noting about these initial observations on MGR in 1995. Firstly, the discussion refers only to 'potential' or 'possible' commercial value. One example of commercial research and development, namely an un-named San Diego based company is referred to. But this single example related to research and development and not the actual commercialization of a product. Thus, in the first UN Report to refer to the status of MGR in ABNJ there was no suggestion that possible or potential commercial value had at all been realized. The report is speaking as to something that may or may not occur in the future; activities may or may not be happening now.

The following year, 1996, the Secretary-General's report again referred to 'the scientific and commercial value of deep seabed genetic resources'¹⁰ but did not provide any evidence as to the nature and scale of that interest. Despite this, 1996 could potentially have been the year when significant evidence on the nature and scale of commercial interest could have been forthcoming as this was the first occasion a detailed study of this issue was undertaken by a UN Body. At the second Conference of Parties (COP) to the 1992 *Convention on Biological Diversity* (CBD)¹¹ parties passed a resolution requesting the CBD Secretariat in consultation with the UN Office for Ocean Affairs and the Law of the Sea to undertake a study of the relationship between the CBD and UNCLOS with regard to the conservation and sustainable use of genetic resources on the deep sea-bed.¹² As the first report by a UN body on the issue, one might have hoped that as a starting point the report would review what is known about the level of scientific and commercial interest in MGR in ABNJ. But the report failed to give any real evidence on either the nature or level of either scientific or commercial interest in MGR from areas beyond national jurisdiction. In fact, in a number of parts, the report highlights the lack of evidence. Thus, in the context of its initial consideration of regulatory options the report observed:

At the moment any consideration of these long-term considerations is hampered by a lack of information and knowledge surrounding the use of genetic resources from the deep sea-bed. Without this basic knowledge, decisions about the type of control that is to be preferred, possible or even practical cannot be made.¹³

Even more significantly later in the context of the report's description of how marine scientific research is carried out, the same report observes:

Obviously, access to marine genetic resources, especially from the deep sea-bed poses some significant problems that limited the use of these resources by biotechnology. Currently, *there is little reliable information on the collection of these resources, and what does exist is largely unsubstantiated.*¹⁴

¹⁰ Report of the Secretary-General, 'Oceans and the law of the sea' (1996) UN Doc A/51/645, para 229.

¹¹ Convention on Biological Diversity (opened for signature 5 June 1992, entered in force 29 December 1993) 31 ILM 818 (CBD).

¹² CBD, 'Conference of Parties, 2nd Meeting, Decision II/10', para 12 <www.cbd.int/decision/cop/default.shtml?id=7083> accessed 27 August 2018.

¹³ CBD Subsidiary Body on Scientific, Technical and Technological Advice, 'Bioprospecting of genetic resources of the deep sea-bed-Note by the Secretariat' (24 July 1996) UN Doc UNEP/CBD/SBSTTA/2/15, para 19.

¹⁴ *ibid* para 43 (emphasis added).



On the scale of the market for commercial use of MGR from ABNJ, and the deep sea in particular, the report goes on to conclude:

The extent to which new, commercially useful extremophile may come from the deep sea-bed is not known. *Consequently, the economic value of this market is entirely speculative and, to date, unrealized.*¹⁵

Thus, the first detailed report on the issue by a UN body concluded there is little evidence of commercial uses of MGR in ABNJ. Despite these unambiguous conclusions the report unfortunately undermined these very clear conclusions by examining the level of interest in MGR in coastal waters (i.e. in areas within national jurisdiction) conflating that with the potential for ABNJ. It is in this context that we first start to see vast figures being quoted relating to biotechnology with little precision or verification. For example, in commenting on the market for enzymes a figure of at least \$600 million is quoted.¹⁶ No evidence is provided in that context as to the source of those enzymes. Were they from the terrestrial environment or from a marine source? Useful enzymes have been sourced for biotechnology from both the terrestrial and marine environments and predominately from within areas of national jurisdiction. Subsequent discussion in the paper goes on to discuss the Taq DNA polymerase as an example of a commercially valuable enzyme, even though this was sourced from a terrestrial geyser in Yellowstone National Park. Perhaps more critically, the source cited for this figure is not the peer-reviewed scientific or economics literature, not a potentially reliable source such as the OCED, the World Bank or some other reliable industry indicator. Rather the source for the subsequently off quoted figure is a newspaper article published in the *New York Times*, albeit an article written by a Pulitzer Prize winner.¹⁷ Subsequent discussion on deep-sea hydrothermal vents in the report also cites articles from other publications such as the *Financial Times* and the *Nikkei Weekly*. While I am not criticizing the author of the *New York Times* article cited (and I acknowledge the other newspapers cited are also credible factual and accurate news sources), basing major international reports like this on newspaper articles over peer-reviewed scientific or economics literature is sloppy research methodology, to say the least, and should not play any part in contributions to major policy debates like the MGR issue.

Unfortunately, subsequent reports are also scant on any detail to support the case for regulation. From 1997 until 2003 there is little useful or additional information on the nature and scale of commercial interest in MGR sourced from ABNJ contained in the Reports of the UN Secretary-General on oceans and the law of the sea. One example of an unnamed enzyme sourced from a hydrothermal vent is mentioned in the 1999 Secretary-General's Report, but no information is provided as to

¹⁵ *ibid* para 65 (emphasis added).

¹⁶ *ibid* para 53.

¹⁷ The source of this figure cited in the bibliography of the report is William Broad, 'Strange oases in sea depths offer map to riches' *New York Times* (New York, 16 November 1993). See Subsidiary Body on Scientific, Technical and Technological Advice (n 13) para 17.



whether that was sourced from within or beyond national jurisdiction.¹⁸ Discussion on MGR, to the extent there is any, relates to MGR sourced from areas within national jurisdiction.¹⁹

The 2003 Secretary-General's Report sheds no further light on the nature and scale of commercial interest in MGR in ABNJ, although it does refer expressly to the report prepared in 2003 for the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) of the CBD on the relationship between the CBD and UNCLOS with regard to the conservation and sustainable use of genetic resources on the deep seabed.²⁰ This rather pedestrian report examines the perceived lacuna in the law and then goes on to set out options for possible regulation of MGR in ABNJ. Like the reports that have come before, it lacks any evidence on the nature and scale of commercial interest in MGR in ABNJ. Curiously, this report does, however, suggest how bioprospecting in ABNJ is carried out observing:

The exploitation of deep seabed genetic resources implies a succession of value-adding activities, from exploration through laboratory analysis to the eventual commercialization. The initial steps of exploration, sampling and analysis in the chain of those activities and processes is referred to as bioprospecting. Some of those activities are carried out *in situ* while others, such as analysis and testing, which refer to the notion of use, are carried out in laboratories, i.e. in *ex situ* conditions.²¹

The 2004 Report on Oceans and the Law of the Sea by the UN Secretary-General also failed to provide any further information on the nature and scale of commercial interest although the increasingly familiar unsubstantiated refrain of a 'vast reserve of economically, scientifically and environmentally valuable compounds, materials and organisms'²² is repeated yet again in the 2004 Report. The report also only speaks of possible rather than actual documented uses when it observes:

Bacteria from seeps contain novel genes that *may be useful* to the biotechnology industry. For example, applications such as the treatment of oil pollution (bioremediation) *may be* of particular interest. *Seepages may be used* as a prospecting tool for the petroleum industry and may also become subject to direct exploitation in the future if high-grade mineral-laden fluids expelled from the deep seabed can be tapped.²³

The report also includes detailed examination of potential differences between marine scientific research and bioprospecting (a very relevant issue at the core of the MGR issue),²⁴ but no specifics are provided of actual scientific research projects or bioprospecting activities.

18 Report of the Secretary-General, 'Oceans and the law of the sea' (1999) UN Doc A/54/429, para 534.

19 See e.g. Report of the Secretary-General, 'Oceans and the law of the sea' (1998) UN Doc A/53/456, para 438.

20 See CBD Subsidiary Body on Scientific, Technical and Technological Advice, 'Marine and Coastal Biodiversity: Review, further elaboration and refinement of the programme of work. Study of the relationship between the Convention on Biological Diversity and the United Nations Convention on the Law of the Sea with regard to the conservation and sustainable use of genetic resources on the deep seabed (decision II/10 of the Conference of the Parties to the Convention on Biological Diversity-Note by the Executive Secretary' (22 February 2003) UN Doc UNEP/CBD/SBSTTA/8/INF/3/Rev. 1.

21 *ibid* para 79.

22 Report of the Secretary-General, 'Oceans and the law of the sea' (2004) UN Doc A/59/62, para 233.

23 *ibid* para 243 (emphasis added).

24 *ibid* para 260-62.



By the time of the publication of the 2004 UN Secretary-General's report on Oceans and the Law of the Sea is published the hyperbole of the report begins to imply a veritable gold rush is underway in the deep sea in ABNJ. Thus the 2004 Report observes:

During the past decade the research efforts of scientists, biotechnology and pharmaceutical companies have increasingly shifted from the shallow-water to deep-water ecosystems, including hydrothermal vents, seamounts, canyons and trenches, cold-water corals and sponges, given the unique nature of the organisms found in these ecosystems...As scientific and commercial interest *grows fast*, so do the related impacts arising from frequent visits and repeat sampling, which, if carried out in an unsustainable manner, may include reducing or driving to extinction the endemic biodiversity of these ecosystems ...

For example, *there is increasing interest from scientists, biotechnology and pharmaceutical companies* in screening hydrothermal vents, seamounts and cold-water habitats and their associated fauna for species which produce potentially beneficial substances and genes.²⁵

No evidence is put forward in the 2004 Report for the 'fast' growth in scientific and commercial interest. In fact, the 2004 Report incorrectly cites as its authority for this assertion a 2004 Report published by UNEP with contributions from a range of leading scientists.²⁶ That report in fact does not argue there has been 'fast' growth in scientific and commercial interest instead it merely notes that '[d]uring the past decade the research efforts of scientists, biotechnology and pharmaceutical companies have increasingly shifted from shallow-water to deep-water ecosystems, including cold-water corals and sponges. The search for beneficial substances and genes offers a new field of economic importance.'²⁷ That is to say that interest has moved from one part of the ocean to another. No insight is offered into the scale or value of these endeavours and certainly there is no evidence offered that the growth is 'fast'.

However, by 2004 the push for the international community to address issues relating to the conservation and sustainable use of biodiversity in ABNJ had gained momentum. In 2004 in Resolution 59/24 the UN General Assembly agreed to establish the Ad Hoc Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction:

(a) To survey the past and present activities of the United Nations and other relevant international organizations with regard to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction;

²⁵ Report of the Secretary-General, 'Oceans and the law of the sea' (2004) UN Doc A/59/62/Add.1, para 60 (emphasis added).

²⁶ André Freiwald and others, *Cold-water Coral Reefs*. UNEP-WCMC (Cambridge 2004).

²⁷ *ibid* 41.



- (b) To examine the scientific, technical, economic, legal, environmental, socio-economic and other aspects of these issues;
- (c) To identify key issues and questions where more detailed background studies would facilitate consideration by States of these issues;
- (d) To indicate, where appropriate, possible options and approaches to promote international co-operation and coordination for the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction.²⁸

An addendum to the 2005 Report of the UN Secretary-General on oceans and the law of the sea was prepared in response to *Resolution 59/24* to assist the Ad Hoc Working Group established by the General Assembly.²⁹ Despite detailed examination of how scientific research is carried out in ABNJ and in the deep-sea in particular,³⁰ the report's examination of the nature and extent of commercial interest in marine genetic resources in ABNJ was very superficial. Significantly the 2005 report again repeats the mistakes of earlier reports by using figures relating to the growth of biotechnology more broadly without any real linkage to the actual figures for biotechnology developed from ABNJ, while also equating biotechnology potential with actual commercialization. Thus, the report observes:

The biotechnology sector is one of the most dynamic research areas with increasing prospects for growth and profitability ... Deep sea organisms, in particular, are interesting because of their ability to adapt to extreme environments. Knowledge of their adaptation process provokes questions as to the mechanisms they use and *possible* commercial applications. Many have been sampled with an eye to their biotechnology *potential*.³¹

The report then goes on to provide examples of academic research institutions such as the Extremobiosphere Research Centre of the Japan Agency for Marine-Earth Science and Technology in Japan and the Marine Bioproducts Engineering Centre in the USA engaged in research which has potential commercial applications.³² Yet no evidence is provided that any of that research has actually led to the commercialization of a product.

The report then goes on to throw around a range of figures relating to natural products research, marine-sourced natural products more generally and the biotechnology industry more broadly, none of which relate specifically to MGR from ABNJ. Thus, the report states:

Potential applications from marine-sourced material include pharmaceuticals, fine chemicals, enzymes, agri-chemicals, cryoprotectants, bioremediators, cosmeceuticals and nutraceuticals. A study of small-molecule new chemicals introduced globally as drugs between 1981 and 2002 showed that 61 per cent can be traced to, or were inspired by, natural products. This figure rose to 80 per cent in

²⁸ UNGA Res 59/24 (17 November 2004) UN Doc A/RES/59/24.

²⁹ Report of the Secretary-General, 'Oceans and the law of the sea' (2005) UN Doc A/60/63/Add.1.

³⁰ See especially *ibid* 5-20.

³¹ *ibid* paras 77-79 (emphasis added).

³² See *ibid* paras 83-86.



2002-2003. Compounds from natural products are considered to be more agreeable to consumers and two thirds of the anti-cancer drugs, for example, are derived from both terrestrial and marine natural products. Marine plants, animals and microorganisms produce many unique biochemicals with great potential in treating diseases such as cancer and inflammatory disorders and may prove effective against HIV/AIDS. Marine-sourced material (for example, from sea water/sediment) has a higher chance of being successful commercially because of its mega-diversity.

Although natural molecules are used by a variety of industries, they are mostly known for their application in the health sector. Biotechnology could lead to more preventive medicine based, inter alia, on genetics and targeted diagnostics. There are also a considerable number of new drugs that are the result of biotechnology, including anti-cancerous and anti-inflammatory agents. In addition, biotechnology may bring solutions to illnesses such as obesity, diabetes or neurological ailments. The role of biotechnology in the health-care industry is increasing and more and more partnerships are being created between biotechnology and pharmaceutical companies. From 22 in 1993, companies using biotechnology for the health sector now number 190, of which 13 have over \$1 billion in sales each per year. In the United States, the approval of new drugs increased by 25 per cent in 2003, with some 300 biotechnology products based on natural compounds.³³

Here we again see the trend towards conflating the significant economic value of the biotechnology sector as a whole with the as yet unrealized and unsubstantiated potential of biotechnology-derived from the marine environment from ABNJ.

Later in the 2005 report, this trend is more evident in the report's attempted analysis of the commercial value of bioprospecting in ABNJ. Thus, the report observes:

... In order to provide an idea of the commercial value of bioprospecting beyond national jurisdiction, the broader context of the biotechnology sector needs to be considered ... As reported by the United Nations University (UNU) Institute of Advanced Studies, according to the Ernst & Young global biotechnology market overview in 2004, the global biotechnology industry (not limited to marine biotechnology) supported almost 200,000 employees worldwide and generated revenues of up to \$46.6 billion in 2003. In connection with marine biotechnology, a 1996 study estimated that the worldwide sales of products related to marine biotechnology were expected to reach \$100 billion by the year 2000. Profits from a compound derived from a sea sponge to treat herpes were estimated to be worth \$50 million to \$100 million annually and estimates of the value of anti-cancer agents from marine organisms are up to \$1 billion a year. However, it is not clear how many, if any, of these products use biological resources from areas beyond national jurisdiction. The UNU study demonstrates that, on the basis of an analysis of patent databases, bioprospecting for deep seabed genetic resources is taking place and related commercial applications are being marketed. Furthermore, there are some patents involving genetic resources from the deep seabed where it is unclear whether practical applications for their use have been developed or not. Bioprospecting activities may therefore create a market for genetic resources.

³³ *ibid* paras 88-89.



... Bioprospecting, including the development and commercialization of products derived from genetic resources in areas beyond national jurisdiction involves very high costs ... and it is estimated that it may take approximately 15 years to produce results. Furthermore, only 1 to 2 per cent of pre-clinical candidates actually become clinically produced. Estimates for the costs of research and development to develop a new drug (not necessarily one related to marine biotechnology) presently range between \$231 and \$500 million to \$800 million and \$1.7 billion. Due to the high costs involved, patenting is presently the main avenue for securing economic benefit as a return for investment. The protection of inventions is granted for a limited period, generally 20 years.

... In the case of land-based bioprospecting, pharmaceutical companies have been willing to pay substantial sums for access to the regions where there is extensive inter-species competition and have made deals with host countries that involve giving them a royalty on the products that might eventually be based on this prospecting. In some cases, the terms of agreement for bioprospecting includes the allocation of a fixed sum of money, to be used for conservation measures, in exchange for the right to receive samples from bioprospecting. The UNU study highlights, however, that it appears that the extension of patentability of biological and genetic material has not been based on sufficient economic analysis and that the positive benefits expected from patent protection with regard to trade, foreign direct investment and technology transfer have not been evidenced.³⁴

Conflating the biotechnology potential of marine biodiversity in areas beyond national jurisdiction with the actual experience of other existing sectors of the biotechnology industry is in part what has fuelled the expectations of a veritable new deep-sea gold rush [sic].

This confusion between the biotechnology industry overall and the theoretical potential of MGR from the deep sea in ABNJ is not confined to the UN Secretary-General's Report. For example, at its 11th meeting held in 2005, the SBSTTA of the CBD considered a report on the *Status and trends of, and threats to, deep seabed genetic resources beyond national jurisdiction, and identification of technical options for their conservation and sustainable use*.³⁵ This report spoke of the 'high potential for biotechnology' from biodiversity associated with deep-sea hydrothermal vents without any authority for this assertion. More problematically without citing any verifiable authority, this report observed:

Deep seabed resources hold enormous potential for many different types of commercial applications, including in the health sector, for industrial processes or bioremediation. A brief search of selected Patent Office Databases revealed that compounds from deep seabed organisms have been used as basis for potent cancer fighting drugs, commercial skin protection products providing higher resistance to ultraviolet and heat exposure, and for preventing skin inflammation, detoxification agents for snake venom, anti-viral compounds, anti-allergy agents and anti-coagulant agents, as well as industrial applications for reducing viscosity.³⁶

³⁴ *ibid* paras 107-09.

³⁵ CBD Subsidiary Body on scientific, Technical and Technological Advice, 'Status and trends of, and threats to, deep seabed genetic resources beyond national jurisdiction, and identification of technical options for their conservation and sustainable use' (22 July 2005) UN Doc UNEP/CBD/SBSTTA/11/11.

³⁶ *ibid* para 21.



In the absence of a citation for this patent database search, it is difficult to verify these assertions. However, the author of this paper has undertaken searches of the patent database and has been unable to reproduce the purported results. It is possible here that there is again confusion between the genetic resources of the deep sea and genetic resources sourced from marine biodiversity in shallow waters, often within national jurisdiction. This possibility is supported by the SBSTTA Report's comments that:

Assessing the type and level of current uses of genetic resources from the deep seabed proves relatively difficult for several reasons. First, patents do not necessarily provide detailed information about practical applications, though they do indicate potential uses. Moreover, information regarding the origin of the samples used is not always included in patent descriptions. However, the commercial importance of marine genetic resources is demonstrated by the fact that all major pharmaceutical firms have marine biology departments. The high cost of marine scientific research, and the slim odds of success (only one to two percent of pre-clinical candidates become commercially produced) is offset by the potential profits. Estimates put worldwide sales of all marine biotechnology-related products at US \$100 billion for the year 2000.³⁷

How is it that the SBSTTA report authors admit patents often do not include information on the origin of samples, and yet assert that specific biota sampled from the deep sea was the basis for the alleged inventions? One might have expected that if this was correct the specific patents might have been cited. What is more likely is that specific patents attributable to MGR from shallower waters have been confused with deep sea MGR. But in the absence of citations for the specific patents, this cannot be verified.

With the exception of material produced by the Ad Hoc Working Group (to be considered below), the following decade of reports³⁸ by the UN Secretary-General on oceans in Law of the Sea actually contained very little useful information on the nature and style of commercial interest in MGR from ABNJ. In fact, the 2007 report explicitly acknowledges that there was very little data available as diplomats and policymakers began the Ad Hoc Working Group process. The 2007 report drawing on a joint United Nations University (UNU) and UNESCO Study co-authored by the author of the present paper (discussed below) noted:

There appears to be no evidence, however, that any commercial entity has mounted its own dive to the deep sea to collect samples for the purposes of research and development. Commercial interest in sample extraction from the deep sea would be limited to funding research dives by national scientific

³⁷ *ibid* para 22.

³⁸ Citation for the little data available in these reports is as follows: Report of the Secretary-General, 'Oceans and the law of the sea' (2008) UN Doc A/63/63, para 280; Report of the Secretary-General, 'Oceans and the law of the sea' (2009) UN Doc A/64/66, para 87; Report of the Secretary-General, 'Oceans and the law of the sea' (2009) UN Doc A/64/66/Add. 2, paras 104-108; Report of the Secretary-General, 'Oceans and the law of the sea' (2011) UN Doc A/66/70/Add.2, para 167; Report of the Secretary-General, 'Oceans and the law of the sea' (2012) UN Doc A/67/79/Add.1, para 167; Report of the Secretary-General, 'Oceans and the law of the sea' (2014) UN Doc A/69/71/Add.1, para 79.



research organizations or academic institutions and/or collaboration in laboratory research. Biotechnology companies would also rely on samples deposited in national culture collection.

... To date, research and product development related to marine genetic resources has centred mainly on the development of novel enzymes for use in a range of industrial and manufacturing processes, including chemical and industrial processes involving high temperatures. A number of commercially viable enzymes have been developed from hydrothermal vent microbes. DNA polymerases, some of which have been isolated from several hydrothermal vent species, are also of interest for use in life sciences research, diagnostics, pharmaceutical and therapeutic applications. Microbial exopolysaccharides isolated from hydrothermal vents are under evaluation for therapeutic uses, principally in the areas of tissue regeneration and cardiovascular diseases. Research on hydrothermal vent microbes has also led to the development of ingredients for cosmetics, including anti-ageing creams. Research also suggests that heat-loving microbes from hydrothermal vents may be suitable for use in novel biotechnological processes including oil, coal and wastegas desulphurization, as well as in the treatment of industrial effluents and the development of new mining techniques such as biomining and bioleaching.

Patent applications provide a good indication of the types of interests in marine genetic resources. Based on a search of 135 patents, a report by UNU indicates that the chemistry and pharmacology sectors have the highest number of patents filed in relation to marine genetic resources in the period 1973 to date, indicating a strong interest from those sectors. It has also been observed that medical innovation continues to drive the growth of the biotechnology industry in general. However, the contribution of marine genetic resources beyond areas of national jurisdiction to such growth is not clear.³⁹

Thus, it is clear that even as the Ad Hoc Working Group was underway there was still significant uncertainty as to the nature and scale of commercial interest in MGR from ABNJ. Indeed, the need for further details and study on the nature and scale of commercial interest in MGR from ABNJ is explicitly acknowledged in the 2007 report which went on further to observe:

Assessing the actual or potential total economic value of marine genetic resources beyond areas of national jurisdiction can assist decision-making by providing indications of the expected economic and societal benefits of such resources, as well as providing supporting arguments for the possible need for conservation and sustainable use measures.

... quantifying the level of the interest in marine genetic resources from areas beyond national jurisdiction is difficult owing to scattered and limited quantified information specifically related to those resources. Some information is also not publicly available owing to its commercially sensitive nature. Any quantification therefore remains anecdotal, speculative and is based on analogies with the biotechnology sector. Strengthening the information base with specific data related to those interests is therefore important.⁴⁰

39 Report of the Secretary-General, 'Oceans and the law of the sea' (2007) UN Doc A/62/66/Add.2, paras 202-04 (emphasis added).

40 *ibid* paras 209 and 217.



Although the Report then goes on to attempt to provide some basic indicators of commercial interest through discussion of limited patent data.⁴¹ At this point, the 2007 report refers to a report by UNEP which mentions 37 examples of patents issued for products based on deep-sea organisms.⁴² But as my original research from which this data is drawn highlights, it is not clear if all of these patents relate to MGR sourced from ABNJ.⁴³

The above discussion has highlighted the paucity of evidence on the nature and scale of commercial interest in MGR in ABNJ contained in the reports of the UN Secretary-General. Before considering the available data from the literature outside the UN system it is useful to briefly consider the extent to which this issue was considered during UNICPLOS and the work of the Ad Hoc Working Group.

2.2 UNICPLOS discussions

MGR were considered at the eighth meeting of UNICPLOS from 25 to 29 June 2007. A total of 21 Panel presentations were made during this meeting relating to the MGR question. While a wide range of issues relating to MGR were canvassed during these meetings no presentations touched on the key issue of the nature and scale of commercial interest in MGR from ABNJ. There were presentations on the role of MGR in biotechnology more generally,⁴⁴ presentations on commercial aspects of biotechnology development from marine sources,⁴⁵ and experiences of MGR commercialization and regulation within areas of national jurisdiction.⁴⁶ But none of the presentations offered any further insight as to the nature and scale of commercial interest in MGR from ABNJ.

2.3 The Ad Hoc Working Group

From 2005 to 2015, issues related to MGR were also considered as part of the Ad Hoc Working Group. While much of the debate during this process focused on the legal status of MGR in ABNJ there was in fact little hard data brought forward on the nature and level of commercial interest in MGR from ABNJ. A significant part of the discussions was devoted to the controversial issues of the

41 For the record it should be noted that the UNEP report cited is not the original source of this data. The original data of 37 patents is drawn from research conducted by the current author as part of his PhD. See David Leary, 'More than just bugs and bioprospecting in the abyss. Designing an international legal regime for the sustainable management of deep-sea hydrothermal vents beyond national jurisdiction' (DPhil Thesis, Macquarie University, 2005). This data is also set out in a revised version of that thesis published as David Leary, *International Law and the Genetic Resources of the Deep Sea* (Martinus Nijhoff 2007).

42 Report of the Secretary-General, 'Oceans and the law of the sea' (2007) UN Doc A/62/66/Add.2, para 220.

43 See 2007 Report of the Secretary-General (n 39).

44 These included presentations by Marc Slattery, 'Marine Genetic Resources: Experiences in Commercialization' (26 June 2007) <www.un.org/Depts/los/consultative_process/8thmeetingpanel.htm> accessed 27 August 2018.

45 For example, Geoff Burton, 'Commercialisation: Not Plain Sailing; and Simon Munt, 'From Marine Expeditions to New Drugs in Oncology' (26 June 2007) <www.un.org/Depts/los/consultative_process/8thmeetingpanel.htm> accessed 27 August 2018. Other presentations can be accessed at the same web address.

46 For example, Marcia Creary, 'Jamaica's marine genetic resources: challenges and opportunities' and John Hooper, 'Maximizing benefits from "biodiscovery": A Coastal State resource providers perspective' (26 June 2007) <www.un.org/Depts/los/consultative_process/8thmeetingpanel.htm> accessed 27 August 2018.



purported common heritage status of MGR in ABNJ, rather than the more important threshold issue of whether there was in fact any commercial interest in MGR from ABNJ in the first place. It is worth noting that on numerous occasions during this process many countries called for further detailed information on and study of this issue. For example, the first report of the Ad Hoc process to the UN General Assembly in 2006 observed the need for a range of studies including:

... [e]conomic aspects of various activities, including ...exploitation of deep seabed genetic resources
... [and] ... Nature and level of interests in marine biological diversity beyond areas of national jurisdiction, in particular commercial interest in genetic resources from the deep sea.⁴⁷

Crucially in 2008 several delegations suggested further research was needed on 'the level of activity actually occurring in respect of [MGR] in [ABNJ] and the costs and risks involved'.⁴⁸ Again in 2012 some delegations 'were of the view that clarification was required as to the extent to which bioprospecting was currently taking place and...its consequences... for commercial and non-commercial aspects'.⁴⁹ While the 2012 meeting did result in the convening of an intersessional workshop on MGR, in 2013 there was little new information that came from that workshop. In fact, what information that did emerge suggested that (as was already well established) most commercial interest in MGR relates to MGR within areas of national jurisdiction. Significantly, the intersessional workshop also highlighted it was almost impossible to determine from patents where a source organism came from, ABNJ or areas within national jurisdiction. As the report on the intersessional workshops observed:

It was remarked that the lack of available information in patent documents on the exact geographical origin of marine genetic resources used in the development of an invention posed challenges. *It was often impossible to establish which patents related to inventions based on marine genetic resources of areas beyond national jurisdiction. However, a panellist observed that since most research was taking place in coastal areas of tropical countries, it could be inferred that compounds used in patented inventions also came from those areas.* It was noted that efforts were under way to better identify the location and environment of sampled resources. *A panellist also indicated that it was too early to determine whether areas within national jurisdiction or those beyond national jurisdiction would yield more promising compounds from a commercial point of view.*⁵⁰

47 UNGA, 'Report of the Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction' (2006) UN Doc A/61/65, Annex II paras (i) and (l).

48 UNGA, 'Report of the Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction' (2008) UN Doc A/63/79, para 34.

49 UNGA, 'Report of the Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction' (2012) UN Doc A/67/95, para 18.

50 UNGA, 'Ad Hoc Open-Ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction, Intersessional workshops aimed at improving understanding of the issues and clarifying key questions as an input to the work of the Working Group in accordance with the terms of reference annexed to General Assembly resolution 67/78. Summary of proceedings prepared by the Co-Chairs of the Working Group' (2013) UN Doc A/AC.276/6, para 15 (emphasis added).



Despite the number of calls for more detailed studies on the nature and scale of commercial interest there appears to be no evidence that such studies were ever formally carried out as part of any of the UN processes considering the issue. The following discussion now turns to consider the limited number of studies that have been carried out outside these processes.

2.4 Published studies on nature and scale of commercial interest in MGR in ABNJ

While there have been a plethora of publications⁵¹ dissecting the legal and policy issues relating to the MGR issue (many of which include some citations to isolated examples of biotechnology developed from MGR in ABNJ), there have in fact only been a handful of studies that have attempted to delineate the actual nature and scale of commercial interest in MGR from ABNJ.

One of the initial studies to attempt this was my own PhD thesis completed in 2005,⁵² which was subsequently revised and published as a monograph in 2007.⁵³ That study focused primarily on bioprospecting associated with deep-sea hydrothermal vent ecosystems and identified 14 companies that were then involved in research and or product development in relation to hydrothermal vent biota as well as several examples of products already on the market.⁵⁴ The study also presented evidence of 37 patents that had been granted in relation to deep-sea genetic resources from a range of sources including deep-sea hydrothermal vents and the ocean floor of the Mariana Trench.⁵⁵ While this was arguably the first study to flesh out any detail on the nature and level of commercial interest on deep sea genetic resources, as the study highlighted it was very difficult to work out whether MGR of interest were sourced from ABNJ or within areas of national jurisdiction.

Also, in 2005, a report published by the UNU-Institute of Advanced Studies⁵⁶ set out some data demonstrating that bioprospecting for deep seabed genetic resources was occurring and gave some examples of commercial applications being marketed. While much of the discussion contained in the report dealt with legal and policy issues, useful data was presented on patents and several commercial examples, such as that of Diversa Corporation and New England Biolabs Inc (also discussed in my own studies mentioned above).⁵⁷ As detailed and informative as that study was, it must be acknowledged that the few examples it provides shed very little light on the full extent of the nature and scale of interest in MGR from ABNJ.

51 Much of the early literature was reviewed in David Leary, 'Moving the Genetic Resources Debate Forward: Some reflections' (2012) 27 *The International Journal of Marine and Coastal Law* 435.

52 Leary, 'More than just bugs and bioprospecting in the abyss' (n 41).

53 Leary, *International Law and the Genetic Resources of the Deep Sea* (n 41).

54 See *ibid* 155-81 and app 1, 271-77.

55 See *ibid* app 2, 278-86.

56 See Salvatore Arico and Charlotte Salpin, 'Bioprospecting of Genetic Resources in the Deep Seabed: Scientific, Legal and Policy Aspects' (UNU-IAS Report, 2005) <www.cbd.int/financial/bensharing/g-absseabed.pdf> accessed 27 August 2017.

57 *ibid* 15-21.



Shortly after this, while based at the UNU in Japan I was invited to join work being conducted by my colleagues at UNU and UNESCO on the ABNJ MGR issue and contributed to a study⁵⁸ that was submitted to the eighth meeting of UNICPLOS in 2007. The report was subsequently revised and key findings on the nature and scale of commercial and scientific interest in MGR were published in a now widely cited article in the peer-reviewed literature.⁵⁹

The report set out to examine the level and nature of scientific and commercial interest in MGR, including in ABNJ. The report was based on a comprehensive examination of published scientific literature, searches of international patent databases, interviews with scientists, and a review of literature and websites published by biotechnology companies.⁶⁰ Significantly, in 2007, drawing on the studies discussed above, in that report we observed:

There is no substantiated evidence that any company has mounted its own dive to the deep sea to collect samples for the purposes of research and development in relation to biotechnology derived from deep sea genetic resources. The involvement of commercial interests in sample extraction from the deep sea is limited to funding research dives by national scientific research organizations or academic institutions and or research collaboration in laboratories once samples have been collected. Commercial interests also rely on samples provided by national culture collections where samples are often deposited by research institutions. Samples of deep sea microbes are available for a nominal fee from several type culture collections and some are even offered for sale over the internet.

Actual isolation, characterization and culture of biological samples (predominately microbial samples) extracted from the deep sea occur either in laboratories operated by public research institutions such as universities, or in laboratories funded by commercial interests. On some occasions research has been carried out as part of major collaborative research projects across several research institutions. Where biotechnology research is funded by the public sector, generally speaking such results will be published in the scientific literature. However, where the research is funded by the private sector these results are generally kept confidential and are ordinarily not disclosed until after patent applications have been filed.⁶¹

Although not acknowledged as such, these conclusions were the source of the assertions made in the UN Secretary-General's Report in 2007 discussed earlier in this paper.

While the report was quite detailed (including detailed examination of the main areas of research interest for MGR and extensive MGR patent data) the information on both scientific and commercial interest in MGR largely referred to marine biotechnology research in shallow waters and within

58 See Marjo Vierros and others, 'An Update on Marine Genetic Resources: Scientific Research, Commercial Uses and a Database on Marine Bioprospecting' (UN Informal Consultative Process on Oceans and the Law of the Sea, Eight Meeting, 25-29 June 2007) <<https://pdfs.semanticscholar.org/e743/926b0e2e4a13a4779084668dea11299047e4.pdf>> accessed 27 August 2018.

59 See David Leary and others, 'Marine Genetic Resources: A Review of Scientific and Commercial Interest' (2009) 33 *Marine Policy* 183.

60 Vierros and others (n 58) 6.

61 *ibid.*



national jurisdiction.⁶² Although it should be noted the report also contained some new information on commercial interest such as examples of enzymes from MGR in ABNJ.⁶³

Our report did conclude that the evidence demonstrates ‘the potential of marine genetic resources is substantial’⁶⁴ and also noted ‘the steady increase in the number of scientific publications and patents on marine genetic resources observed demonstrates that this area is of growing importance to both the scientific community and to those involved in bioprospecting.’⁶⁵ But for the most part here we were talking more generally about MGR from areas within national jurisdiction. Significantly, in our conclusions we also noted ‘the need to increase the information base on marine genetic resources.’⁶⁶

A very interesting study on biological diversity in the patent system⁶⁷ published in 2013 presented further novel (but brief) information on the extent of patents granted in relation to deep-sea biodiversity. This study noted:

Using the Chemosynthetic Ecosystem Science (ChEssBase) database of 1,085 marine organisms with additional research we identified an initial 128 deep sea and hydrothermal species in the patent data... Patent activity is led by extremophiles such as *Thermus thermophilus*, *Methanocaldococcus jannaschii*, *Thermococcus litoralis*, *Aeropyrum pernix*, *Archaeoglobus fulgidus* and *Pyrococcus horikoshii*. Other species include the giant tube worm *Riftia pachyptila* for a novel fusion protein and *Beryx splendens* (the Splendid alfonso fish) for foodstuffs and medicines. *Anoplopoma fimbria* is involved in the development of vaccines for fish and *Bythograea thermydron* (the vent crab) for a new nucleic acid useful in therapeutic insertions of DNA. *Microstomus pacificus* (Pacific dover sole) is involved in a claimed new treatment for bone disorders.⁶⁸

But significantly this study also went on to note:

These examples illustrate the diversity of potential applications arising from marine organisms and extremophiles but raise concerns about benefit-sharing and the environmental impacts of research in these environments ... *We would emphasize that further research is required to provide a more comprehensive picture of patent activity involving organisms from these environments and the impacts of research.*⁶⁹

⁶² Note the report does make this clear. See *ibid* 8.

⁶³ *ibid* 27-28

⁶⁴ *ibid* 55.

⁶⁵ *ibid*.

⁶⁶ *ibid*.

⁶⁷ See Paul Oldham, Stephen Hall and Oscar Forero, ‘Biological Diversity in the patent System’ (2013) 8(11) PLoSOne 1.

⁶⁸ *ibid* 9.

⁶⁹ *ibid* (emphasis added).



Despite years of discussion on the MGR issue, it was not until 2014 that a very detailed study was finally produced.⁷⁰ This study commissioned by the United Kingdom Department for Environment, Food and Rural Affairs is by far the most comprehensive study on the nature and extent of scientific and commercial interest in MGR from ABNJ published to date. Based on a comprehensive review of scientific literature, extensive analysis of patent data based on a methodology of patent landscaping, a range of commercial sources and a Delphi study surveying key expert in the field, this study contains a wealth of information relevant to the debates on the MGR issue. A detailed examination of the data contained in the 241 pages of that report is not possible in this paper. However, it is worth noting the five key findings of that report were as follows:

1. *There is growing interest in marine genetic resources in general but research mainly takes place inside national jurisdictions.* This is demonstrated through mapping of deep-sea research locations from the scientific literature. Research in ABNJ is concentrated in a limited number of locations such as the East Pacific Rise and Mid-Atlantic Ridge;
2. *Marine organisms from ABNJ that appear in patents often occur elsewhere.* Patents are an indicator of commercial research and development. *Many deep-sea marine organisms from ABNJ that appear in patent documents also occur inside national jurisdictions and terrestrial aquatic environments.* There are very limited references to actual field collections of organisms from ABNJ. It is likely that patent applicants mainly obtain marine genetic material or data from commercial sources, public collections or databases;
3. *Marine natural product research mainly concentrates on marine invertebrates from inside national jurisdictions.* Marine natural product research focuses on marine invertebrates, such as sponges and tunicates, but displays growing interest in microorganisms. *Interest in organisms from ABNJ is best described as emergent;*
4. *Marketed products are mainly derived from organisms inside national jurisdiction with limited exceptions.* The exceptions are mainly enzymes from extremophiles and oils from Antarctic krill for nutraceutical products;
5. *Widely quoted market estimates for marine genetic resources lack methodological transparency and should not be relied upon in the absence of peer review.*⁷¹

It is disappointing that the conclusions of this report have not been widely debated in policy or academic circles.

⁷⁰ See Paul Oldham and others, *Valuing the Deep: Marine Genetic Resources in Areas Beyond National Jurisdiction*. (Defra Contract MB0128 Final Report, DEFRA 2014).

⁷¹ *ibid* 12-13 (emphasis added).



2.5 Conclusion: Does the evidence support the need for MGR to be addressed in the proposed instrument?

In a paper delivered at the Law of the Sea Institute Conference in 2011, Kim Juniper and I argued:

Examples of actual commercialisation of deep-sea genetic resources, and especially those deep-sea areas beyond national jurisdiction are largely anecdotal and the evidence is at best patchy. While some commercial products have been developed from deep-sea organisms, the actual proportion coming from areas beyond national jurisdiction is as yet un-substantiated. In analysing what information is available it is very important to distinguish between hard proof of products on the market or in the development phase, and speculation about their theoretical potential. The academic literature and policy debates are littered with enthusiastic statements about possibilities, but there is in fact very little hard proof in the way of products on the market ... based on our review of the limited available data, we see little evidence of systematic commercial scale development of the genetic resources of the deep sea. Instead we see a debate where limited evidence is being confused and conflated with the more prolific evidence of commercialisation of marine biodiversity from shallower waters. This is primarily occurring within areas of national jurisdiction such as the territorial sea and the EEZ. Compounding this are rather grand or broad sweeping statements in the academic and policy literature as to the theoretical potential of marine biodiversity. It may sit uncomfortably with many now engaged in the debate on this topic, but there is currently very little evidence of the proverbial 'pot of gold' said to be waiting to be discovered in the biodiversity of the deep sea. There may well be a few specks of gold, but as yet no hard or substantiated evidence of great riches. It appears the rhetorical or political debate does not match the hard data.⁷²

The review of the evidence presented during debates on the issue of MGR in ABNJ at the UN over the past decade and a half presented in the current paper only go to re-enforce that our conclusions made nearly seven years ago remain valid today.

Of course, these conclusions in some respects only echo the cautionary question raised on this issue from the very beginning. Some 21 years ago now Lyle Glowka, the father of the MGR in ABNJ debate argued that an examination of the nature and scale of commercial interest in MGR and its relationship with marine scientific research was a vital first step. He argued what was needed was an examination of:

the entire spectrum of activities involving the Area's genetic resources. This could illuminate the distinctions and interfaces between marine scientific research, commercial investigative activities, and biotechnological research and development. It might also illuminate which activities are critical to adding value to the Area's genetic resources, while potentially demonstrating the present and future usefulness of the Area's genetic resources. Such an examination could add to the transparency of

72 David Leary and Kim Juniper, 'Addressing the Marine Genetic Resources Issue: Is the debate heading in the wrong direction' in Clive Schofield, Seokwoo Lee and Moon-Sang Kwon (eds), *The Limits of National Jurisdiction* (Martinus Nijhoff 2014) 769-85.



future intergovernmental discussions. In addition, three questions might be posed. By determining (1) whether benefits can realistically accrue to humanity as a whole from the Area's genetic resources and (2) whether the LOS Convention's marine scientific research provisions, the LOS Convention's cooperation provisions, and those of the CBD adequately ensure such benefits, governments may be able to conclude (3) whether new international measures are needed to ensure the fair and equitable utilization of the Area's genetic resources.

Answering the first question will certainly require an examination of the current and possible future economic benefits that are or could be derived from the Area's genetic resources. The examination might also determine what in-kind benefits derive from greater formal international cooperation and collaboration. These might include greater knowledge of the Area's biological diversity, risk minimization, sharing expertise and expenses, hard and soft technology transfer between partners, and greater private-sector involvement and investment.⁷³

It seems the international community has ignored the first of the three questions posed by Glowka and have instead jumped straight to negotiating the new international measures suggested by the third of Glowka's questions. Given that political reality, it is now useful to consider some elements of what might be an optimal outcome from these negotiations.

3. Optimal outcomes on the MGR issue: Prep-Comm III – Chairs non-paper and draft negotiating text

In light of the lack of evidence justifying MGR issues being dealt with in the proposed international legally binding instrument, the final part of this paper offers some brief thoughts on optimal outcomes from the current negotiations on the MGR issue based on some elements outlined in the Chairs non-paper for PrepComm III as a starting point for analysis. Whether the optimal outcomes will be achieved is still too early to judge.

Drawing on submissions from parties to the negotiations and civil society (but not reproducing those submissions verbatim) the Chairs non-paper provided a clustering of proposed elements and ideas in a suggested structure which proved useful as a reference document to assist delegations in their consideration of issues discussed at PrepComm III.⁷⁴ Some 112 pages in length, it is fair to say that the non-paper covers all of the key and complex issues that need to be addressed in the negotiations. While the content of the non-paper is without prejudice to the positions of delegations to the negotiations, the paper did an excellent job of capturing the diverse negotiating positions of all parties to the negotiations. Its scope is not just confined to the MGR issues and canvasses all the key issues up for negotiation under the proposed 'package deal' covering, inter alia the MGR issue, area-based management tools such as marine protected areas, environmental impact assessment,

⁷³ Glowka (n 8).

⁷⁴ UN Paper (n 5) 1.



capacity building and marine technology, institutional arrangements, exchange of information or clearing-house mechanisms, financial resources and funding mechanisms, monitoring, compliance and enforcement, settlement of disputes, obligations of non-parties, and a review mechanism.

It is not possible to canvass all issues dealt with in the non-paper in this short article. However, for present purposes, (although the following discussion is necessarily selective) I think it useful to focus on the following matters: Definitional issues (3.1); Guiding principles and approaches (3.2); Sharing of benefits from the utilization of MGR (3.3).

3.1 Definitional issues

The non-paper reflects three key approaches to definitional issues or use of key terms. One approach is that the definitions contained in the proposed instrument should be consistent with those contained in UNCLOS. A second approach is for the definitions, where possible, to be consistent with UNCLOS, the *UN Fish Stocks Agreement*, the CBD, the *Nagoya Protocol* and other relevant instruments, adjusted for the marine biodiversity of ABNJ. A third approach is that the instrument contains its own separately defined terms specifically excluding trade in commodities.

Given the MGR issue is a major element up for negotiation, an optimal outcome would be for parties to the negotiations to adopt the second of these approaches. The CBD and the *Nagoya Protocol* are key existing international treaties relating to biodiversity, biotechnology, bioprospecting and the whole question of access and benefit sharing. It would be an unfortunate manifestation of the fragmentation of international environmental law if key definitions and concepts applying within areas of national jurisdiction were to be departed from in ABNJ.

A further argument in favour of this approach is the now very dated terminology used in UNCLOS (for example, concepts like maximum sustainable yield) and the fact that many of the concepts and technologies associated with genetic resources, bioprospecting and biotechnology were largely unknown when UNCLOS was negotiated.

Of course, there are many challenges ahead in reconciling those approaches, not the least of which will be the approach to key and problematic concepts like defining MGR, what constitutes utilization of MGR and definition or lack thereof of key concepts such as bioprospecting, and marine scientific research, as well as the extent to what extent derivatives are to be addressed. Many of these issues, of course, have already been debated at length in the political and scholarly debates⁷⁵ over the past decade and a half and no doubt significant challenges still lie ahead in trying to reach common agreed positions on these concepts.

Another major issue that has so far been given little attention relates to the increasing reliance on digitized gene sequences in biotechnology research and development. While the existing access and benefit-sharing regime under the CBD and the *Nagoya Protocol* have traditionally focused on access

⁷⁵ See for example discussion in Arico and Salpin (n 56).



to the samples of genetic resources, in modern biotechnology it is increasingly access to digitized gene sequence of organisms that is far more valuable. There are as yet very significant and real questions that remain unanswered as to whether digitized gene sequences of organisms uploaded to DNA databases fall within existing access and benefit-sharing regimes.

A related and also emerging issue for international and domestic legal systems is the implications of the birth of the next generation of biotechnology known as synthetic biology.⁷⁶ Synthetic biology holds significant implications for access and benefit-sharing regimes. Where a naturally occurring organism has been genetically manipulated into a totally novel organism (i.e. a new organism not a modified organism) which country has sovereign rights in relation to the new organism: (1) the country where the original naturally occurring organism was first sourced; (2) the country where the research lab that developed the new organism is based; or (3) some other (such as where the DNA database server located). If the naturally occurring organism is sourced from ABNJ similar questions arise. In that regard it is worth noting that at its 2016 Conference of Parties (COP), parties to the CBD, *inter alia*, established a process to further consider the implications of digital sequence information on genetic resources (a key element of synthetic biology methodologies), including establishing an ad hoc expert group to examine the issue more closely.⁷⁷

Given recent developments in relation to digital sequence data and synthetic biology, it will be very important for any instrument relating to ABNJ to be consistent with whatever emerges during the course of work on the issue at the CBD. It is an issue that any instrument relating to ABNJ must address or it will run the risk of becoming redundant in light of new developments in biotechnology.⁷⁸

3.2 Guiding principles and approaches

I have previously questioned the futility of parties to these negotiations entering into debate in favour or against the applicability of the common heritage of mankind to MGR from ABNJ.⁷⁹ As it was during the negotiations relating to the Part XI regime under UNCLOS, the pro and anti 'common heritage of mankind' ('CHM) advocates hold deeply entrenched positions. Much of the non-paper, like much of the debates during UNICLOS and the Ad Hoc Working Group process, is devoted to debates relating to the relevance of the CHM to MGR in ABNJ.

⁷⁶ For a detailed exploration of some of the implications of for international environmental law and domestic environmental law see David Leary, 'The Synthetic Biology Revolution: Mapping a Future Research Agenda' (2015) 34(1) *The University of Tasmania Law Review* 110. On this issue see also the ground-breaking research published in Paul Oldham, Stephen Hall and Geoff Burton, 'Synthetic Biology: Mapping the Scientific Landscape' (2012) 7(4) *PLoS One* 1.

⁷⁷ 'Decision adopted by the Conference of the Parties to the Convention on Biological Diversity (XIII/17- Digital Sequence Information on genetic resources)' Conference of the Parties to the Convention on Biological Diversity (2016) UN Doc CBD/COP/DEC/XIII/17.

⁷⁸ On this issue see also Leary and Juniper (n 72) 777-80.

⁷⁹ This aspect is discussed extensively in Leary, 'International Law and the Genetic Resources of the Deep Sea' (n 41) 353-69.



This issue alone has the potential to derail negotiations and I would hope all parties at some stage see sense and focus on the ‘real’ issues up for negotiation. As I have previously noted:

Entering into the debate on the application of the [CHM] is, I would argue, a futile exercise-for the simple reason that, whether or not these resources are regarded or subsequently designated as the [CHM], that still does not address the core issue...We still have to develop a specific regime tailored to the unique circumstances of the way in which [MGR in ABNJ] are commercially exploited.⁸⁰

Having said that, I am not optimistic of a sudden outbreak of pragmatism during the current negotiations.

3.3 Sharing of benefits from the utilization of MGR

Given the very clear lack of information on the extent and nature of commercial interest in MGR from ABNJ, I would argue there are at least two key aspects of benefit sharing that need to be considered closely.

The first aspect is the need for a very wide conceptualization of benefit sharing. It must encompass both monetary and non-monetary benefits which I note is the position adopted by the G77 and China (amongst others).⁸¹ This is consistent with the approaches elsewhere such as under the CBD and Nagoya Protocol. But more importantly, given the commercial potential of MGR from ABNJ is largely still speculative and unrealized this would mean non-monetary benefits could still flow long before monetary benefits are realized (if they ever are).

In that regard, I think the approach of the European Union (EU) marks a worthwhile starting point. In the non-paper the EU position on that issue is summarized as follows:

UNCLOS provisions related to marine scientific research already foresee different forms of non-monetary benefit-sharing, such as:

promoting international cooperation in marine scientific research (article 242 UNCLOS);

making knowledge resulting from marine scientific research available by publication and dissemination (article 244 para. 1 UNCLOS);

promoting data and information flow and the transfer of knowledge (article 244 para. 2 UNCLOS).

In this regard the new UNCLOS implementing agreement could provide for a framework to specify, coordinate, promote and monitor the implementation, with respect to marine genetic resources from areas beyond national jurisdiction, of the above mentioned benefit-sharing provisions to make the best use of the available diverse non-monetary benefit-sharing activities. Such an approach could

⁸⁰ *ibid* 366.

⁸¹ See UN Paper (n 5) 28.



be further strengthened and integrated with capacity-building activities that could be based on Part XIV UNCLOS, as well as with activities to enhance, facilitate and stimulate the sharing of material, information and knowledge. In particular, it could be useful to draw upon such provisions of Part XIV UNCLOS as articles 266 ('promotion of the development and transfer of marine technology') and 269 (establishment of, inter alia, programmes of technical cooperation, seminars, conferences, promote the exchange of scientists).⁸²

Likewise, Australia and Norway have advocated incorporation of non-monetary benefits along the lines of the Nagoya Protocol.⁸³ The IUCN has similarly suggested non-monetary benefits might include:

access to samples, data and knowledge, including the publication and sharing of scientific knowledge;

collaboration and international cooperation in scientific research;

capacity building and technology transfer including scientific training and access to resources, research infrastructure and technology; and

other socio-economic benefits (e.g. research directed to priority needs such as health and security).⁸⁴

These and similar proposals are sensible and practical benefits that could flow long before any monetary benefits could ever accrue.

The second issue that merits very careful consideration is the extent to which any future regime will rely on the potential monetary benefits from MGR from ABNJ to fund its operation. There are a range of different proposals on this aspect that are reflected in the non-paper. These include proposals such as those linking monetary benefit sharing to funding of specific programs for certain classes of states such as Small Island Developing States (SIDS) as advocated by the Alliance of Small Island States (AOSIS)⁸⁵ or funding for specific projects to support the conservation and sustainable use of biodiversity such as proposed by WWF.⁸⁶

These and similar proposals relating to sharing monetary benefits from commercialization of MGR from ABNJ all assume there are monetary benefits to be shared. But as is clear from analysis elsewhere in this paper the true nature and scale of commercial exploitation of MGR from ABNJ is unclear. It would be pointless for States to negotiate a very detailed program of works or implementing structures if the funding for such was dependent on such monetary benefits which fail to materialise. Any new mechanisms would be a hollow shell if they depended on monetary benefits from exploitation of MGR from ABNJ that never materialized or was significantly less than many parties to the negotiations currently assume (without any real evidence base to justify such assumptions).

⁸² *ibid.*

⁸³ *ibid* 29.

⁸⁴ *ibid* 29-30.

⁸⁵ *ibid* 31.

⁸⁶ *ibid.*



4. Conclusion

It may still be several years yet for the current ABNJ negotiations to be concluded, assuming we can reach a common understanding on many of the very difficult issues that need to be thrashed out. Regardless of the future course of the current negotiations, we should not lose sight of the fact that despite the vast attention that has been given to the MGR issue, it is only one part of the current negotiations. I would argue in fact it is the least important part. The oceans and marine biodiversity are under threat more than ever before. The well-reported decline in the health of the oceans and the rapid alarming loss of marine biodiversity require urgent and strong responses by the international community across many domains. The conservation and sustainable use of marine biological diversity of ABNJ, measures such as area-based management tools, including marine protected areas, environmental impact assessments and capacity-building and the transfer of marine technology are key to addressing these challenges. Regardless of the uncertainty surrounding MGR from ABNJ diplomats and policymakers involved in the current negotiations must not lose sight of the fact that these issues, and not MGR in ABNJ, are the ‘main game’.

Whether real or illusory the benefits of MGR from ABNJ cannot be allowed to distract the international community from providing for a sustainable future for the oceans which the future of humanity is so closely tied to. As this paper has argued, there is still great uncertainty as to the level of commercial interest in MGR from ABNJ and the actual (as opposed to potential) benefits it may bring. It would be a sad day for international law if we built the ABNJ regime on the premise that vast new wealth will come from MGR from ABNJ or if any of the other elements of the ABNJ were too reliant on benefits from MGR from ABNJ and no wealth materialized.

In the current climate, it is, of course, a very unorthodox approach to raise these very difficult questions. But as an advocate for conservation and the marine environment, and as a vocal critic of the perverse and pervasive trend to ‘alternate facts’ and ‘fake news’ I do think this is an important debate we need to have, even at this late stage in the ABNJ negotiations.

Fair and equitable benefit-sharing in a new international instrument on marine biodiversity: A principled approach towards partnership building?

Elisa MORGERA*

Abstract

This article suggests a principled approach to the negotiations on benefit-sharing from the use of marine genetic resources under a new international legally binding instrument on marine biodiversity of areas beyond national jurisdiction (BBNJ). It first reflects on the terms in which benefit-sharing has been discussed in the BBNJ negotiations until now, which have been characterized by an operational concern for the type of benefits that could be accrued and distributed. It then contrasts the negotiations with insights arising from other international benefit-sharing regimes, with a view to suggesting a more principled approach focused on 'sharing' benefits 'fairly and equitably.' This helps highlight the potential value added of benefit-sharing to foster deeper and cosmopolitan international cooperation (that is, a global partnership) vis-à-vis existing international obligations on marine scientific research, capacity building, marine technology transfer and the protection of the marine environment. The article then applies these considerations to the thorny and novel question of digital information on marine genetic resources of areas beyond national jurisdiction.

Keywords: equity, benefit-sharing, law of the sea, digital sequence information, right to science, marine biodiversity, BBNJ

First published online: 3 December 2018

* Corresponding author details: Elisa Morgera is Professor of Global Environmental Law at Strathclyde University Law School and Director of the Strathclyde Centre for Environmental Law and Governance. She is the PI of the BENELEX project. This article was prepared under the BENELEX project ('Benefit-sharing for an equitable transition to the green economy') at the Strathclyde Centre for Environmental Law and Governance, University of Strathclyde, Glasgow, UK. The project is generously funded by Grant 335592 from the European Research Council. The author is grateful for the comments of an anonymous peer-reviewer, as well as Deborah Scott, Elsa Tsiumani, Mitchell Lennan, Maria Ntona and Eleftheria Asim. Eleftheria also kindly provided research assistance. All mistakes remain the author's own.



1. Introduction

For more than ten years,¹ negotiators in New York have been debating the need for a new international instrument² to ensure benefit-sharing from the use of marine genetic resources of areas beyond national jurisdiction. The genetic material of marine sponges, krill, corals, seaweeds and bacteria in remote areas of the ocean possesses unique characteristics that may lead to significant innovations in the pharmaceutical, food and renewables sectors, among others.³ But only a handful of countries, and very few companies within them,⁴ have been able to file patents related to marine genetic resources,⁵ while the vast majority of developing countries are not part of these bioprospecting efforts and are greatly underrepresented in marine taxonomic research.⁶ There is still little evidence, however, of patents or products being specifically or exclusively based on marine genetic resources of areas beyond national jurisdiction, as opposed to resources of other marine areas.⁷

1 UNGA Res 59/24 (17 November 2004) UN Doc A/RES/59/24, para 73 establishing an Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction. See official documentation at <www.un.org/Depts/los/biodiversityworkinggroup/biodiversityworkinggroup.htm> accessed 4 November 2018 and Earth Negotiations Bulletin reports at <<http://enb.iisd.org/oceans/marine-biodiv9/>> accessed 4 November 2018. See also Arianna Broggiato and others, 'Fair and Equitable Sharing of Benefits from the Utilization of Marine Genetic Resources in Areas beyond National Jurisdiction: Bridging the Gaps between Science and Policy' (2014) 49 Marine Policy 176.

2 While the mandate of the negotiations refers to an 'international legally binding instrument', UNGA Res 72/249 (24 December 2017) A/RES/72/249, it is expected that it will take a treaty form and serve as an implementing agreement to UNCLOS: Elisa Morgera and others, 'Summary of the Fourth Session of the Preparatory Committee on Marine Biodiversity of Areas beyond National Jurisdiction' (2017) 25 (141) Earth Negotiations Bulletin (ENB PrepCom 4) 5. All ENBs cited in this article can be found at <<http://enb.iisd.org>> accessed 4 November 2018.

3 Paul Oldham and others, *Valuing the Deep: Marine Genetic Resources in Areas Beyond National Jurisdiction*, Defra Contract MB0128 Final Report Version One (Defra 2014); and David Leary and others, 'Marine Genetic Resources: A Review of Scientific and Commercial Interest' (2009) 33 Marine Policy 183.

4 A 'single corporation registered 47% of all marine sequences including in gene patents, exceeding the combined share of 220 other companies (37%)': Robert Blasiak and others, 'Corporate Control and Global Governance of Marine Genetic Resources' (2018) 4 Science Advances eaar5237.

5 Only 10 countries account for 90% of patents related to marine genetic resources (the US, Japan, certain EU countries, Switzerland and Norway): Sophie Arnaud-Haond, Jesús Arrieta and Carlos M. Duarte, 'Marine Biodiversity and Gene Patents' (2011) 331 Science 1521.

6 Arianna Broggiato and others, 'Mare Geneticum: Balancing Governance of Marine Genetic Resources in International Waters' (2018) 33 International Journal of Marine and Coastal Law 3, 15-16, referring to S Kim Juniper, 'Use of Marine Genetic Resources' in Michael Banks, Caroline Bissada and Peyman Eghtesadi Araghi (eds), *The First Global Integrated Marine Assessment World Ocean Assessment I* (UN, 2016) 7-8, and Iris E Hendriks and Carlos M Duarte, 'Allocation of Effort and Imbalances in Biodiversity Research' (2008) 360 Journal of Experimental Marine Biology and Ecology 15, 17.

7 Broggiato and others (n 6) 12-13, 23.



From a policy perspective, divergence remains⁸ among States whether the freedoms of the high seas, the common heritage regime of the Area, or a hybrid should apply to marine genetic resources under a new international legally binding instrument on marine biodiversity of areas beyond national jurisdiction (BBNJ).⁹ This article will not engage with this question as such, but rather focus on how to ensure benefit-sharing from the use of these resources. The mandate of the BBNJ negotiations has invariably referred to benefit-sharing, without entering into the merit of whether this is a concept attached to one regime or both under the UN Convention on the Law of the Sea (UNCLOS).¹⁰ This is not only an *escamotage* to avoid a principled question that has marred this international debate from the start. Rather, it arguably reflects the evolution of this legal concept in international law. Benefit-sharing was initially seen as part and parcel of the common heritage regime within the conceptual landscape of the New International Economic Order.¹¹ Actually, benefit-sharing was perceived as the most controversial element of common heritage, and was allegedly the reason why common heritage was not developed in other areas of international law.¹² Benefit-sharing has, however, become increasingly a self-standing obligation in international biodiversity law¹³ that is capable of fitting

8 UNGA 'Report of the Preparatory Committee established by General Assembly resolution 69/292: Development of an 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' (10-21 July 2017) 4th Session (2017) UN Doc A/AC.287/2017/PC.4/2.

9 There is abundant research on the question of how to 'fit' marine genetic resources in the context of the different regimes beyond national jurisdiction established by the UN Convention on the Law of the Sea: eg Dire Tladi, 'Conservation and Sustainable Use of Marine Biodiversity in Areas beyond National Jurisdiction: Towards an Implementing Agreement' in Rosemary Rayfuse (ed), *Research Handbook of International Marine Environmental Law* (Edward Elgar 2017) 259; Louise Angélique de La Fayette, 'A New Regime for the Conservation and Sustainable Use of Marine Biodiversity and Genetic Resources Beyond the Limits of National Jurisdiction' (2009) 24 *The International Journal of Marine and Coastal Law* 221; David K Leary, 'Bioprospecting and the Genetic Resources of Hydrothermal Vents on the High Seas: What is the Existing Legal Position, where are we Heading and what are our Options' (2004) 17 *Macquarie J. Int'l & Comp. Env'tl. L.* 137; Natalie Y Morris-Sharma, 'Marine Genetic Resources in Areas beyond National Jurisdiction: Issues with, in and outside of UNCLOS' (2017) 20 *Max Planck Yearbook of United Nations Law* 71; Dire Tladi, 'Genetic Resources, Benefit-sharing and the Law of the Sea: The Need for Clarity' (2007) 13 *Journal of International Maritime Law* 183.

10 UNGA Res 66/231 (24 December 2011) UN Doc A/RES/66/231; reiterated in the mandate of the Preparatory Committee (PrepCom) established by UNGA Res 69/292 'Development of an 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' (19 June 2015) UN Doc A/RES/69/292; UNGA Res 72/249 (24 December 2017) UN Doc A/RES/72/249; United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1982) 21 ILM 1261 (UNCLOS).

11 John E Noyes, 'The Common Heritage of Mankind: Past, Present and Future' (2011) 40 *Denver Journal of International Law & Policy* 447, 451, 469-70.

12 In addition to deep-seabed mining, common heritage has only been used in relation to the Moon in a treaty that did not enter into force: eg Scott J Shackelford, 'The Tragedy of the Common Heritage of Mankind' (2009) 28 *Stanford Environmental Law Journal* 109, 128; Noyes (n 11) 451, 469-70; Jennifer Frakes, 'The Common Heritage of Mankind Principle and the Deep Seabed, Outer Space, and Antarctica: Will Developed And Developing Nations Reach a Compromise?' (2003) 21 *Wisconsin International Law Journal* 409, 417.

13 Convention on Biological Diversity (adopted 5 June 1992, entered into force 29 December 1993) 1760 UNTS 79 (CBD) art 1; International Treaty on Plant Genetic Resources for Food and Agriculture (adopted 3 November 2001, entered into 29 June 2004) 2400 UNTS 303 (ITPGRFA) art 1; Elisa Morgera, 'The Need for an International Legal Concept of Fair and Equitable Benefit-sharing' (2016) 27 *European Journal of International Law* 353.



into different regimes for natural resources (both within and beyond national jurisdiction).¹⁴ On this basis, this paper argues that a reflection on benefit-sharing can be entertained independently of the legal status of marine genetic resources of areas beyond national jurisdiction,¹⁵ and could serve to make progress in developing a hybrid approach to the matter¹⁶ based on an evolutive and systemic interpretation of the law of the sea.

The article will first reflect on the terms in which benefit-sharing has been discussed in the BBNJ negotiations until now, which have been characterized by an operational concern for the type of benefits that could be accrued and distributed. It will then contrast the negotiations with insights arising from other international benefit-sharing regimes, with a view to suggesting a more principled approach focused on 'sharing' benefits 'fairly and equitably.' This will help highlight the potential value added of benefit-sharing to foster deeper and cosmopolitan international cooperation¹⁷ (that is, a global partnership¹⁸) vis-à-vis existing UNCLOS obligations on marine scientific research, capacity building, technology transfer and environmental protection. The article will then apply these considerations to the thorny and novel question of digital information on marine genetic resources of areas beyond national jurisdiction.¹⁹

14 See, however, Kemal Baslar, *The Concept of the Common Heritage of Mankind in International Law* (Martinus Nijhoff, 1998), who instead suggested that common heritage as such should be applied to other natural resources of different international legal status as a functional rather than territorial concept.

15 A similar argument is put forward by David Leary, 'Moving the Marine Genetic Resources Debate Forward: Some Reflections' (2012) 27 *International Journal of Marine and Coastal Law* 435, 438; Broggiato and others (n 6); and by Huaiwen He, 'Limitations to Patenting Inventions Based on Marine Genetic Resources of Areas Beyond National Jurisdiction' (2014) 29 *International Journal of Marine and Coastal Law* 521, 525-26.

16 Note the words of caution in Anna-Maria Hubert and Neil Craik, 'Towards Normative Coherence in the International Law of the Sea for the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction' (*JCLOS Blog*, 1 February 2018) <<http://site.uit.no/jclos/2018/02/01/towards-normative-coherence-in-the-international-law-of-the-sea-for-the-conservation-and-sustainable-use-of-marine-biological-diversity-of-areas-beyond-national-jurisdiction/>> accessed on 4 November 2018.

17 Morgera (n 13) 363-64.

18 Inspired by international solidarity and the Rio Declaration on Environment and Development. For a critical view of Sustainable Development Goal 17 on global partnerships from this perspective, see Nathan John Cooper and Duncan French, 'SDG 17: Partnerships for the Goals - Cooperation within the Context of a Voluntarist Framework' in Duncan French and Louis J Kotzé (eds), *Sustainable Development Goals: Law, Theory and Implementation* (Edward Elgar 2018) 271.

19 The article acknowledges, but does not address, the crucial role played by intellectual property rights (IPRs), with a view to complementing this well-documented debate with a consideration of other legal issues: Eve Heafey, 'Access and Benefit Sharing of Marine Genetic Resources from Areas beyond National Jurisdiction: Intellectual Property--Friend, not Foe' (2014) 14 *Chicago Journal of International Law* 32; Carlos M Correa, 'Access to and Benefit-sharing of Marine Genetic Resources beyond National Jurisdiction: Developing a New Legally Binding Instrument' in Charles R McManis and Burton Ong (eds), *Routledge Handbook of Biodiversity and the Law* (Routledge, 2017); Claudio Chiarolla, 'The Work of the World Intellectual Property Organization (WIPO) and Its Possible Relevance for Global Ocean Governance' (Social Science Research Network, 2016); Ane Jørem and Morten Walløe Tvedt, 'Bioprospecting in the High Seas: Existing Rights and Obligations in View of a New Legal Regime for Marine Areas beyond National Jurisdiction' (2014) 29 *International Journal of Marine and Coastal Law* 321; Angelica Bonfanti and Seline Trevisanut, 'TRIPS on the High Seas: Intellectual Property Rights on Marine Genetic Resources' (2011-2012) 37 *Brooklyn Journal of International Law* 187; and Charlotte Salpin and Valentina Germani, 'Patenting of Research Results related to Genetic Resources from Areas beyond National Jurisdiction: The Crossroads of the Law of the Sea and Intellectual Property Law' (2007) 16 *Review of European Community and International Environmental Law* 12.



2. The current operational focus on benefits

The BBNJ discussions on benefit-sharing have mainly focused on the nature and type of benefits to be distributed, along with linked questions on the material scope of a new instrument, and the need for a global mechanism and for control of access to marine genetic resources. With regard to the scope, the main concern surrounded the question of excluding fish used as a commodity, as opposed to that used for research and development purposes and possibly also for non-commercial research (such as research necessary for fisheries conservation and sustainable use). A proposal in this regard was put forward about developing a scientific threshold to distinguish fish used as a commodity from fish used by bioprospectors, by defining a certain quantity, depending on species and habitat variability, above which fish would be presumed to be caught as a commodity.²⁰

Another question that remains very divisive is whether a new treaty should regulate, or otherwise address, access to marine genetic resources.²¹ International regulation or control of access to resources is probably the most controversial implication of the proposal to extend the common heritage regime of the Area to marine genetic resources. Lighter-touch proposals have also emerged. Some have suggested, for instance, requiring researchers' prior notifications of intended access to a centralized database, to ensure information-sharing on bioprospecting efforts and monitoring of subsequent use of genetic resources.²² Access would thus not be made conditional upon obtaining an international permit or necessarily following a prior environmental impact assessment.²³ This obligation could be accompanied by the issuance of 'passports' or an internationally recognized certificate of compliance,²⁴ to ensure traceability of successive uses and users. Benefit-sharing was then linked to access, based on the idea that different pre-conditions could be set for access for different actors or thresholds, including requirements to provide capacity building and technology transfer for the analysis and use of marine genetic resources.²⁵ Among the possible conditions, one was identified as an upfront monetary contribution by upstream researchers into a global benefit-sharing fund as a mandatory advance payment, or as a voluntary payment to ensure exclusive access to certain ma-

20 UN non-paper, 'Chair's streamlined non-paper on elements of a draft text of an 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' (Chair's streamlined paper) (2017) 14 <www.un.org/depts/los/biodiversity/prepcom_files/Chairs_streamlined_non-paper_to_delegations.pdf> accessed 19 November 2018.

21 Elisa Morgera and others, 'Summary of the 4th Session of the Preparatory Committee Established by the UN General Assembly Resolution 69/292: Development of an 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: 10-21 July 2017' (2017) 25(131) *Earth Negotiations Bulletin* (ENB PrepCom 4).

22 Broggiato and others (n 6) 8, 17-21.

23 Thomas Greiber, 'Common Pools for Marine Genetic Resources: A Possible Instrument for a Future Multilateral Agreement addressing Marine Biodiversity in Areas beyond National Jurisdiction' in Evanson Chege Kamau and Gerd Winter (eds), *Common Pools of Genetic Resources: Equity and Innovation in International Biodiversity Law* (Routledge 2013) 399, 409.

24 Similar to that under the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (adopted 29 October 2010, entered into force 12 October 2014) (Nagoya Protocol) UNEP/CBD/COP/DEC/X/1, art 17(3-4); see ENB PrepCom 4 (n 21).

25 ENB PrepCom 4 (n 21).



marine genetic resources.²⁶ Another (additional or alternative) option was for upstream researchers to ensure facilitated access to marine genetic resource samples and research findings, on the basis of existing UNCLOS obligations on marine scientific research.²⁷ The sharing of samples has allegedly the potential to minimize the need for re-sampling, thereby preventing unsustainable harvesting.²⁸ As the value of genetic resources is not clear at the time of access, payments by operators further down the R&D chain were also considered. It was proposed requesting additional monetary benefit-sharing upon commercialization of products derived from marine genetic resources, and use 'earn-out provisions' for triggering earlier payments at certain non-financial and financial milestones.²⁹

The vast majority of the proposals have thus focused on various types and triggers of benefits. Convergence was only found on the need for the new instrument to address non-monetary benefit-sharing, however.³⁰ Divergent views surrounded the question of whether monetary benefit-sharing should also be specifically provided for and whether an international benefit-sharing 'mechanism' would be needed to that end.³¹ Opposition to monetary benefit-sharing was based on the fact that there already exist functioning centres and databases for documenting and sharing biological and genetic data, which arguably already provide for non-monetary benefit-sharing in the form of information-sharing.³² A new instrument could thus contribute to make this a more systematic practice. Limited capacity of different countries to access and make use of the information contained in databases, as well as intellectual property protection of databases themselves, however, have not been adequately discussed.³³ The need to ensure inter-operability across databases through standardization of collection, storage and benefit-sharing practices³⁴ and to deploy a 'coordinating tracking system'³⁵ has also been underscored. Others raised the concern that the immediate provision of samples and

26 Broggiato and others (n 6) 28-29.

27 Chair's streamlined paper (n 20) 15-16; ENB PrepCom4 (n 21).

28 Greiber (n 23) 409.

29 ENB PrepCom 4 (n 21); on other possible triggers, see Morten Walløe Tvedt and Ane E Jørem, 'Bioprospecting in the High Seas: Regulatory Options for Benefit Sharing' (2013) 16 *Journal of World Intellectual Property* 150, 154.

30 UN non-paper, 'Chair's overview of the second session of the Preparatory Committee' (2016) <www.un.org/depts/los/biodiversity/prepcom_files/Prep_Com_II_Chair_overview_to_MS.pdf> accessed 19 November 2018; see also discussion in Tvedt and Jørem (n 29) 152-55.

31 Elisa Morgera and others, 'Summary of 3rd Session of the Preparatory Committee Established by the UN General Assembly Resolution 69/292: Development of an 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: 27 March - 7 April 2017' (2017) 25 (129) *Earth Negotiations Bulletin* (ENB PrepCom3).

32 See eg Harriet Harden-Davies, 'Deep-sea Genetic Resources: New Frontiers for Science and Stewardship in Areas beyond National Jurisdiction' (2017) 137 *Deep-Sea Research Part II* 504.

33 Claudio Chiarolla, 'Intellectual Property Rights and Benefit Sharing from Marine Genetic Resources in Areas beyond National Jurisdiction: Current Discussions and Regulatory Options' (2014) 4 *Queen Mary Journal of Intellectual Property* 171, 183-84.

34 Harriet Harden-Davies, 'Marine Science and Technology Transfer: Can the Intergovernmental Oceanographic Commission Advance Governance of Biodiversity beyond National Jurisdiction?' (2016) 74 *Marine Policy* 260, 261.

35 Broggiato and others (n 6) 32.



of information on marine genetic resources may act as a disincentive for scientists,³⁶ presumably on the understanding that it takes time to determine the potential value of genetic resources and other scientists may be able to determine it without taking the risks and bearing the costs of bioprospecting in areas beyond national jurisdiction.

Many delegations appear to share the view that non-monetary benefit-sharing may be more immediate and predictable, as well as more significant in development terms, than monetary benefit-sharing. In effect, it has been argued, with reference to other international regimes, that non-monetary benefit-sharing helps respond to endogenously identified needs through capacity-building that effectively bridges equity gaps in R&D.³⁷ But the insistence on an exclusively non-monetary approach raised suspicion that it would merely encompass existing good scientific practices, and not change the current *ad hoc* approach that has not sufficed to fully implement existing obligations on capacity building, technology transfer and marine scientific cooperation.³⁸ As a developed country group cautioned, non-monetary benefit-sharing could amount to relying on existing UNCLOS provisions embodying generic obligations to make research findings available through publication and dissemination, and promote data and information flows,³⁹ which are largely non-implemented. Some developing country delegations cautioned against making funding for capacity building and technology transfer conditional on access and use.⁴⁰ Furthermore, what has become increasingly clear in the negotiations is the understanding that monetary/non-monetary is a false dichotomy, because non-monetary benefits have costs and economic value.⁴¹ For instance, sharing raw data on marine genetic resources as an open access resource still requires the development of adequate infrastructure and curation; training has costs related to trainees' travel, precious space/resources on expensive scientific research vessels, trainers' time, and scholarships; and the sharing of best practices requires analysis and effective delivery of information.

3. A principled approach to benefit-sharing and its value added

What has lacked in the BBNJ negotiations, and admittedly is often missing as an explicit consideration in other intergovernmental processes on benefit-sharing, is a more principled exchange on what it means 'to share' benefits and when such sharing is 'fair and equitable.' As discussed below, benefit-sharing is a treaty objective, an obligation and a mechanism under international biodiversity law. It is also a component of the human right to science,⁴² which is relevant to the BBNJ negotiations,

36 ENB PrepCom 4 (n 21).

37 This has been considered, for instance, the principal success of the ITPGRFA: Elsa Tsiumani, 'Beyond Access and Benefit-sharing: Lessons from the Emergence and Application of the Principle of Fair and Equitable Benefit-sharing in Agrobiodiversity Governance' in Fabien Girard and Christine Frison (eds), *The Commons, Plant Breeding and Agricultural Biotechnologies: Challenges for Food Security and Agrobiodiversity* (Routledge 2018) 41, 53.

38 UNGA 'Report of the work of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea' (22 July 2010) 11th Meeting UN Doc A/65/164, paras 28, 57.

39 Chair's streamlined paper (n 20) 17-19.

40 ENB PrepCom 3 (n 31).

41 *ibid.*

42 Universal Declaration of Human Rights (adopted 10 December 1948) (UDHR) UN Doc A/810 71, art 27.



as well as to international biodiversity law.⁴³ While the status of benefit-sharing in international law remains a matter of speculation, it can be argued that it is emerging as a general principle of international law.⁴⁴ It can be considered as a sub-set of the general principle of equity,⁴⁵ as it transcends particular treaty regimes as the manifestation of consensus among developed and developing countries⁴⁶ on ‘the evolution of a new balance of rights and duties in many fields of international law’ ‘in a world deeply divided by conflicting ideologies as well as conflicting interests.’⁴⁷

It has been argued elsewhere, that benefit-sharing, as a sub-set of the general principle of equity, is ‘open-textured and evolutionary’ and ‘may be filled with content by establishing a linkage with different international legal sub-systems.’⁴⁸ A principled approach can thus build not only upon the experience of other international benefit-sharing agreements related to genetic resources, but also on the objectives and standards of other areas of international law. The BBNJ negotiations have, of course, already identified the relevance of international biodiversity law for developing a new instrument, although, as will be discussed below, mainly form an operational rather than principled perspective. In addition, it is argued here that international human rights law⁴⁹ also provides insights and standards for filling with content benefit-sharing obligations under a new instrument on BBNJ.

This is notably the case of the human right to science. It was proclaimed in the Universal Declaration of Human Rights⁵⁰ and has been enshrined in several treaties, including the International Cove-

43 Elisa Morgera, ‘Fair and Equitable Benefit-sharing at the Crossroads of the Human Right to Science and International Biodiversity Law’ (2015) 4 *Laws* 803.

44 Elisa Morgera, ‘Fair and Equitable Benefit-sharing’ in Ludwig Krämer and Emanuela Orlando (eds), *Principles of Environmental Law* (Edward Elgar, 2018) 323, 332-34.

45 Francesco Francioni, ‘Equity’ in Rüdiger Wolfrum (ed), *Max Planck Encyclopedia of Public International Law* (OUP 2010; online edition).

46 Rüdiger Wolfrum ‘General International Law (Principles, Rules and Standards)’ in Wolfrum (n 45) paras 28, 33–36.

47 Wolfgang Friedmann, ‘The Use of “General Principles” in the Development of International Law’ (1963) 57 *American Journal of International Law* 279, 287, 289–90.

48 Morgera (n 13) 381-82.

49 As the 2018 UN Framework Principles on Human Rights and the Environment underline, States should respect, protect and fulfil human rights in the actions they take to address environmental challenges and pursue sustainable development (Principle 16): UNHRC ‘Report of the Special Rapporteur on Human Rights and the Environment: Framework Principles on Human Rights and the Environment’ (2018) UN Doc A/HRC/37/59.

50 On the broad consensus regarding the inclusion of the human right to science in the Universal Declaration of Human Rights, see: William A Schabas, ‘Study of the Right to Enjoy the Benefits of Scientific and Technological Progress and its Applications’ in Yvonne Donders and Vladimir Volodin (eds), *Human Rights in Education, Science and Culture: Legal Developments and Challenges* (Ashgate, 2007).



nant on Economic, Social and Cultural Rights,⁵¹ so its legally binding force is not under discussion.⁵² It is seen as an autonomous right that is worthy of protection for its contribution to the continuous raising of the material and spiritual standards of living of all members of society, both for individual emancipation and collective economic and social progress.⁵³ As such, it may contribute to the enjoyment of other human rights such as the rights to food and health,⁵⁴ and therefore significant for the realization of SDGs 2 (hunger) and 3 (health and well-being). In addition, the right to science contributes to '[protecting] and [enabling] each person to develop his or her capacities for education and learning, to form enduring relationships with others, to take equal part in political, social and cultural life and to work without fear of discrimination.'⁵⁵ It therefore contributes to the implementation of SDGs 4 (education), 8 (decent work) and 10 (inequality).⁵⁶

In 2011, the UN Special Rapporteur on cultural rights Farida Shaheed suggested that the right to science encompasses four distinct elements: the right to share in the benefits of science for everyone without discrimination; the opportunity for all to contribute to scientific research; the obligation to protect all persons against negative consequences of scientific research or its applications on their food, health, security and environment; and the obligation to ensure that priorities for scientific research focus on key issues for the most vulnerable.⁵⁷ While the international law of the sea does not refer to human rights and is framed in terms of inter-State obligations, its provisions on scientific cooperation, technology transfer, capacity building and environmental protection can be read in light of the human right to science, as UNCLOS is a living instrument that is interpreted in light of other relevant international law developments.⁵⁸ Applying such an international human rights law lens would serve to highlight how limited implementation of these inter-State obligations negatively affects individuals and groups. In effect, recent efforts to conceptually clarify the human right to science have specifically pointed to inter-State technology transfer obligations,⁵⁹ arguably expressing a discontent about the current level of cooperation and implying that non-compliance with international environmental provisions on technology transfer is also a matter of international human

51 International Covenant on Economic, Social and Cultural Rights (adopted 16 December 1966, entered into force 3 January 1976) 6 ILM 360 (ICESCR) art 15. See also: Charter of the Organization of American States (adopted 30 April 1948) 119 UNTS 3, art 38; American Declaration on the Rights and Duties of Man (adopted 30 April 1948) OAS Res XXX, art XIII; Additional Protocol to the American Convention on Human Rights in the Area of Economic, Social and Cultural Rights (Protocol of San Salvador) (adopted 17 November 1988, entered into force 16 November 1999) 28 ILM 156, art 14; and Arab Charter on Human Rights (adopted 22 May 2004, entered into force 15 March 2008) art 42.

52 Mikel Mancisidor, 'Is There such a Thing as a Human Right to Science in International Law?' (2015) 4(1) European Society of International Law <<http://esil-sedi.eu/?p=897>> accessed 20 November 2018.

53 Aurora Plomer, *Patents, Human Rights and Access to Science* (Edward Elgar 2015).

54 Schabas (n 50); Mancisidor (n 52); and Audrey R Chapman, 'Towards an Understanding of the right to Enjoy the Benefits of Scientific Progress and its Applications' (2009) 8 Journal of Human Rights 1.

55 Plomer (n 53).

56 Elisa Morgera and Mara Ntona, 'Linking Small-Scale Fisheries to International Obligations on Marine Technology Transfer' (2018) 93 Marine Policy 295.

57 UNHRC 'Report of the Special Rapporteur in the field of cultural rights: the right to enjoy the benefits of scientific progress and its applications' (14 May 2012) UN Doc A/HRC/20/26, paras 1, 25, 30–43.

58 See eg Jill Barret and Richard Barnes, *Law of the Sea: UNCLOS as a Living Treaty* (BIICL 2016).

59 Special Rapporteur in the field of cultural rights (n 57) paras 65–69.



rights law.⁶⁰ Thus, current efforts to clarify the content of the right to science provide useful insights also for BBNJ negotiations, which are expected to play a prominent role in advancing science.⁶¹ This in turn will be particularly relevant for the role of a new instrument in supporting the realization of the Sustainable Development Goals across scales. In other words, a human rights lens may provide a powerful analytic tool for deepening the understanding of the content of, and consequences of non-compliance with, international provisions on scientific cooperation, technology transfer capacity building and environmental protection, including vis-à-vis small-scale fishing communities and traditional knowledge holders.⁶² The next two subsections will focus on how reliance on the right to science may help fleshing out a principled approach to 'sharing' benefits and to fairness and equity.

3.1 Why focusing on 'sharing' benefits?

Legal scholars engaging with the right to science argued that 'sharing' benefits is a key conceptual element to be clarified. Mancisidor, who is currently leading the development of a general comment on the right to science, emphasized that the concept of 'sharing' indicates agency.⁶³ The *travaux préparatoires* of the Universal Declaration suggest that 'sharing' conveys the idea that even if not everyone may play an active part in scientific advancements, all persons should indisputably be able to participate in the benefits derived from it.⁶⁴ In other words, beneficiaries should not be passive receivers of benefits, but active participants in discussions about the nature of benefits, their desirability/appropriateness, and their distribution modalities. While not explicitly referring to agency, other international sources have pointed to the linkage between benefit-sharing and the right to self-determination of indigenous peoples,⁶⁵ or more generally to partnership building among different stakeholders.⁶⁶ On that basis, it has been argued that 'sharing' implies a concerted, iterative

60 Morgera (n 43) 818.

61 Glen Wright and others, 'Protect the Neglected Half of our Blue Planet' (2018) 554 *Nature* 163; Harriet Harden-Davies, 'The Next Wave of Science Diplomacy: Marine Biodiversity beyond National Jurisdiction' (2018) 75 *ICES Journal of Marine Science* 426.

62 See generally Morgera and Ntona (n 56).

63 Mancisidor (n 52).

64 Chapman (n 54) 5–6.

65 UNHRC 'Report of the Special Rapporteur on the situation of human rights and fundamental freedoms of indigenous people' (15 July 2009) UN Doc A/HRC/12/34, para 53; UNHRC 'Report of the Special Rapporteur on Indigenous Peoples' Rights: Extractive Industries and indigenous peoples' (1 July 2013) UN Doc A/HRC/24/41, paras 75–77, 88, 92; UNPFII 'Review of Developments Pertaining to the Promotion and Protection of Human Rights and Fundamental Freedoms of Indigenous Peoples' (20 June 2001) UN Doc E/CN.4/Sub.2/AC.4/2001/2, para 19.

66 On the intra-state dimension of benefit sharing, see eg CBD, 'Möotz Kuxtal Voluntary Guidelines' (4–17 December 2016) (CBD Decision XIII/18) UN Doc CBD/COP/DEC/XIII/18, paras 6, 24 for the development of mechanisms, legislation or other appropriate initiatives to ensure the 'prior informed consent', 'free prior informed consent' or 'approval and involvement', depending on national circumstances, of indigenous peoples and local communities for accessing their knowledge, innovations and practices, the fair and equitable sharing of benefits arising from the use and application of such knowledge, innovations and practices and for reporting and preventing unauthorized access to such knowledge, innovations and practices; UNPFII Review (n 65). On the inter-state dimension, see eg ECOSOC 'Report of the High-Level Task Force on the Implementation of the Right to Development on Its Second Meeting' (8 December 2005) UN Doc E/CN.4/2005/WG.18/TF/3, para 82.



dialogue aimed at finding common understanding in identifying and apportioning benefits to lay the foundation for a partnership among different actors in the context of power asymmetries,⁶⁷ and possibly different (world)views.⁶⁸ This relies on a consideration of a menu of benefits, the nature of which can be economic and non-economic, with a view to taking into account the beneficiaries' needs, values, and priorities through a contextual selection of the combination of benefits that may best serve to lay the foundation for a partnership.⁶⁹ In other words, benefit-sharing is not about the sharing of any benefits irrespective of the views of the beneficiaries. It should therefore not be understood in a mere logic of exchange, but rather as the identification of a path towards a deeper form of cosmopolitan cooperation to realize relevant international objectives.⁷⁰

But what difference would such a principled discussion make in the ongoing BBNJ negotiations? What value added would such understanding of benefit-sharing offer vis-à-vis existing UNCLOS obligations that already provide for non-monetary benefit-sharing, such as scientific cooperation, capacity building and technology transfer? A common trend seems to be emerging in other international benefit-sharing regimes that may provide an answer to these questions. Namely, a concerted and iterative dialogue can be arguably facilitated at the international level through a proactive and institutionalized multilateral approach to facilitate and broker, and possibly also oversee and identify gaps or issues in, an otherwise *ad hoc* flow of information-sharing, scientific cooperation and capacity-building activities.⁷¹ One such example can be found in the context of guidelines on training programmes for operators used by the Secretariat of the International Seabed Authority (ISA). The guidelines act as a benchmark for assessing operators' exploration proposals. They specify that the training programme should be designed and carried out for the benefit of the trainee, the nominating country and ISA member states, with every attempt being made to follow best practice at all times and to contribute to the training and capacity development needs of the participants' country of origin. The guidelines also emphasize that the provision of training is no less important than any other activity included in the proposed plan of work and should be afforded the same priority in terms of time, effort and financing.⁷² In addition, the guidelines assist in matching suitable candidates to training opportunities offered by contractors. The ISA Legal and Technical Commission agrees on a list of pre-approved candidates from the roster on the basis of transparent criteria and conducts regular reviews to ensure that the goal of equitable and geographic sharing of opportunities is followed.

67 See eg ECOSOC Report (n 66). For a discussion, Morgera (n 13) 363-66.

68 Morgera (n 13) 363-66.

69 *ibid.*

70 *ibid.* 364.

71 Elisa Morgera, 'Study on Experiences Gained with the Development and Implementation of the Nagoya Protocol and Other Multilateral Mechanisms and the Potential Relevance of Ongoing Work Undertaken by Other Processes, Including Case Studies' (1-3 February 2016) UN Doc UNEP/CBD/ABS/A10/EM/2016/1/2. This point is also made by Broggiato and others (n 6) 24.

72 International Seabed Authority, 'Recommendations for the guidance of contractors and sponsoring States relating to training programmes under plans of work for exploration' (15-26 July 2013) Doc ISBA/19/LTC/14.



Another example can be found under the International Treaty on Plant Genetic Resources for Food and Agriculture, which is developing a more institutionalized multilateral approach to support information-sharing and its links to capacity building. The development of a Global Information System (GLIS)⁷³ is under way with a view to integrating and augmenting existing information systems, by promoting and facilitating interoperability among them, and creating a mechanism to assess progress and monitor effectiveness. At the same time, the GLIS proactively identifies opportunities for all to contribute to scientific research, providing capacity development and technology transfer.⁷⁴ This shows the potential of more institutionalized approaches to ensure responsiveness to the needs of those benefitting from information-sharing, provide oversight of the distribution of benefits across different regions, and contribute to a more systematic encouragement of virtuous circles through capacity building.

Overall, this trend across international benefit-sharing regimes supports the proposal in the BBNJ negotiations for an international benefit-sharing mechanism, shedding light (as will be discussed below) on the possible roles of a clearinghouse. It also provides useful basis for assessing, by comparison, the potential role of the UNESCO Intergovernmental Oceanographic Commission under a new instrument on the basis of its existing and planned competencies and initiatives.⁷⁵

A concerted and iterative dialogue through a proactive and institutionalized multilateral approach can also serve to identify and address any shortcomings in benefit-sharing that will emerge through implementation. This may be particularly useful with regard to monetary benefit-sharing, as the key lesson learned in other multilateral benefit-sharing instruments is that monetary benefits are very difficult to be accrued in practice. This is most notably the case of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA),⁷⁶ where government donations have been relied upon to operate the Benefit-sharing Fund, as a trigger for monetary benefit-sharing linked to patent-related access restrictions has 'proved to be ineffective.'⁷⁷ This is partly because of the uncertainties and length inherent in a bio-based R&D process and partly because of loopholes in the system (as genetic material is available outside of the system, in private-company gene banks or the col-

73 ITPGRFA (n 13) art 17.

74 ITPGRFA (Resolution of the Governing Body) Res 3/2015 (2015) UN Doc IT/GB-6/15/Res3.

75 IOC-UNESCO 'IOC Potential Contribution to a New International Instrument under UNCLOS on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction' (17 May 2016) IOC/INF-1338, 3-4. See also Harden-Davies (n 34); and Broggiato and others (n 6) 31.

76 The relevance of the ITPGRFA for the negotiations on marine biodiversity has been raised several times: Petra Drankier and others, 'Marine Genetic Resources in Areas beyond National Jurisdiction: Access and Benefit-Sharing' (2012) 27 International Journal of Marine and Coastal Law 375; see considerations by Leary (n 9) 442-445 and Elsa Tsioumani, 'Beyond Access and Benefit-Sharing: Lessons From the Law and Governance of Agricultural Biodiversity' (2018) 21 Journal of World Intellectual Property Rights 106 (forthcoming).

77 Chiarolla (n 33) 186.



lections of non-Parties).⁷⁸ To address the need to ensure the financial viability, ITPGRFA parties are thus considering an upfront regular payment of fees by users.⁷⁹ Another interesting example, already in operation, is provided by the WHO, which is implementing a system of mandatory contributions (annual partnership contributions) to its benefit-sharing instrument related to pandemic influenza.⁸⁰ Each year the WHO issues a questionnaire that identifies potential contributors, such as companies and institutions that conduct research and development in the field of influenza and all recipients of pandemic influenza preparedness biological material recorded in the Influenza Virus Traceability Mechanism database.⁸¹ This shows the potential of 'partnership contributions from commercial partners interested in accessing materials and metadata from institutions that belong to a public [marine genetic resources] research network'.⁸²

Overall, a principled focus in the negotiations on 'sharing' benefits can lead to a more systematic discussion about the objectives and functions of a benefit-sharing mechanism as an iterative partnership-building process for enhancing the implementation of UNCLOS and other relevant international law. This could serve to weigh different options to address the challenges that have characterized other international benefit-sharing instruments, such as the need to identify users that could become benefit-sharing trend-setters in their sector; the financial viability of both monetary and non-monetary benefit-sharing and in particular the challenges in linking monetary benefits to intellectual property rights with the result of restricting the use of materials that may provide other benefits to humanity.⁸³ Furthermore concerted and iterative dialogue through an institutionalized multilateral approach can serve to better understand the interactions between monetary and non-monetary benefits for building capacity, even where there may be institutional distinctions in the accruing and delivery of monetary and non-monetary benefits.⁸⁴

3.2 Why focusing on fairness and equity?

Another key element of benefit-sharing that is often left undetermined in intergovernmental negotiations is equity.⁸⁵ Benefit sharing is invariably accompanied by the qualification 'equitable'⁸⁶ or 'fair

78 Elsa Tsoumani, 'Why Technicalities Matter – On the International Treaty on Plant Genetic Resources for Food and Agriculture and the Seventh Session of its Governing Body' (*BENELEX blog*, 13 March 2018) <<https://benelexblog.wordpress.com/2018/03/13/why-technicalities-matter-on-itpgrfa-gb7/>> accessed 4 November 2018. All BENELEX blog posts cited in this article can be found at <<https://benelexblog.wordpress.com/>> accessed 20 November 2018.

79 ITPGRFA 'Report of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture' (5-9 October 2015) Secretariat Sixth Session UN Doc IT/GB-6/15/Report Add 1 Rev 1.

80 World Health Organization (WHO) 'Pandemic Influenza Preparedness Framework for the Sharing of Influenza Viruses and Access to Vaccines and Other Benefits' (24 May 2011) (PIP Framework) WHA64.5, art 6 (14) (3).

81 WHO 'Influenza' (PIP Framework) <www.who.int/influenza/pip/benefit_sharing/partnership_contribution/en/> accessed 4 November 2018.

82 Chiarolla (n 33) 191, who also underscored the key differences between the WHO, ITPGRFA and BBNJ contexts 184-91.

83 Tsoumani (n 76) 116-17.

84 Elsa Tsoumani, 'Beyond Access and Benefit-Sharing: Lessons from the Law and Governance of Agricultural Biodiversity' BENELEX Working Paper 9/2016 (Social Science Research Network 2016) 28-29 <<https://papers.ssrn.com/abstract=2796658>> accessed 4 November 2018.

85 Francioni (n 45).

86 UNCLOS (n 10) art 140; CBD (n 13) art 8(j).



and equitable⁸⁷ in existing international treaties. The mandate of the BBNJ negotiations, however, was silent on whether benefit-sharing was linked to equity and fairness.⁸⁸ This section will first outline the different views of equity that have emerged in the BBNJ negotiations. It will then discuss the implications of addressing equity through a standardized contract and different ways to approach the distribution of benefits, with a view to identifying additional options arising from the application of the human right to science.

3.3 Different conceptions of equity

Under the BBNJ process, national delegations have expressed different conceptions of equity underlying the different jurisdictional regimes established by UNCLOS. Developing States have argued that the common heritage approach should be adapted to marine genetic resources, as both deep-seabed mining and deep-sea bioprospecting are activities that are only available to high-tech countries, thereby raising the same equity concerns in the Area: resources of areas beyond national jurisdiction should not be appropriated exclusively by technologically advanced States, but rather conserved and exploited only for the benefit of humankind, without discrimination. That is, control of these resources should be placed under an international institution to manage and regulate activities which must be conducted for peaceful purposes and lead to sharing revenues, as well as technology, research results and building-capacity opportunities (participation in scientific expeditions and follow-up research).⁸⁹ Some suggested that this role could be played by the International Seabed Authority itself.⁹⁰ Certain developed countries, however, have opposed this view of equity, underscoring that the high seas freedoms, as the default regime that applies in the absence of an explicit indication to the contrary in UNCLOS, supports a different equity perspective. According to that view, research and development on marine genetic resources in the deep seas is a highly costly and time-consuming endeavour with uncertain results, that when successful would benefit humanity in the form of scientific advancements contributing to global public health, food security and environmental protection. These countries have indicated openness to some form of non-monetary benefit-sharing, either through codes of conduct or the ad hoc sharing of data and research results, capacity building and scientific collaboration.⁹¹

87 CBD (n 13) arts 1, 15(7); ITPGRFA (n 13) arts 1, 10(2), 11(1); Nagoya Protocol (n 24) Annex I arts 1, 5.

88 Charlotte Salpin, 'Marine Genetic Resources of Areas Beyond National Jurisdiction: Soul Searching and the Art of Balance' in Elisa Morgera and Kati Kulovesi (eds), *Research Handbook on International Law and Natural Resources* (Edward Elgar 2016) 411, 428.

89 UNCLOS (n 10) arts 137, 140, 144.

90 Elisa Morgera, 'Summary of the Eight Meeting of the Working Group on Marine Biodiversity Beyond Areas of National Jurisdiction: 16-19 June 2014' (2014) 1 <http://enb.iisd.org/oceans/marinebiodiv8/brief/brief_marine_biodiv8.pdf> accessed 19 November 2018; Elisa Morgera and others, 'Summary of the Second Session of the Preparatory Committee on Marine Biodiversity Beyond Areas of National Jurisdiction: 26 August-9 September 2016' (2016) 25(118) *Earth Negotiations Bulletin* 4.

91 ENB PrepCom 4 (n 21) 19; Salpin (n 88) 412.



While this divergence of views was not expected to be overcome during the preparatory phases of the BBNJ negotiations, some proposals were put forward about specific equity dimensions of a new instrument. One suggestion was to link ‘fair and equitable’ benefit-sharing to UNCLOS preambular language on a ‘just and equitable international economic order which takes into account the interests and needs of [hu]mankind as a whole,’ as this was also the basis for UNCLOS benefit-sharing provisions in relation to outer continental shelf resources and deep-seabed mineral resources.⁹² Another proposal was to create a review mechanism over time to assess fairness and equity in actual benefit-sharing arrangements under a new instrument.⁹³ The latter could be part of a global benefit-sharing mechanism supporting a concerted and iterative dialogue based on continuous learning.

From a theoretical perspective, it has been argued that the use of the two expressions ‘fair and equitable’ serves to make explicit both procedural dimensions of justice (fairness) that determine the legitimacy of certain courses of action, as well as substantive dimensions of justice (equity)⁹⁴ to balance competing rights and interests⁹⁵ to the benefit of all, not just to the advantage of the powerful.⁹⁶ References to fairness and equity in international law are thus understood as a mandate for the global community to engage in a dialogue to develop a common understanding⁹⁷ of what is understood as fair and equitable, including in light of other relevant areas of international law.⁹⁸ This can arguably help to discuss in an open and structured manner the respective merits of different legal options from different justice perspectives in developing a new international instrument.⁹⁹ Specific justice considerations can be drawn from the right to science, such as prioritizing ‘simple and inexpensive technologies that can improve the life of marginalized populations’ and the ‘development of international collaborative models of research and development for the benefit of developing countries and their populations.’¹⁰⁰ In both cases, the preferences of intended beneficiaries and local contextual elements need to be assessed,¹⁰¹ to prevent dependency on exogenous, ready-made solutions that may

92 Michael E Lodge and others, ‘Sharing and Preserving the Resources in the Deep Sea: Challenges for the International Seabed Authority’ (2017) 32 *International Journal of Marine and Coastal Law* 427.

93 ENB PrepCom 4 (n 21).

94 Roland Kläger, *Fair and Equitable Treatment in International Investment Law* (Cambridge University Press 2013) 141–52 commenting on Thomas M Franck, *Fairness in International Law and Institutions* (Oxford University Press 1995).

95 Ciarán Burke, *An Equitable Framework for Humanitarian Intervention* (Hart 2014) 197–98.

96 *ibid* 250–51.

97 Kläger (n 94) 144.

98 The suggestion to draw on the evolution of fair and equitable treatment under international investment law: Francesco Francioni, ‘International Law for Biotechnology: Basic Principles’ in Francesco Francioni and Tullio Scovazzi (eds), *Biotechnology and International Law* (Hart 2006) 3, 24.

99 Elisa Morgera, ‘Justice, Equity and Benefit-Sharing Under the Nagoya Protocol to the Convention on Biological Diversity’ (2015) 24 *Italian Yearbook of International Law* 113. See also Bege Dauda and others, ‘What Do the Various Principles of Justice Mean Within the Concept of Benefit Sharing?’ (2016) 13 *Journal of Bioethical Inquiry* 281.

100 Special Rapporteur in the field of cultural rights (n 57) para 68.

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



not fit particular circumstances or the exertion of undue influence.¹⁰² The components of the right to science thus provide concrete pointers: non-discriminatory results, prioritization of the needs of the vulnerable, and protection against negative environmental and socio-economic consequences of scientific research.

3.4 Accruing benefits through standardized contracts

Defining legal choices in a new instrument on benefit-sharing, however, would not exhaust the space for dialogue on concrete fairness and equity dimensions. Although multilateral benefit-sharing is often conceived as an inter-State mechanism, all existing multilateral benefit-sharing mechanisms ultimately rely on standard contractual clauses to reach non-State actors that will ultimately be those producing benefits.¹⁰³ A standardized contractual approach in principle allows to distill intergovernmental consensus on certain conditions to achieve fairness and equity in the relationship with a private user, while making a clear and explicit connection with the public international law dimension of the benefit-sharing obligations under an international instrument.¹⁰⁴ To that end, such a contract can make reference to treaty objectives and international provisions as terms of reference for the interpretation of the contract,¹⁰⁵ to ensure uniform interpretation across jurisdictions where users may be based.

In addition, a standardized contract can address the risk of differing interpretations by national courts,¹⁰⁶ by opting for alternative dispute mechanisms. This can be done on the assumption that non-judicial means entail higher flexibility, simpler procedures and lower costs than national judicial ones.¹⁰⁷ Such an assumption, however, needs to be critically examined. In actual fact, alternative dispute resolution (particularly arbitration) may well be costlier than access to national courts, and can be less transparent as arbitral awards are usually confidential. In addition, arbitrators are likely to be more familiar with (and, therefore, more inclined to give weight to) commercial law than public in-

102 Elisa Morgera, Elsa Tsoumani and Matthias Buck, *Unraveling the Nagoya Protocol: A Commentary on the Nagoya Protocol on Access and Benefit-sharing to the Convention on Biological Diversity* (Nijhoff Publishers 2014) 313, 331.

103 James Harrison, 'Who benefits from the exploitation of non-living resources on the seabed? Operationalizing the benefit-sharing provisions in the UN Convention on the Law of the Sea' (*BENELEX blog*, 1 July 2015) <<https://benelexblog.wordpress.com/2015/07/01/who-benefits-from-the-exploitation-of-non-living-resources-on-the-seabed-operationalizing-the-benefit-sharing-provisions-in-the-un-convention-on-the-law-of-the-sea/>> accessed 4 November 2018; and Elisa Morgera, 'Multilateral benefit-sharing: whither from here?' (*BENELEX blog*, 20 June 2016) <<https://benelexblog.wordpress.com/2016/06/20/multilateral-benefit-sharing-whither-from-here/>> accessed 4 November 2018.

104 Elisa Morgera and Lorna Gillies, 'Realizing the Objectives of Public International Environmental Law through Private Contracts: The Need for a Dialogue with Private International Law Scholars?' in Duncan French, Veronica Ruiz Abou-Nigm and Kasey McCall-Smith (eds), *Public and Private International Law: Strengthening Connections* (Hart 2018) 175.

105 Claudio Chiarolla, 'Plant Patenting, Benefit Sharing and the Law Applicable to the Food and Agriculture Organisation Standard Material Transfer Agreement' (2008) 11 *Journal of World Intellectual Property* 1, observes 'The reference to "the objectives and the relevant provisions of the Treaty" (i.e. truly international standards) reflects the important public interest functions discharged by the SMTA.'

106 *ibid.*

107 Hiroshi Isozaki, 'Enforcement of ABS Agreements in User States' in Kamau and Winter (n 23) 439, 446.



ternational law dimensions of the dispute. From a private international law perspective, a principled objection can also be identified: arbitration essentially ‘takes away from States altogether’ their regulatory authority over the private law questions at hand,¹⁰⁸ and with that also the regulatory authority over the underlying public international law objectives.¹⁰⁹ There is, therefore, a risk in diverting disputes from courts, as public bodies may be better entrusted to pursue public objectives. The risk consists in exposing parties to power imbalances in the resolution of the dispute, and to potentially lower standards of justice than those presumably inherent in national courts.¹¹⁰ In addition, even in the context of standardized contracts, complex legal questions arising from the interface of public and private international law in relation to access to justice as a human right¹¹¹ cannot be excluded and have only started to be mapped in legal scholarship.¹¹²

A principled discussion on fairness and equity under a new BBNJ instrument could thus address issues around interpretation of standardized benefit-sharing contracts in light of public international law objectives, as understanding of equity and fairness issues evolves among relevant parties. It could seek to find a balanced approach to confidentiality, legal certainty and access to remedies also in light of relevant international human rights standards and the different dimensions of the right to science in particular. A cautious and iterative multilateral dialogue on the use of contracts from a fairness and equity perspective is particularly important as research on the role of benefit-sharing contracts remains very limited.¹¹³

3.5 Distributing benefits through other multilateral approaches

Establishing more specific conditions for equity and fairness in benefit-sharing to a standardized contract does not exhaust the need for multilateral dialogue either. For one thing, these contracts are mainly concerned about accruing benefits from users, but may not necessarily address the question of the distribution of benefits. Along these lines, as complementary approaches to a standardized contract for benefit-sharing, the World Health Organization has developed a benchmark for equity in relation to the distribution of benefits based on the principles of public health risk and needs.¹¹⁴ On this basis, a prioritization of beneficiary countries is carried out by the WHO’s regional officers. The WHO Director General oversees the distribution of benefits, with the support of an advisory group (comprising a mix of internationally recognized policy makers, public health experts and technical experts) that monitors implementation and provides recommendations on the application of the fairness and equity criteria.¹¹⁵ A similar model could be conceived under a new BBNJ instrument, on

108 Alex Mills, ‘Connecting Public and Private International Law’ in French, Ruiz Abou-Nigm and McCall-Smith (n 104) 13.

109 Morgera and Gillies (n 104) 189.

110 Lorna McGregor, ‘Alternative Dispute Resolution and Human Rights: Developing a Rights-Based Approach through the ECHR’ (2015) 26 *European Journal of International Law* 607, 609.

111 Francesco Francioni (ed), *Access to Justice as a Human Right* (Oxford University Press 2007).

112 Morgera and Gillies (n 104) 196-98.

113 Tsioumani (n 84) 29.

114 PIP Framework (n 80) art 6(1).

115 *ibid* art 7(1)-(2), Annex 3, 2(1)(d).



the basis of global assessments of risks for ocean health and needs to address them, and an involvement of regional seas conventions and relevant sectoral bodies in the identification of beneficiary countries.

A different approach for the distribution of benefits has been adopted instead under the ITPGRFA: a global Benefit-Sharing Fund channels benefits to particular activities in developing countries with a view to assisting particular communities and partner research institutions in producing global benefits (in terms of conservation and sustainable use of biodiversity) as well as the livelihoods of concerned communities.¹¹⁶ Equity and fairness are therefore addressed through specific eligibility and selection criteria to assess project proposals, which were adopted by the ITPGRFA Governing Body and applied by a panel of experts. This approach could serve to create links between international and local benefits, taking into account the local contributions to, and implications for, the realization of the SDGs in relation to traditional knowledge holders whose relevance have become increasingly clear in the BBNJ process.¹¹⁷ It would also be in line with guidance under the Convention on Biological Diversity on integrating traditional knowledge in marine impact assessments and ecologically and biologically significant marine areas.¹¹⁸ It could also chime with ongoing global scientific assessments such as those under the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.¹¹⁹ At the same time, however, the competitive nature of a project-based approach may take insufficient account of the unequal capacities of different countries and actors.¹²⁰ To address some of these concerns, the ITPGRFA Secretariat has organized a series of workshops and a helpdesk function to assist applicants to prepare proposals.¹²¹ Prioritizing and effectively supporting beneficiaries in an increasingly complex landscape of actors and different (public and private) interests remains an issue under the ITPGRFA and should be considered also in the context of the BBNJ process.¹²²

A principled discussion of a benefit-sharing mechanism under a new BBNJ instrument could focus on fairness and equity criteria and approaches for distributing benefits in order to avoid discrimination and respond to the needs of the vulnerable, while preventing negative environmental and socio-economic consequences of scientific research. Such a discussion could focus on possible means to target both global and local benefits, as well as on opportunities to build on global and regional findings and institutions. The discussion could further reflect on ways to receive and assess proposals from local actors, and supporting new collaborative approaches and learning across scales.

116 FAO, ITPGRFA 'Benefit-sharing Fund' <www.fao.org/plant-treaty/areas-of-work/benefit-sharing-fund/overview/en/> accessed 4 November 2018.

117 Note references to traditional knowledge under all the elements of a new treaty in UNGA 'Report of the Preparatory Committee established by General Assembly resolution 69/292' (n 8).

118 Morgera and Ntona (n 56) 4.

119 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) 'Deliverable 1(c): Procedures, approaches and participatory processes for working with indigenous and local knowledge systems' <www.ipbes.net/deliverables/1c-ilk> accessed 4 November 2018.

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

121 Morgera (n 103).

122 Tsiumani (n 84) 28-29.



4. Digital sequence information

The previous sections have made the case for a principled focus in the negotiations of a new BBNJ instrument on 'sharing' benefits and on fairness and equity to lead to a more systematic discussion of the objectives and approaches of a benefit-sharing mechanism as an iterative partnership-building process for enhancing implementation of UNCLOS and other relevant international law. This could serve to learn from the lessons accrued in other international benefit-sharing instruments with regard to fairness and equity, including the trend to rely on more institutionalized multilateral approaches to assess progress and challenges, facilitate and broker, and ensure coherent implementation of multiple international obligations. Such a discussion could also focus, taking into account the human right to science, on how to distribute benefits in order to avoid discrimination and to respond to the needs of the vulnerable, in light of various international objectives (human rights standards, as well as multiple Sustainable Development Goals). Considering the connectivity of the ocean, a principled discussion on a benefit-sharing mechanism could consider opportunities to building on global and regional assessments, as well as receiving inputs from traditional knowledge holders and researchers, with a view to supporting collaborative approaches and learning across scales to deliver global and local benefits.

All these considerations will now be related to one of the trickiest questions around benefit-sharing in a new BBNJ instrument – whether digital sequence information on marine genetic resources, rather than only the genetic resources themselves, should fall under the scope of a future benefit-sharing regime.¹²³ This is a question arising from bioinformatics, i.e. the application of computer science and information technology to expand the understanding of biological processes and to generate value in the genetic material without physical access to the biological sources where it was originally found.¹²⁴ The underlying North-South divergence of views on digital sequence information has emerged in various fora, including existing benefit-sharing mechanisms under the Convention on Biological Diversity (CBD) and ITPGRFA. On the one hand, developing countries argue that the prevailing or growing trend in bio-based research to rely on digital information may ultimately render physical access to the genetic resource unnecessary, thereby making the premise of current benefit-sharing regimes obsolete. Even if R&D based on physical access and on digital information will continue to co-exist in practice, exchange of digital sequence information would escape international benefit-sharing requirements, frustrating the objective of relevant treaties. Developed countries, on the other hand, argue that the scope of existing benefit-sharing instruments does not cover information, but only genetic resources in their physical form.¹²⁵ A counterargument offered by developing coun-

123 Also referred to as '*in silico* access': see Morgera and others, 'Summary of the First Session of the Preparatory Committee on Marine Biodiversity of areas beyond National Jurisdiction: 28 March – 8 April 2016' (2016) 25 (106) Earth Negotiations Bulletin.

124 For some background, Bevis Fedder, *Marine Genetic Resources, Access and Benefit Sharing. Legal and biological perspectives* (Earthscan 2013) 122-55, 172.

125 Elsa Tsoumani and others, 'UN Biodiversity Conference Highlights: 6 December 2016' (2016) 9(669) Earth Negotiations Bulletin 1.



tries is that through sequencing and genetic manipulation in the lab, digital information ‘re-materializes’ as genetic resources in every sense of the term.¹²⁶

More specifically under the CBD, the terminology concerning digital information remains subject to debate.¹²⁷ It is unclear whether the definition of ‘utilization’ of genetic resources under the Nagoya Protocol on Access to Genetic Resources and Benefit-sharing (ABS) under the CBD,¹²⁸ which is one of the sources of inspiration of the BBNJ negotiators, may encompass reliance on digital information. Even if that was the case, however, the overall architecture of the Protocol has been conceived without specific consideration of bioinformatics. CBD Parties thus noted, in 2016, ‘rapid advances regarding the use of digital sequence information on genetic resources,’ the ‘importance of addressing this matter in the CBD framework in a timely manner,’ and the need to consider in 2018 ‘any potential implications of the use of digital sequence information on genetic resources for the three CBD objectives.’

In the specific context of the ITPGRFA, already in 2013, Secretary Shakeel Bhatti highlighted 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 plant genetic material’ and called on Parties to widen the focus of the ITPGRFA provisions with the potential to address the non-material values of genetic resources. In 2017, a proposal was made by the African Group to reflect the concept of digital sequence information in a revised Standard Material Transfer Agreement (SMTA) under the ITPGRFA through a new definition of genetic parts and components as ‘elements of which they are composed or the genetic information/traits that they contain.’ No consensus was reached on if and how to reflect this issue in the text of the revised SMTA.¹²⁹ In addition, the African Group suggested inviting, pending clarification of their benefit-sharing obligations, voluntary contributions to its benefit-sharing fund from users of digital sequence information on genetic resources obtained from the ITPGRFA Multilateral System and from the use of which such users obtained benefits. While the proposal did not find sufficient support, the Treaty’s Governing Body is expected to consider at its meeting in 2019 the potential implications of the use of digital sequence information for the objectives of the Treaty.¹³⁰

The argument put forward in this paper is that while views may diverge on the most persuasive legal interpretation of the scope of existing benefit-sharing agreements, a solution that fosters increased cooperation and multilateral learning should be favored in the name of the principles of effectiveness

126 Elsa Tsioumani and others, ‘Summary of the Seventh Session of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture: 30 October – 3 November 2017’ (2017) 9 (691) *Earth Negotiations Bulletin*.

127 CBD COP Decision XIII/16 (4-17 December 2016) UN Doc CBD/COP/DEC/XIII/16, fn 1.

128 Joseph Henry Vogel and others, ‘The Economics of Information, Studiously Ignored in the Nagoya Protocol on Access to Genetic Resources and Benefit Sharing’ (2011) 7 *Law, Environment and Development Journal* 52.

129 Tsioumani (n 126).

130 *ibid*.



and good faith.¹³¹ These principles support interpretations that contribute to ensure *full* effect to a treaty,¹³² rather than depriving international provisions of impact on the ground.¹³³ They further suggest ‘rejecting results that maintain an uncertain position or the perpetuation of disagreements’¹³⁴ and rather privileging an approach aimed at ‘better protection or implementation of universal values, and in addition [ensure] international institutions are involved to monitor or steer the process.’¹³⁵ These ideas clearly chime with the proposed principled approach to sharing benefits fairly and equitably as an institutionalized multilateral partnership-building process, thereby guiding the developing of a new international instrument, in addition to the interpreting of existing ones.

Considering limited progress in other areas of international law to address digital sequence information, the fact-finding studies commissioned under existing international benefit-sharing processes,¹³⁶ and in particular the studies prepared under the CBD and the ITPGRFA, provide useful insights for the BBNJ discussions. Notably, these studies provide a sense of current scientific practices in relation to digital sequence information, and how they challenge the conceptual premises of existing international benefit-sharing regimes. In addition, these studies identify certain ways forward that can be assessed on the basis of the principled approach to fair and equitable benefit-sharing discussed above in relation to the BBNJ negotiations. Finally, this section will suggest considering the merits of addressing digital sequence information ‘from the side,’ rather than ‘head on,’ along the lines of an incipient initiative on information sharing under the ITPGRFA.

4.1 Opportunities and Challenges

In terms of current scientific practices, the 2018 CBD fact-finding study underscores that currently most digital sequence information ‘is the product of sequencing technologies that have become faster, cheaper and more accurate in recent years... and permeates every branch of the life sciences and

131 Elisa Morgera, Elsa Tsioumani and Stephanie Switzer, ‘Study into the Criteria to Identify a Specialised Access and Benefit-sharing Instrument, and a Possible Process for its Recognition’ (9-13 July 2018) UN Doc CBD/SBI/2/INF/17.

132 Melgosia Fitzmaurice, ‘The Law of Treaties’ in Malcom Shaw (ed), *International Law* (6th ed, Oxford University Press 2008) 810, 832-38.

133 Alexander Orakhelashvili, *The Interpretation of Acts and Rules in Public International Law* (Oxford University Press 2008) 398.

134 *ibid* 395.

135 Salvatore Zappalà, ‘Can Legality Trump Effectiveness in Today’s International Law?’ in Antonio Cassese (ed), *Realizing Utopia* (Oxford University Press 2012) 105.

136 The Commission on Genetic Resources for Food and Agriculture (CGRFA) agreed to request the Secretariat to conduct an exploratory, fact-finding scoping study on ‘digital sequence information,’ and also to submit that study to the CBD COP: CGRFA ‘Report of the Sixteenth Regular Session of the Commission on Genetic Resources for Food and Agriculture’ (30 January – 3 February 2017) UN Doc CGRFA-16/17/Report/Rev.1, paras 86-90; the Parties to the CBD and the Nagoya Protocol requested in 2016 a fact-finding and scoping study to clarify terminology and concepts, and to assess extent, terms and conditions of the use of digital sequence information on genetic resources in the context of CBD & Nagoya Protocol: CBD COP Decision XIII/16, para 3(b); and ITPGRFA ‘Report on genetic information associated with material accessed from the Multilateral System’ (14-17 March 2017) UN Doc IT/OWG-EFMLS-6/17/Report. See also WHO (World Health Assembly Decision) ‘Research and development for potentially epidemic diseases’ (20 March 2017) UN Doc A70/10, para 8(b).



modern biology today.¹³⁷ So, on a positive note, new genetic sequences that are routinely published in sequence databases can be seen as ‘a resource for the global community’ that has led to ‘dynamic knowledge hubs and diffuse scientific collaborations.’¹³⁸ This is particularly significant in terms of non-monetary benefits supporting advancements in marine science that contribute to conservation and sustainable use of marine biodiversity, which is seen as an essential contribution of benefit-sharing in the BBNJ negotiations.¹³⁹ The CBD study, for instance, underscored that technologies related to digital sequence information can serve to ‘deepen knowledge about diversity including by identifying and mitigating risks to threatened species, engaging ability to track illegal trade, identifying species and geographic origin of products, and assisting with biodiversity planning and conservation management.’¹⁴⁰ The study also noted the potential for digital sequence information to lead to products that can be used to control invasive alien species, reduce consumption of fossil fuels, or reduce pollution from manufacturing.¹⁴¹ Views submitted to the CBD from Parties and stakeholders further pointed to opportunities for open access to digital sequence information to support prioritizing conservation efforts in situ and ex situ, evaluating the effectiveness of in situ conservation, collecting information on genetic variation, understanding resilience and adaptability of populations vis-à-vis environmental changes and climate change, and reducing need to take samples from wild populations.¹⁴² Some of the examples mentioned in the submission were specific to the marine environment, such as the restoration of coral reefs through the selection of appropriate places for reintroduction, the definition of population stocks for fisheries management decisions, as well as the labelling of fish to certify its legal origin, to clarify whether it is derived from aquaculture or capture, and to show compliance with quality control.¹⁴³

Several challenges, however, were identified in the CBD scoping study. First, there are often-ignored equity issues in relation to sequence databases. Most countries do not have funds or capacity to maintain comparable databases and the benefits from digital sequence information (usually underestimated) accrue to the few countries hosting databases and their users.¹⁴⁴ This finding challenges the argument advanced in the BBNJ negotiations that current scientific practices may already cater to developing countries’ needs. Power imbalances have also been underscored in the ITPGRFA study,

137 Sarah Laird and Rachel Wynberg, ‘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’ (13-16 February 2018) UN Doc CBD/DSI/AHTEG/2018/13, 8.

138 *ibid* 9-11.

139 UNGA ‘Report of the Preparatory Committee established by General Assembly resolution 69/292’ (n 8) 10; Broggiato and others (n 6) 24-28.

140 Laird and Wynberg (n 137) 9.

141 *ibid* 13, 40.

142 CBD Secretariat, ‘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’ (13-16 February 2018) UN Doc CBD/DSI/AHTEG/2018/1/2, 9-10.

143 *ibid* 6-7, 12.

144 *ibid* 13.



which found that database operators, and scientists, notwithstanding open-access and open-source sharing ethos, are resistant to implementing tracking and generally agree to ‘publishing and making accessible other ‘parts’ or information whose money-making potential is more theoretical,’ while ‘strategically patent[ing] research tools with clear commercial applications.’¹⁴⁵ Furthermore, the study indicated that researchers would not normally share ‘developments with commercial potential, particularly where, for example, the research was funded by government entities interested in local or regional job creation, and in seeing clear economic benefits returning to taxpayers.’¹⁴⁶ In addition, relevant technologies have increasingly blurred ‘distinctions between different industrial sectors, and between academic, government and industry research, ... as academic research institutions require generation of economic value and to that end seek intellectual property rights.’¹⁴⁷ This means that devising benefit-sharing that differentiates between upstream and downstream, non-commercial and commercial, actors along the R&D chain (particularly for monetary benefit-sharing purposes), as discussed in the BBNJ negotiations, may be based on inaccurate assumptions.¹⁴⁸

The ITPGR scoping study systematized digital sequence information-related developments as challenges to three pillars of international access and benefit-sharing regimes (identification, monitoring and value generation), as well as the premise that the control over access to resources enables the identification of users and the establishment of contracts.¹⁴⁹ Without recurring explicitly to the same distinction, the CBD study also offers insights on the challenges to these three pillars, which are relevant for the BBNJ process.

With regard to identifying the provenance of digital sequence information, the CBD study indicates that increasingly publication of new genetic sequences in sequence databases is accompanied by information on provenance and meta-data.¹⁵⁰ But identification of provenance can be difficult in practice, as ‘sequences from the same species from the same habitat might differ due to natural mutations over short periods of time and sequences from different species and origins may be similar’ and/or because ‘digital sequences can no longer be recognizable as belonging to a particular source because they undergo several modifications.’¹⁵¹ The ITPGRFA study, in turn, indicated that the im-

145 Eric W Welch and others, ‘Potential Implications of New Synthetic Biology and Genomic Research Trajectories on the International Treaty for Plant Genetic Resources for Food and Agriculture’ (FAO 2017) 16 <www.fao.org/fileadmin/user_upload/faoweb/plant-treaty/GB7/gb7_90.pdf> accessed 20 November 2018.

146 *ibid* 21.

147 *ibid* 9–11.

148 For a similar conclusion, see also Elisa Morgera and Miranda Geelhoed, ‘Consultancy report to the European Commission on the notion of “utilization” under the Nagoya Protocol and the EU ABS Regulation for Upstream Actors’ (2016) <<http://ec.europa.eu/environment/nature/biodiversity/international/abs/pdf/ABS%20Final%20Report%20upstream%20users.pdf>> accessed 19 November 2018.

149 Welch and others (n 145) ii–iv.

150 Laird and Wynberg (n 137) 12.

151 *ibid* 15.



portance of information about provenance varies, as ‘researchers may be less likely to return to the original material over time,’ ‘database owners, sequencing companies and others are neither keeping nor requesting information about the material source of digital sequence information,’ patents do not necessarily request geographic origin information, and ‘the information may be hidden if a particular sequence could be obtained from more than one kind of organism.’¹⁵²

The ITPGR study also found that digital sequence information undermines the approach to monitoring ‘the transmission of the rights associated with the resources through subsequent exchanges,’ which in turn relies on the capacity to identify exchanges and track individual germplasm samples.¹⁵³ The study acknowledged that database access could be tracked.¹⁵⁴ One option is currently being tested on the basis of block chain technology (the same used for the electronic currency BitCoin),¹⁵⁵ which could be combined with the creation of unique identifiers for the materials for which notification was given.¹⁵⁶ But the ITPGR study found that, on the one hand,

even with such tracking, identifying uses of accessed data would not be intuitive due to (1) the myriad ways that partial sequence information can be combined, and (2) the fact that the same sequence or portion of a sequence may be present in multiple organisms.¹⁵⁷

With regard to value generation, the CBD study underscores that it is difficult to assess value and contributions as new collaborations do not include bilateral agreements or direct interaction among researchers.¹⁵⁸ In addition, the authors call attention to the practice of ‘bulk studies’ that raise different benefit-sharing issues from discrete and unique sequence associated with a particular organism of interest: value is often found in the aggregate as part of larger collection of sequences within databases against which searches and analyses are run.¹⁵⁹ The ITPGRFA study, in turn, concludes that the dematerialization of genetic resources has ‘led to a multiplication of innovation trajectories, diffuse uses and means of combining sequences and parts’¹⁶⁰ that ‘makes articulation of a specific monetary value of a sequence within an entire new product or process challenging.’¹⁶¹

The key take-home messages for the BBNJ processes therefore are the following. Digital sequence

¹⁵² Welch and others (n 145) iv-v.

¹⁵³ *ibid* v, 24.

¹⁵⁴ *ibid* 13.

¹⁵⁵ ‘Sequencing the world: How to map the DNA of all known plants and animal species on Earth’ *The Economist* (Washington DC, 23 January 2018) <www.economist.com/science-and-technology/2018/01/23/sequencing-the-world> accessed 20 November 2018; Frederic Perron-Welch, ‘Blockchain Technology and Access and Benefit-sharing’ *ABS Canada* (August 2018) <www.abs-canada.org/category/featured/> accessed 20 November 2018.

¹⁵⁶ Broggiato and others (n 6) 19-20.

¹⁵⁷ Welch and others (n 145) 13.

¹⁵⁸ Laird and Wynberg (n 137) 14.

¹⁵⁹ *ibid* 15.

¹⁶⁰ Welch and others (n 145) vi, 36.

¹⁶¹ *ibid* iv, 38.



information is a growing practice, that presents opportunities to create global knowledge and dynamic partnerships and increases the 'potential for generating high-value products, and thus monetary and non-monetary benefits, with the increasing use of synthetic biology technologies in the future.'¹⁶² It also has potential to contribute to conservation and sustainable use of marine biodiversity. But digital sequence information greatly complicates the identification of relevant actors and the drawing of distinctions among them (which impacts on the setting of triggers for benefit-sharing obligations, as discussed above). In addition, even if information is eventually made available through open-access databases, that does not mean that all individuals in different countries would have the same capacity to retrieve relevant information and put it to use. Nor is there any guarantee that scientists will include in these databases promising or valuable information. Furthermore, the determination of provenance, the tracking of use, and the determination of when value is generated are particularly challenging when digital sequence information is concerned.

4.2 Potential ways forward

The ways forward identified in the two scoping studies will now be analyzed with respect to their potential to contribute to partnership building as part of a principled reflection on sharing benefits fairly and equitably in the BBNJ context.

The ITPGRFA scoping study considers pooling genetic resources as part of a multilateral benefit-sharing mechanism as a way forward: 'interviewees generally considered the pooling of benefits to be more feasible and more in line with common research practice.'¹⁶³ This is also relevant for the BBNJ process, where the idea of pooling marine genetic resource samples and other data through an international clearinghouse has been put forward,¹⁶⁴ as discussed above. Under the ITPGRFA, a Multilateral System already pools genetic resources under standardized contractual terms, which served to rationalize the administrative costs of benefit-sharing. When thinking of the existing System in the context of digital sequence information, the ITPGRFA study indicates that a pooling approach can be suitable to the 'multiplication of holders of digital information collections distributed in a number of media and the diversity of standards, norms and behaviours' as it will allow for 'establishing an aggregated and standardized system at a desirable scale, [requiring] a central authority to adopt and manage collective rights.'¹⁶⁵ But it also points to the drawback that it will 'probably lower flexibility for adaptation to specific contexts.'¹⁶⁶

Furthermore, the ITPGRFA study points to an upfront fee/subscription model for access, although there may be 'different willingness to pay' among users because of 'a shift in perceived value of the collection of [digital sequence information] and recognition of the value of particular entries within

¹⁶² *ibid* vi.

¹⁶³ *ibid* vi, 26; Tvedt and Jørem (n 29) 155-58.

¹⁶⁴ Greiber (n 23); Broggiato and others (n 6) 8, 21.

¹⁶⁵ Welch and others (n 145) 38.

¹⁶⁶ *ibid*.



databases.' Currently, ITPGRFA Parties are developing an upfront mandatory payment (a subscription system to all genetic resources covered by the Multilateral System), but they have not found agreement yet on payment rates, enforcement measures and whether to include digital sequence information.¹⁶⁷ For its part, the CBD study notes that 'given the blurred boundaries between commercial and non-commercial user, all might gain access on the same terms....some have suggested a global fund to be established to address benefit-sharing from public databases.'¹⁶⁸ These considerations can be related to the proposals for a global benefit-sharing fund in the BBNJ negotiations, and for an upfront payment to ensure the viability of the fund. Financial viability of multilateral benefit-sharing mechanisms, and the complexity in particular of ensuring monetary benefit-sharing from bio-prospecting, are common issues across existing regimes, as discussed above.¹⁶⁹ As such, they underscore the need to learn from experience within and across international processes through systematic monitoring and understanding of bottlenecks. Such systematic learning can be facilitated through a multilateral institutionalized approach, as autonomous efforts by States or other actors are largely seen as less conducive to 'systematically and structurally' improving inter-institutional learning.¹⁷⁰ Learning seems a key aim to keep in mind moving forward as the understanding of scientific practices, and of feasible and necessary forms of accountability and incentives for the scientific community to participate in equitable collaborations, is only incipient.¹⁷¹

The ITPGRFA study concludes that monitoring the use of digital sequence information requires a mechanism and incentives 'to build norms of exchange across multiple users and uses,'¹⁷² which further supports the proposition made above about the merits of proactive facilitation, brokering and oversight through multilateral institutionalized approach. The ITPGRFA study also finds potential in the facilitation of public access (both entry-level and advanced users) to synthetic biology technologies and tools for education, participation in scientific endeavors and low-cost investment with a view to supporting social and institutional innovations as mechanisms for identifying and capturing collective benefits (information-sharing, capacity-building and technology transfer). The same finding was also reached in the CBD study,¹⁷³ and is directly relatable to the BBNJ negotiations.¹⁷⁴ It chimes with the argument made above about the need for a multilateral institutionalized approach to assess equity issues and look at digital sequence information in the context of relevant technologies, capacities and scientific endeavors with a view to reflecting on potential synergies between obliga-

167 Tsioumani (n 78).

168 Laird and Wynberg (n 137) 14.

169 Morgera (n 71) 19, 30.

170 Sebastian Oberthür, 'Interplay Management: Enhancing Environmental Policy Integration Among International Institutions' (2009) 9 *International Environmental Agreements: Politics, Law and Economics* 371, 376.

171 Elizabeth Karger, 'Options for Benefit-sharing: The Case of Digital Sequence Information on Genetic Resources' (Master thesis, University of Bayreuth 2018) 86 (on file with author).

172 Welch and others (n 145) vi, 36.

173 Laird and Wynberg (n 137) 13.

174 This seems to be the conclusion on digital sequence information in the BBNJ context of Broggiato and others (n 6) 17, 30.



tions on scientific cooperation, information-sharing, capacity-building and technology transfer.

The risks related to the increased accessibility of these technologies are not discussed in the IT-PGRFA study, but have been identified in the CBD process. Accordingly, undue reliance on digital sequence information could arguably undermine the resolve to conserve biodiversity *in situ*. It could negatively impact (economically and culturally) other knowledge producers such as traditional knowledge holders. And it may lead to modifying organisms that could become invasive, even within one country.¹⁷⁵ These risks point to the need for oversight at the multilateral level, informed by the dimensions of the right to science outlined above. They also point to the need to address the concerns of traditional knowledge holders, in consideration of their potential role in environmental and strategic impact assessments and area-based management tools under a new BBNJ instrument.

The CBD study also identifies a range of approaches to attach use conditions to digital sequence information: notifications on databases, notices of conditions of use, or click-through agreements. These can be used to assert that the information is patrimony of a certain country (or of humankind, in a BBNJ scenario) and requiring users to acknowledge the source in any publication or contact a focal point if the information is used for commercial purposes.¹⁷⁶ They can also serve to require best efforts to collaborate with a certain laboratory in the analyses and to share products derived from data.¹⁷⁷ The development and use of agreements could be facilitated and brokered by an international body, with a view to systematically ensuring contributions to realizing relevant international objectives, as discussed above.

The CBD study, in addition, reports of new research agreements ('protected commons') that serve to ensure recognition and attribution of material through a flexible and easy process and to involve research collaborations, which do not address monetary benefit-sharing.¹⁷⁸ Rather they contribute to the creation of global web of collaborators contributing in iterative ways to a final product that is openly available for use, including on topics of research that receive less attention by private sector, thereby addressing a situation where each participant is at the same time a provider and a user through reciprocal benefit-sharing.¹⁷⁹ This has the potential to contribute to enhanced implementation of UNCLOS provisions on scientific collaboration in light of the right to science.

The CBD study further notes that researchers increasingly use personal unique identifiers that could allow the tracking of research through their publications all along their careers and could potentially link to sequence data deposited in or accessed from databases.¹⁸⁰ This provides another element of consideration in facilitating inter-operability of existing databases at the international level. The CBD

175 CBD Secretariat (n 142) 7, 13-14.

176 Laird and Wynberg (n 137) 11.

177 *ibid* 38.

178 *ibid* 43.

179 *ibid* 47, 37.

180 *ibid* 15.



study also recommends separating legal and scientific databases to help address concerns among scientists.¹⁸¹ This can be a helpful consideration in the current discussions on the need to establish a clearinghouse in the negotiations on a new treaty on marine biodiversity.

Finally, the CBD study points to the opportunity to consider issuing 'fair trade label' to certify certain companies contributing to benefit-sharing.¹⁸² This option could also be considered in the context of BBNJ negotiations, possibly replicating the WHO experience mentioned above of identifying key actors that are involved in research on marine genetic resources of areas beyond national jurisdiction in contributing to a multilateral benefit-sharing fund.

4.3 Addressing digital sequence information from the side, rather than head on

While we are still far from the identification of clear solutions to the challenges posed by digital sequence information in existing benefit-sharing regimes, some progress has nonetheless been achieved in the context of the ITPGRFA Global Information System (GLIS) mentioned above.¹⁸³ This example is to be treated with caution as this initiative is still in very early stages of development and has mainly focused on digital object identifiers to 'unambiguously and permanently identify' genetic resources exchanged across organizations.¹⁸⁴ In addition, the initiative is not free from controversy, as civil society has underscored with regard to the DivSeek initiative.¹⁸⁵ This is a multi-stakeholder partnership of plant experts working on sequencing and phenotyping data, which allegedly uses technologies to sequence, include in a database and electronically distribute the genomes of crop seeds, without cooperating with the ITPGRFA.¹⁸⁶ Nonetheless, the GLIS represents a salient example for the BBNJ process to address digital sequence information without necessarily first agreeing on a definition or on its inclusion in the scope of a new instrument. It rather addresses digital sequence information in a sideways manner,¹⁸⁷ focusing on existing information-sharing obligations, thereby promoting transparency in this field and having the potential to gradually build some form of multilateral governance of genetic resource-related information.

¹⁸¹ *ibid* 16.

¹⁸² *ibid* 48.

¹⁸³ ITPGRFA (n 13) art 17.

¹⁸⁴ FAO, ITPGRFA 'Digital Object Identifiers' <www.fao.org/plant-treaty/areas-of-work/global-information-system/doi/en/> accessed 4 November 2018.

¹⁸⁵ DivSeek <<http://www.divseek.org>> accessed 4 November 2018; ITPGRFA 'Governing Body Resolution 5/2017' (2017) UN Doc IT/GB-7/17/Report, Appendix A.5, paras 5(iii), 6.

¹⁸⁶ Elisa Morgera, Elsa Tsioumani and Daniela Diz, 'Benefit-Sharing in marine areas beyond national jurisdiction: where are we at? (Part IV)' (*BENELEX blog*, 26 July 2016) <<https://benelexblog.wordpress.com/2016/07/26/benefit-sharing-in-marine-areas-beyond-national-jurisdiction-where-are-we-at-part-iv/>> accessed 4 November 2018; Third World Network, 'Digital genebanks plan to ignore UN request on the impact of genomics and synthetic biology on access and benefit sharing' (April 2016) <www.twn.my/announcement/digital_genebanks_final_uslet.pdf> accessed 19 November 2018.

¹⁸⁷ Note that most likely progress on including digital sequence information is to be achieved under the World Health Organization: the Health Assembly agreed that the WHO secretariat should comprehensively analyse, in consultation with Member States and relevant stakeholders, the implications of amending the definition of PIP biological materials to include genetic sequence data (May 2017).



The vision and programme of work of the GLIS explicitly acknowledge the need to provide principles and tools to support the operation of existing information systems in accordance with the ITPGRFA principles and rules, and promote transparency on the rights and obligations of users for accessing, sharing and using such information.¹⁸⁸ What is noteworthy about the GLIS is that a web-based entry point to information and knowledge is specifically geared towards strengthening the capacity for the conservation, management and utilization of plant genetic resources for food and agriculture.¹⁸⁹ In other words, it is a combination of elements to actively pursue the sharing of scientific information by promoting and facilitating interoperability among existing systems, and creating a mechanism to assess progress and monitor effectiveness of such enhanced and more coordinated information-sharing opportunities.¹⁹⁰ The GLIS can therefore provide inspiration for an ambitious and systematic clearinghouse under discussion in the context of the BBNJ negotiations: it is not just an online repository of information, which is rather the case of the CBD or Nagoya Protocol clearinghouses.¹⁹¹ Rather, the GLIS governance structure can arguably support a concerted and iterative dialogue to identify and respond to needs and priorities of beneficiaries in effectively making use of, and contributing to the production of, digital sequence information, in line with the principled understanding of benefit-sharing discussed earlier. In addition, as discussed above, the GLIS provides institutional support for setting priorities, brokering of scientific cooperation, capacity-building and technology-transfer opportunities. For these reasons, it could also help operationalize identified synergies among the elements of a new BBNJ instrument, such as the scientific, capability and technological needs related to carry out or participate in environmental impact assessments, marine spatial planning and marine protected areas. Although this indirect approach focuses only on non-monetary benefits, it can possibly help explore in the interim technological solutions to move towards monetary benefit-sharing.

Finally, the GLIS may provide inspiration on how to devise a partnership-building approach that builds upon the various dimensions of the right to science. Tackling systematically inter-operability of databases and other online tools, facilitating the sharing of effective capacities and technologies to make use of them, and enhancing opportunities for collaboration can help ensure that all participate in relevant research efforts. It can also support the identification of priorities for the vulnerable, risks to humans or the environment, and any issues leading to discriminatory results in the sharing of information, by assessing progress and monitoring effectiveness through feedback and periodic consultations. It can finally focus efforts on the priorities of the vulnerable by supporting a focus on 'high-priority material.'¹⁹²

188 ITPGRFA Res 3/2015 (n 74); see also FAO 'Global Information System' <www.fao.org/plant-treaty/areas-of-work/global-information-system/en/> accessed 19 November 2018.

189 ITPGRFA (n 13) arts 13(2)(a), 17.

190 ITPGRFA Res 3/2015 (n 74).

191 Elisa Morgera and others (n 102) 237-40.

192 ITPGRFA Res 3/2015 (n 74).



5. Conclusions

The final report of the BBNJ preparatory committee indicates that further discussions are required on whether a new instrument should regulate access to marine genetic resources, what is the nature of these resources, what benefits should be shared, whether to address intellectual property rights, and whether to provide for the monitoring of the utilization of marine genetic resources of areas beyond national jurisdiction; as well as with regard to modalities for capacity building and technology transfer.¹⁹³ Considering the limited reflection in the BBNJ process on the relevance of the new instrument for the Sustainable Development Goals,¹⁹⁴ the Intergovernmental Conference taking forward the negotiations from September 2018 onwards would benefit from a more principled reflection. Such a reflection should focus primarily on sharing as an iterative process of partnership-building across scales and on specific ways in which international law can cater to fairness and equity in light of other relevant areas of international law. In addition, it should take into consideration the four dimensions of the human right to science, as earlier discussions on marine genetic resources of areas beyond national jurisdiction were recognized as essentially aimed at ‘increasing humankind’s knowledge about nature.’¹⁹⁵ A principled approach can provide a much-needed compass to weight the detailed, but still fragmented, proposals related to benefit-sharing, including on novel issues such as digital sequence information. It can help orient negotiations towards enhancing cooperation to implement UNCLOS obligations on scientific research, capacity building, technology transfer and environmental protection holistically in areas beyond national jurisdiction.

193 Report of the Preparatory Committee established by UNGA Res 69/292 (n 8) 17.

194 Analysis of ENB PrepCom 4 (n 21).

195 Rüdiger Wolfrum, ‘Concluding Remarks’ (2009) 24 *The International Journal of Marine and Coastal Law* 343, 346.

The Common Heritage applied to the resources of the seabed. Lessons learnt from the exploration of deep sea minerals and comparison to marine genetic resources.

Marzia ROVERE*

Abstract

This paper draws a parallel between mineral resources of the deep sea and marine genetic resources. The paper first discusses the discovery and first deep sea exploration of minerals bearing metals of economic interest. Secondly, the paper gives a brief historical overview of metal prices, and other external factors, such as the technological challenge and the global economic conditions, that have so far prevented from entering into an exploitation phase of deep seabed mining in areas beyond national jurisdiction. Subsequently, the paper provides an outline of the state of the art in the scientific investigation of marine genetic resources, and gives an overview of possible harmful consequences of exploiting hotspots of marine life through bioprospecting in the deep sea. The two examples analysed serve to substantiate the idea that international authorities tend to be established at a too early stage of scientific knowledge, pressured by misleading preconceptions, which are not based on sound and free marine scientific research.

Keywords: deep sea mineral resources; polymetallic nodules; International Seabed Authority; marine genetic resources; ABNJ

First Published Online: 14 December 2018

1. Introduction

Metallurgy is rooted in ancient history. Ever since man first discovered copper in 9,000 BC, metals have been of such fundamental importance for human evolution that they define the principal steps of human technological progress. Such is the case for the Bronze Age (an alloy of copper and tin) and for the Iron Age. In modern times, our lives are becoming more and more dependent on metals and other elements, for which there is an increasingly strong demand and decreasing supply, given their critical role for low carbon and digital technologies. Copper continues to be of great importance and is used in a wide range of applications, including the renewable energy industry, as heat dissipater

* Marzia Rovere is a research scientist, marine geologist, based at Istituto di Scienze Marine, Consiglio Nazionale delle Ricerche, Bologna (m.rovere@ismar.cnr.it). She works on marine geohazards and mineral resource assessment and has been a member of the Legal and Technical Commission of the International Seabed Authority (2015-2016).



and electrical conductor; cobalt is used in lithium ion battery cathodes; nickel and manganese are used in stainless steel. A group of chemical elements, the Rare Earth Elements (REEs) and Yttrium (Y) are essential in several high-tech sectors, such as TV and smartphones' screen colour, laser technology, cancer treatment, hydrogen storage, light-emitting diodes (LEDs). The discovery of polymetallic nodules forming on the deepest abyssal plains of the ocean first suggested the idea of harvesting minerals from the seafloor. The initial phase of scientific investigation at sea lasted from 1972 to 1982, following the prediction of global mineral shortage, and culminated in the successful testing of a pilot-plant system in 1978. By the early 1980s, metal prices plummeted and marine research on deep seabed minerals of economic interest lost momentum. Although proved technically feasible, it remained debatable whether seabed mining could be economically competitive with land mining.

Nevertheless, this inspired the establishment of an international legal regime and the creation of an international institution to govern the mineral resources of the deep seabed in areas beyond national jurisdiction (ABNJ) as the common heritage of mankind, as declared in resolution 2749 (XXV) of 17 December 1970 of the General Assembly of the United Nations.¹ The International Seabed Authority (ISA) was established under the United Nations Convention on the Law of the Sea (UNCLOS).² The ISA was a response to an idealistic vision whereby the mineral wealth should be shared by all countries, whether developed or developing, coastal or landlocked. Furthermore, the human costs behind land mining, the issues of illegal and child miners, environmental pollution and displacement of local populations, issues that, is worth to say, have remained substantially unchanged to date,³ were becoming more and more evident to the public opinion. Today, 50 years later, several factors, including prevailing economic conditions and technological challenges, still make the exploitation of seabed mining in the Area unfeasible. Furthermore, despite working within the framework established by UNCLOS and despite the progress made for example with respect to the reporting on mineral resources by contractors,⁴ more recently, in 2015, the ISA has been the subject of political attacks and mudslinging campaigns.⁵ Principal promoters of the campaigns are international environmental agencies, which consider that the ISA is not doing enough in terms of environmental protection or that lacks transparency compared to other maritime organizations, such as Regional Fisheries Management Organisations.⁶

1 UN General Assembly, Declaration of Principles governing the Sea-Bed and the Ocean Floor, and the Subsoil Thereof, beyond the Limits of Nations Jurisdiction, 17 December 1970, A/RES/2749(XXV).

2 The United Nations Convention on the Law of the Sea (UNCLOS) (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 397 and see UN General Assembly, 'Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982' 33 ILM 1309.

3 Todd C Frankel, 'The Cobalt Pipeline: Tracing the path from deadly hand-dug mines in Congo to consumers' phones and laptops' (*The Washington Post*, 30 September 2016) <www.washingtonpost.com/graphics/business/batteries/congo-cobalt-mining-for-lithium-ion-battery/> accessed 9 November 2018.

4 Pedro Madureira and others, 'Exploration of Polymetallic Nodules in the Area: Reporting Practices, Data Management and Transparency' (2016) 70 Marine Policy 101.

5 'ISA: Protect our oceans' <https://secure.avaaz.org/en/deep_sea_mining_en_dn4/?byxqlab&v=62027> accessed 9 November 2018.

6 Jeff A Ardron, 'Transparency in the Operations of the International Seabed Authority: An Initial Assessment' (2018) 95 Marine Policy 324.



In addition to mineral resources, the deep sea mineral environments host biological communities that live in extreme chemical-physical conditions. The communities host enormous amounts of genes and metabolites dispersed in the biomass and sediments that represent the primary resource for bioprospecting in the deep sea beyond national jurisdiction. On 19 June 2015, the United Nations General Assembly (UNGA) adopted resolution 69/292, which launched a preparatory committee tasked with preparing elements of a draft text for an international legally binding instrument for the conservation and sustainable use of marine biological diversity of ABNJ, including marine genetic resources (MGRs), implying that there is a direct connection between the conservation of biodiversity and the access to human-exploitable biological resource. The UNGA adopted a new resolution at the end of 2017, with which it convened an intergovernmental conference, under the auspices of the United Nations, to consider the recommendations of the preparatory committee and to elaborate the text of an international legally binding instrument, with a view to developing it as soon as possible.

Are we navigating the same experience for deep sea MGRs as for mineral resources: a research, industry and investment sector which is still in its infancy and for which there is a clear intention to establish, by 2020, an international regime, at what is arguably far too early a stage of scientific knowledge?

2. The mineral resources of the deep sea

Marine mineral resources can be harvested from the seabed at different water depths (Tab. 1). The majority of them are found in relatively shallow waters (0-1000 m) and only polymetallic nodules, polymetallic sulphides and ferromanganese crusts form at water depths found in ABNJ. In particular, only the polymetallic nodules are found almost exclusively in ABNJ. The projection of World Economic Exclusive Zones (EEZs) boundaries v10⁷ over 500-m-contours generated from the General Bathymetric Charts of the Oceans⁸ indicates that, on average, only water depths exceeding 3000 m belong to ABNJ. Currently, most of seabed mining activities are carried out within EEZs. Contrary to what is commonly thought, the relatively shallower geologically-defined continental shelves (0-200 m water depths) have not been, so far, solely the domain of oil and gas producers.⁹ On the contrary, a significant and underestimated damage to the environment has been already caused by extensive seabed mining activities. For example, dredging of sand and gravel for the construction industry and land reclamation projects is a common practice, especially in northern Europe, United Arab Emirates, Singapore, and in the South China Sea, around the disputed Spratly Islands. Global indirect estimates of aggregates extraction, based on cement production alone, accounts for about 45 billion tonnes every year.¹⁰ Most of this extraction comes from marine sources. Reliable data on

7 'Shapefiles Maritime Boundaries v10' <www.marinerregions.org/downloads.php> accessed 9 November 2018.

8 Pauline Weatherall and others, 'A New Digital Bathymetric Model of the World's Oceans' (2015) 2 *Earth and Space Science Research* 331.

9 Mark Hannington, Sven Petersen and Anna Krätschell, 'Subsea Mining Moves Closer to Shore' (2017) 10 *Nature Geoscience* 158.

10 UNEP/GRID-Geneva, 'Sand, Rarer than One Thinks' (2014) 11 *Global Environmental Alert Service* 208 <https://na.unep.net/geas/getUNEPPageWithArticleIDScript.php?article_id=110> accessed 9 November 2018.



marine aggregate extraction are unavailable and estimates account for only 140 million tonnes (as 2016), coming from few European countries and U.S., which are the only countries providing figures for statistics.¹¹

Table 1 – Principal marine mineral resources, use and average water depths where they are found.

Commodity	Use	Water depth (m)
Tin	Computers Components	0-up to 50
Iron-Gold	Metals	0-50
Phosphates	Manufactured Fertilisers	100-500
Diamonds	Safe-Haven Asset	0-200
Sand and Gravel	Constructions, Land Reclamation	30-150
Polymetallic Nodules	Metals	3500-6500
Polymetallic Sulphides	Metals	5-6000
Ferromanganese Crusts	Metals, REE	800-2500 (seamounts)

In 1868, stony nodules rich in manganese and copper were discovered on the seabed of the Kara Sea, offshore Siberia.¹² A few years later, similar nodules were found in the abyssal plains of the ocean during the expeditions of the research vessel Challenger.¹³ At first, scientists were not even interested in the nodules, but in the cosmic spherules attached to them;¹⁴ almost a century had to pass before deep sea nodules were again discussed.

Polymetallic nodules typically occur on sediment-covered abyssal plains at 3500–6500 m water depths, where sediment accumulation rates are extremely low (as low as 10 cm per thousand year)¹⁵ and where nodules grow at rates up to 250 mm per millions of years. Nodules are comprised of iron oxy-hydroxides and manganese oxides and form abiotically by hydrogenetic (from seawater) and diagenetic (from pore fluids) precipitation about a hard nucleus on the surface of soft sediment. More recently however, the role of microbial metabolism in nodule development has also been recognized.¹⁶ Polymetallic nodules contain metal elements such as manganese, cobalt, copper, nickel

11 SCICOM Steering Group On Ecosystem Pressures and Impacts, *Report of the Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem* (ICES CM 2016) SSGEPI:06.

12 Yu A Bogdanov and others, 'Ferromanganese Nodules of the Kara Sea' (1994) 34(5) *Okeanologiya* 789.

13 John Murray and Alphonse François Renard, *Report on the scientific results of the voyage of H.M.S. Challenger during the years 1872-76* (published by order of Her Majesty's Government, Eyre & Spottiswoode 1891).

14 Robert B Finkelman, 'Magnetic particles extracted from manganese nodules: suggested origin from stony and iron meteorites' (1970) 167 *Science* 982.

15 David Z Piper and Michael E Williamson, 'Composition of Pacific Ocean Ferromanganese Nodules' (1977) 23 *Marine Geology* 285.

16 James R Hein and others, 'Deep-Ocean Mineral Deposits as a Source of Critical Metals for High- and Green-Technology Applications: Comparison with Land-Based Resources' (2013) 51 *Ore Geology Reviews* 1.



and traces of molybdenum and lithium.¹⁷ From very recent video surveys, we know that sessile fauna use nodules as their habitat and that the removal of this scattered hard substrate would cause a loss in biodiversity and connectivity.¹⁸ Polymetallic nodules are present in quantities and density that can be commercially exploited (eg composite metal grade > 2.5%, which is equivalent to 25 kg per tonne, and density > 10 kg m⁻²)¹⁹ in few abyssal plains of the ocean. These are: the Clarion Clipperton Fracture Zone (CCZ), the Peru and the Samoa Basins (all of these are in the Pacific Ocean) and the central Indian Ocean.²⁰

In the 1970s and early 1980s, another important discovery occurred in the deep ocean: sites were discovered where the venting from the seafloor of toxic compounds such as hydrocarbons and superheated hydrogen sulphide (up to 400°C), driven by magmatic/volcanic heat, allow the life of complex ecosystems. Hydrothermal vents associated with chemosynthetic communities were first discovered along the Galápagos Rift in 1977,²¹ while hydrocarbon seepage at the seabed and in the overlying water column was first documented along the Florida continental slope, in the Gulf of Mexico, in 1984.²² Their existence was anticipated by the discovery of metalliferous muds in the Red Sea, in the mid-1960s.

Life in these extreme habitats is sustained by consortia of bacteria. Bacteria cannot survive in the proximity of superheated hydrothermal fluids (the upper limit for microbial life is actually 120° C), but outside the hottest waters, instead of using the energy of sun light to turn carbon dioxide into sugar (photosynthesis), they harvest chemical energy from the minerals and chemical compounds to release sugar and sulphur (chemosynthesis).²³

The presence of abundant sulphur in these environments sustains life for animals, like tubeworms, clams and mussels, that live in symbiosis with sulphur-oxidizing bacteria, which provide them with metabolic energy in exchange of sheltering inside their bodies.²⁴ These chemical conditions allow not only the existence of extremely adapted ecosystems, but also the deposition of metals on the seabed. The superheated fluids leach out metals from the surrounding rocks in the sub-seabed and enter the water column as a plume. When the plume mixes with cold seawater, dissolved metals precipitate as

17 Benjamin J Tully and John F Heidelberg, 'Microbial Communities Associated with Ferromanganese Nodules and the Surrounding Sediments' (2013) 4 *Frontiers in Microbiology* 1.

18 Ann Vanreusel and others, 'Threatened by Mining, Polymetallic Nodules Are Required to Preserve Abyssal Epifauna' (2016) 6 *Scientific Reports* 26808.

19 Geoffrey P Glasby, 'Lessons Learned from Deep-Sea Mining' (2000) 289 *Science* 551.

20 Hein and others (n 16).

21 John B Corliss and others, 'Submarine thermal springs on the Galápagos Rift' (1979) 203 *Science* 1073.

22 Charles K Paull and others, 'The first Biological communities at the Florida escarpment resemble hydrothermal vent taxa' (1984) 226 *Science* 965.

23 Frank W Adair and Kristian Gundersen, 'Chemoautotrophic sulphur bacteria in the marine environment, I. Isolation, cultivation and distribution' (1969) 15 *Canadian Journal of Microbiology* 345.

24 Antje Boetius, 'Microfauna-Macrofauna Interaction in the Seafloor: Lessons from the Tubeworm' (2005) 3 *PLoS Biology* 375.



polymetallic sulphides on the seabed. Sulphides are formed mainly by minerals such as pyrite, chalcopyrite, sphalerite which are sources of copper, zinc, lead, but also gold (tens of grams per tonne) and silver (hundreds of grams per tonne).²⁵ 65 % of global polymetallic sulphides form along mid-ocean ridges, which are located in ABNJ, but, especially in the western Pacific Ocean; they deposit along back arc basins spreading centres and volcanic arcs on seabeds of national jurisdiction.²⁶ It is apparent that, particularly for this type of resource, the exploitation would cause physical damage to the seabed and the loss of extremely rare and site-specific ecosystems.

The third deep sea mineral resource are the ferromanganese crusts, which occur only where rock surfaces are free of sediment on the flanks of seamounts at water depths of 600–7000 m. Seamounts and crusts of economic interest are located at a restricted water depth range of 800–2500 m. Their thickness varies from less than 1 mm to about 260 mm and they form pavements of manganese and iron oxides which grow at very slow rates of 1–5 mm per millions of years. Ferromanganese crusts are composed of iron oxyhydroxide and manganese oxide that precipitate directly from cold, ambient ocean water, from which they sorbe several metals (hydrogenetic accretion). Crusts contain manganese, cobalt, copper, nickel and significant traces of rare metals and elements (titanium, platinum, zirconium, neodymium, tellurium, yttrium, bismuth, molybdenum, vanadium, thorium).²⁷ In the Pacific Ocean, there are tens of thousands of seamounts and a high percentage of them belong to the seabed within the national jurisdiction of Small Pacific Island States. By comparison, the Atlantic and Indian Ocean have fewer seamounts.²⁸ It is difficult to arrive at a global marine mineral resource and reserve estimate, due mostly to the fact that only 15 % of the ocean seabed is mapped,²⁹ but recent rough estimates indicate areas of availability in the order of 38 million km² (nodules), 1.7 million km² (crusts), 3.2 million km² (sulphides).³⁰ It must be mentioned that the actual tonnage of global sulphides is poorly known compared to the other resources.

3. The concept of deep seabed mining and the establishment of the ISA

The publication in 1965 of *The Mineral Resources of the Sea*³¹ by JL Mero, which portrayed a feast of manganese, cobalt, nickel and copper in the abyssal plains of the ocean, launched hundreds of research cruises in the following decade and inspired the creation of the ISA.³² Mero in 1977 estimated that the nodules from the 6 million-km²-large CCZ, 400 km off Mexico in the Pacific Ocean, where

25 Sven Petersen and James R Hein, *The Geology of Sea-Floor Massive Sulphides* (Secretariat of the Pacific Community 2013).

26 Mark Hannington and others, 'The Abundance of Seafloor Massive Sulfide Deposits' (2011) 39 *Geology* 1155.

27 James R Hein, Tracey A Conrad and Rachel E Dunham, 'Seamount Characteristics and Mine-Site Model Applied to Exploration- and Mining-Lease-Block Selection for Cobalt-Rich Ferromanganese Crusts' (2009) 27 *Marine Georesources & Geotechnology* 160.

28 Peter T Harris and others, 'Geomorphology of the Oceans' (2014) 352 *Marine Geology* 4.

29 Weatherall and others (n 8).

30 Sven Petersen and others, 'News from the Seabed – Geological Characteristics and Resource Potential of Deep-Sea Mineral Resources' (2016) 70 *Marine Policy* 175.

31 John L Mero, *The Mineral Resources of the Sea* (Elsevier, 1965).

32 Peter A Rona, 'Resources of the Sea Floor' (2003) 299 *Science* 673.



the majority of exploration licenses for polymetallic nodules have been granted so far by the ISA, would contain 12 billion tonnes of commercial metals.³³ These figures proved to be unrealistic and are no longer reliable for the area. The investigation of the 1970s culminated in the successful testing of a pilot-plant system in 1978 by a consortium of seven companies sponsored by U.S., Germany, France, UK and Japan. The test was conducted in the CCZ at 5400 m water depth, with a recovery of 800 tonnes of nodules. Unfortunately, the entire mining system was lost at sea at the end of operations.³⁴ Furthermore, in the same period, the U.S.-based company Lockheed Martin claimed the construction of the mining vessel *Glomar Explorer*. The mining system was hosted in an 82-m-long bay, openable from the ship's hull. But the *Glomar Explorer* had been built in 1971 by the U.S. Central Intelligence Agency primarily to recover the K-129 Soviet nuclear submarine sunken off Hawaii in 1969 (project Azorian). To keep the mission secret, the U.S. government kept pretending that the ship was a mining vessel, using billionaire Howard Hughes as a front man. The recovery mission was proceeding successfully, when the claw mechanism, designed to bring the submarine to the surface, failed and a section of the boat broke off during the ascent to the ship.³⁵

In the aftermath, and possibly accelerated by this rollercoaster of alternating events, the International Seabed Authority (ISA) established its headquarters in Kingston, Jamaica, in 1994. The ISA has the mission of administering, on behalf of humankind, mineral resources beyond the limits of national jurisdiction (article 157 of UNCLOS), comprising about 54 % of the global ocean floor. Since then, the ISA has put in place a comprehensive legal and technical framework covering prospecting and exploration of marine minerals, with detailed guidelines and recommendations to help contractors to comply with their contractual obligations, in terms of reporting their activities and environmental assessment.³⁶ In 2012, the ISA approved an Environmental Management Plan for the CCZ, which includes the designation of Areas of Particular Environmental Interest (APEIs), which have a function similar to that of Marine Protected Areas (MPAs) in ABNJ.³⁷

The ISA has so far approved twenty-nine contracts for exploration covering areas of the seabed in excess of 1.2 million km².³⁸ Sixteen contracts are for exploration for polymetallic nodules in the CCZ, one in the Central Indian Ocean Basin. Seven contracts are for exploration for polymetallic sulphides in the South West Indian Ridge, Central Indian Ridge and the Mid-Atlantic Ridge and five for cobalt-rich crusts in the Western Pacific Ocean and South Atlantic. Six of these exploration licenses reached the 15-year term in 2016/2017 and the contractors applied for an extension of their explo-

33 John L. Mero, *Marine Manganese Deposits* (Elsevier, 1977).

34 Glasby (n 19).

35 Tony Munoz, 'Grand Finale for Infamous *Glomar Explorer* - Part 1 The ship that secretly raised a Soviet submarine is being scrapped' (*The Maritime Executive*, 18 June 2015) <<http://maritime-executive.com/features/grand-finale-for-infamous-glomar-explorer>> accessed 9 November 2018.

36 ISA, *Consolidated Regulations and Recommendations on Prospecting and Exploration* (International Seabed Authority 2013).

37 Michael Lodge and others, 'Seabed Mining: International Seabed Authority Environmental Management Plan for the Clarion-Clipperton Zone. A Partnership Approach' (2014) 49 *Marine Policy* 66.

38 ISA, 'Deep Seabed Contractors' <www.isa.org.jm/deep-seabed-minerals-contractors> accessed 9 November 2018.



ration licenses, citing prevailing economic conditions as an obstacle to proceed into an exploitation phase.³⁹ Contractors are currently represented by private entities, sponsored by the state party to the UNCLOS where the company is based; governmental research institutions; the states themselves; governmental bodies and their branches (Tab. 2).

Table 2 – Categories of the ISA contractors and their sponsoring states.

Contractor	Type	Sponsoring state
Cook Islands Investment Corporation	Private entity	Cook Islands
UK Seabed Resources Ltd	Private entity	UK
Ocean Mineral Singapore Pte Ltd	Private entity	Singapore
G TEC Sea Mineral Resources	Private entity	Belgium
Marawa Research and Exploration Ltd.	Private entity	Kiribati
Tonga Offshore Mining Ltd	Private entity	Tonga
Nauru Ocean Resources	Private entity	Nauru
Deep Ocean Resources Dev. Co. Ltd	Private entity	Japan
Yuzhmorgeologiya	Private entity	Russian Federation
Bundesanstalt für Geowissenschaften und Rohstoffe (BGR)	Research organization	Germany
Institut Français de la Mer (Ifremer)	Research organization	France
Government of India	Member state	India
Government of the Republic of Korea	Member state	Republic of Korea
Government of the Russian Federation	Member state	Russian Federation
Ministry of Natural Resources and Environment	Governmental body	Russian Federation
Oil, Gas and Metals National Corporation	Governmental body	Japan
Companhia De Pesquisa de Recursos Minerais	Governmental body	Brasil
China Ocean Mineral Resource R&D Association (COMRA)	Governmental body	China
Interoceanmetal Joint Organization	Governmental body	Bulgaria, Cuba, Czech Republic, Poland, Russian Federation, Slovakia

³⁹ *ibid.*



The sponsoring state exercises control over the contractor, by requiring it to comply with the provisions of UNCLOS regarding its activities in the Area. To what extent the sponsoring state is accountable for the failure of the sponsored contractor to meet its own obligations, has been recently the subject of some debate. On this matter, the Council of the ISA consulted the Seabed Disputes Chamber (SDC) of the International Tribunal for the Law of the Sea (ITLOS). In 2011, the SDC issued an advisory opinion⁴⁰ that made it clear that the sponsoring state is not liable for the failure of the sponsored contractor and that an eventual damage caused by the sponsored contractor is not automatically attributable to the sponsoring state. The SDC put on the same liability level developing and developed states, except with regards to the application of the precautionary approach, which has to apply according to the capacity of the state, in terms of scientific and technical knowledge.⁴¹

The next phase for the ISA is to develop a regulatory and fiscal framework for exploitation.⁴² A 'zero draft' of the regulations was completed by February 2016, after the ISA launched a stakeholder consultation in 2014, followed, in January 2017, by a discussion paper. In August the same year a new version of the 'Draft Regulations on Exploitation of Mineral Resources in the Area' was finalized.⁴³ This includes exploitation rights, contract duration, initial financial terms and expected fiscal regime, size of permitted exploitation areas, environmental impact assessment and environmental management plans. The mining code is a prerequisite for entering an exploitation era; investors need a level of certainty about future profits and revenues, especially in the case of deep seabed mining, which is an emerging industry with little developed business models.

4. The challenge of deep sea technology and the state of the art of imminent deep seabed mining projects in areas of national jurisdiction

There are still many challenges that deep seabed mining has to face, in terms of technological requirements for harvesting mineral resources in the deep sea, lifting and retrieval of minerals to the operating vessel, and mineral processing for metallurgy. For example, bioleaching as well as pyro- and hydrometallurgical techniques, for the extraction of metals, are being tested only at a laboratory scale.⁴⁴ Some companies and governmental institutions maintain that they have developed the technology for deep sea nodules recovery, but most of their advancements are at the stage of design, concept, prototype or, indeed, they are testing small-scale systems for shallow waters.

40 Seabed Disputes Chamber, *Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area, Advisory Opinion* (ITLOS Case 17, 1 February 2011, p 76).

41 Ximena Hinrichs Oyarce, 'Sponsoring States in the Area: Obligations, Liability and the Role of Developing States' (2018) 95 *Marine Policy* 317.

42 ISA, *Towards the development of a regulatory framework for polymetallic nodule exploitation in the Area* (International Seabed Authority Technical Study 11, 2013).

43 ISA, 'Ongoing development of regulations on exploitation of mineral resources in the Area' <www.isa.org.jm/legal-instruments/ongoing-development-regulations-exploitation-mineral-resources-area> accessed 9 November 2017.

44 Klaus Boserker, 'Bioleaching: metal solubilisation by microorganisms' (1997) 20 *FEMS Microbiology Reviews* 591.



For example, BGR appointed Aker Wirth GmbH (now MH Wirth) to develop a self-propelling collector vehicle concept, in 2010.⁴⁵ In 2008, the National Institute of Ocean Technology, India, started developing a pumping system for nodule mining, which is designed to be effective at 1032 m water depth.⁴⁶ In 2007, the South Korea-based Institute of Ocean Technology (KIOST) developed a deep sea mining robot called MineRo to collect nodules up to 1300 m water depth. In 2012, they progressed with the design and manufacture of a pilot mining robot, MineRo-II, equipped with a module able of crushing nodules into smaller pieces. Since deep sea tests are enormously expensive and time-consuming, numerical simulations for predicting the dynamic behaviour of the materials have to run for years, before a real test takes place at sea.⁴⁷

Mining the crusts is more challenging, because crusts can be firmly attached to the underlying rock substrate. This has substantially, so far, hampered the technological development for this mineral resource, because it is economically unsustainable.

The Canada-based Nautilus Minerals, which was granted an exploration license for polymetallic sulphides in the Bismark Sea, Papua New Guinea, back in 1997, runs the Solwara 1 Project, located approximately 50 km north of Rabaul, at 1600 m water depth. For this purpose, in 2016, Nautilus Minerals developed a complete mining system comprised of three prototype robots designed and built by the UK-based company Soil Machine Dynamic (SMD). The seafloor production tools comprise an auxiliary cutter, a bulk cutter and a collecting machine. The tools arrived in Papua New Guinea in April 2017, where they are undergoing submerged trials. Various components of the remote-controlled mining system such as the deployment system of the tools, the pumping and lifting systems are under development and they strictly depend on the final design of the operational support vessel, which is under construction in China.⁴⁸

The project raised substantial private capital investment to achieve its goals and in 2011 Nautilus Minerals obtained a 20-year mining lease for extracting copper and gold. However, the project has been halted for several years due to major environmental concerns, protests by the local communities and public consultations with stakeholders. The project will possibly enter in production in 2019, but the company has had to postpone the date several times in the last years, because of the current ongoing litigation with the Papua New Guinea local communities, registered at Waigani National Court House, over a socially acceptable environmental impact assessment study.⁴⁹

45 'Manganese nodule exploration in the German license area' <www.bgr.bund.de/EN/Themen/MarineRohstoffforschung/Projekte/Mineralische-Rohstoffe/Laufend/manganknollen-exploration_en.html> accessed 9 November 2018

46 'Deep Sea Technologies' <www.niot.res.in/index.php/node/index/33/> accessed 9 November 2018.

47 Chang-Ho Lee, Hyung-Woo Kim and Sup Hong, 'A Study on Dynamic Behaviours of Pilot Mining Robot according to Extremely Cohesive Soft Soil Properties' (ISOPE Ocean Mining and Gas Hydrates Symposium, Szczecin, September 2013).

48 'Seafloor Production Tools' (Nautilus Minerals) <www.nautilusminerals.com/irm/content/seafloor-production-tools.aspx?RID=333> accessed 9 November 2018.

49 'Nautilus' stock plummets as deep sea mining litigation proceeds' <www.deepseaminingoutofourdepth.org/nautilus-stock-plummets-as-deep-sea-mining-litigation-proceeds/> accessed 26 November 2018.



The 62 km² large Atlantis II Deep, 115 km west of Jeddah in the Red Sea, at 2000 m water depth, is the largest seabed mineral deposit on Earth. Here, muddy sulphide deposits were first discovered in the late 1960s. Samples collected in 1979 indicated that the major mineral is zinc with significant, but secondary, amounts of copper, gold and silver. The most promising deposits lie in a series of deep basins along the central spreading ridge. Here, 40 m of fine-grained metalliferous sediments have accumulated from inactive hydrothermal vent sites beneath 200 m thick hot brines, which rise water temperatures up to 56°C and salinities seven times greater than normal seawater. In 2010, the Saudi-Sudanese Red Sea Commission awarded a 30-year licence to Manafa International Ltd., a Saudi Arabian company. Diamond Fields International later joined the venture to pursue the project, which is located within the national jurisdiction of Sudan and Saudi Arabia. Both countries support the technological advancement as well as research and exploitation activities, but progress on the project is currently on hold pending a dispute over contractual issues. There are several additional technological challenges at Atlantis II Deep: minerals occur in extremely fine size of 2 microns, seabed sediments have high salinity and low strength. These elements combined together may cause difficulties to the seafloor tools' efficiency and their control systems, which need to be designed considering also the highly corrosive environment.⁵⁰

In 2014, JOGMEC (Japan Oil, Gas and Metals National Corporation) launched the 'Zipangu-in-the-Ocean' (Zipangu is the old name of Japan, and refers to Marco Polo's land of gold) under the auspices of METI (Ministry of Economy, Trade and Industry). The targeted seabed resources include nodules, sulphides and crusts. Japan is massively investing in technology advancement with a look to the environment, such as sensors to detect ore bodies covered by thick sedimentary bodies and so avoiding sensitive active hydrothermal vent faunas.⁵¹ The inferred sulphide ore reserve at the Hakurei site, Okinawa Trough, comprises 3.74 million tonnes of zinc, copper, silver and gold, making it second only to Atlantis II Deep. In the southern Japanese continental margin, there is another polymetallic sulphide deposit, the so-called Sunrise, located in the Izu-Ogasawara Arc at about 2600 m water depth, but so far there has not been great progress on the assessment of this area.

5. How socio-economic conditions have influenced metal prices and deep seabed mining in the last 50 years

The world economy experienced an unprecedented boom in 1972–73, with a consequent rapid growth in demand for raw materials, and a corresponding price boom for several commodities, including metals. The sharp rise was soon followed by an abrupt fall during the recession of 1974–75. The period of booming prices experienced acceleration of the overall rates of inflation, the adoption of a floating exchange rate system for most of the currencies and speculation activity in the market.⁵²

⁵⁰ Lev Egorov and others, *Sustainable Seabed Mining: Guidelines and a New Concept for Atlantis II Deep*, (vol 4, The LRET Collegium 2012).

⁵¹ Testsuro Urabe and others, 'Next-Generation Technology for Ocean Resources Exploration (Zipangu-in-the-Ocean) Project in Japan' (MTS/IEEE OCEANS, Genoa, May 2015).

⁵² Richard N Cooper and Robert Z Lawrence, 'The 1972-75 Commodity Boom' (1975) 3 *Brookings Papers on Economic Activity* 671.



In 1977–1978, the Shaba conflict broke out when the Congolese National Liberation Front (FNLC) crossed the border from Angola into the modern Democratic Republic of Congo, in an attempt to achieve the Katanga province's secession from the dictatorship of Mobutu. The FNLC occupied the mining town of Kolwezi and cobalt mines nearly stopped production. This caused some speculation activities and had long-term impacts on the cobalt market, which developed into a free market.

In 1980 gold hit record high at 850 \$ per ounce (in August 1972, U.S. had devalued dollar to 38 \$ per ounce of gold) during a period characterized by high inflation, strong oil prices, Soviet intervention in Afghanistan and the Iran revolution, which encouraged investors to buy safe-haven assets.⁵³

Under these circumstances, deep seabed mining appeared to be the ideal response to global concerns about imminent shortage of metal supply over a predicted growing population and unprecedented economic boom.⁵⁴ When the 'Great Commodities Depression' occurred, the prices of raw materials remained depressed and declined from, roughly, 1982 until 1998.⁵⁵ At the same time, marine exploration activities were almost completely abandoned. Low prices were due to weak demand and poor economic conditions, especially in Asia, where the economic crisis hit in 1997. Copper prices, for example, fell to the lowest level in the U.S., since the Great Depression of the 1930s. During that time, recycling and recovery of some key metals, such as cobalt, substantially increased.⁵⁶

During the first two decades of the 2000s (2000–2014), the world has experienced a commodities boom⁵⁷ or the so-called 'commodities super cycle'⁵⁸, with the rise, and subsequent fall, of many metal prices. The boom was largely due to the rising demand from emerging markets such as the BRIC countries, particularly China during the period 1992–2013, for electrical goods (copper, neodymium and tantalum). Demand for rare elements and metals increased as computers, mobile and smart phones became more popular in the mid to late 2000s, especially in densely populated Southeast Asia. These facts resulted in new concerns over long-term supply availability.

There was a sharp downturn in prices during 2008 and early 2009 as a result of the credit crunch and sovereign debt crisis, but prices began to rise as demand recovered from late 2009 to mid-2010 and peaked in 2011.

When China, which almost owns a monopoly over the REEs production and export, stopped their exportation to Japan in 2010 for almost two months and imposed export quotas to the production,

53 Buying Gold, 'What happened to the gold price in 1980?' <<http://buying-gold.goldprice.org/2008/01/what-happened-to-gold-price-in-1980.html>> accessed 9 November 2018.

54 Donella H Meadows and others, *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind* (Universe Books 1972).

55 USGS, *Metal prices in the United States through 1998* (US Geological Survey 1999).

56 *ibid.*

57 Bilge Erten and Jose A Ocampo, *Super-cycles of commodity prices since the mid-nineteenth century* (United Nations Department of Economic and Social Affairs 2012).

58 Walt W Rostow, 'Kondratieff, Schumpeter, and Kuznets: Trend Periods Revisited' (1975) 35 *The Journal of Economic History* 719.



the problem of the mineral supply chain burst out again.⁵⁹ As a result, renewed concerns about the scarcity of supply metals and rare elements, especially for the renewable energy sector, entered in full force. European Union reacted in 2011, publishing a list of 14 Critical Raw Materials (CRMs), a priority action defined in the EU 'raw materials initiative' of 2008.⁶⁰ A second, revised, list of CRMs was out in 2014⁶¹ and a third list of 27 CRMs was published in 2017,⁶² based on a refined methodology, in areas such as manufacturing applications, trade, substitution, recycling. In 2011, probably to respond to China's move, a group of Japanese scientists published a paper claiming that the Pacific seabed muds are enriched in REEs and Yttrium to a point that would constitute a resource 1,000 time bigger than the land-based reserves.⁶³

By the early 2000s, new technology had been made available from the deep sea oil & gas industry, which is now operating down to 3600 m water depth in the Gulf of Mexico. Stellar metal prices and new perspectives in the offshore, due to high prices of crude oil, prompted again the idea that deep seabed mining was an industrial option.

In the meantime, coastal member states were supposed to present their proposals for the extension of their continental shelves by May 2009, following the publication, ten years prior, of the 'Scientific and Technical Guidelines' of the United Nations Commission on the Limits of the Continental Shelf (CLCS). Coastal states can extend their EEZs up to 350 nautical miles from the coast or 100 nautical miles from the water depth of 2500 metres, pursuant article 76(5) of UNCLOS. Australia, for example, was amongst the first countries to submit the proposal in 2004. In 2008 the CLCS expanded the Australian continental shelf to reach a size about 1.3 times larger than its land area. It is possible that also this circumstance acted as an incentive to considering again the deep seabed mining as the next frontier in the offshore industry, because mineral resources are present in areas that can fall within national jurisdiction, where coastal state's rules, in terms of licensing and environmental protection, apply. Regulations can considerably vary from state to state and in most cases, they are not even in place, making the opportunity of seabed mining very attractive especially to small capital enterprises.

Around the beginning of 2000s, as a consequence of these concomitant factors, several international research projects, initiatives and joint academic-industry expeditions were launched at sea, which summed or interacted with the exploration activities that the ISA contractors were committed to undertake starting from 2002. With a lot of new high-quality data and images of the seabed coming in⁶⁴, previously unexpected environmental concerns were raised and, starting by the end of 2010s,

59 Richard Herrington, 'Road Map to Mineral Supply' (2013) 6 *Nature Geoscience* 892.

60 European Commission, 'Tackling the challenges in commodity markets and on raw materials' COM (2011) 25 final.

61 European Commission, 'On the review of the list of critical raw materials for the EU and the implementation of the Raw Materials Initiative' COM (2014) 297 final.

62 European Commission, 'On the 2017 list of Critical Raw Materials for the EU' COM (2017) 490 final.

63 Yasuhiro Kato and others, 'Deep-Sea Mud in the Pacific Ocean as a Potential Resource for Rare-Earth Elements' (2011) 4 *Nature Geoscience* 535.

64 Ann Vanreusel and others (n 18).



fierce international campaigns against deep seabed mining have been promoted worldwide by environmental organizations.⁶⁵

In the current state of affairs, no deep seabed mining operations are active either beyond or within national jurisdiction. The 'deepest' seabed mining activities currently operating are for diamonds collection down to 200 m water depth,⁶⁶ along the Atlantic margins of Namibia and South Africa⁶⁷ and, as previously said, for aggregates extraction on the majority of the continental shelves around the world, up to around 180 m water depth.

One argument, which is often used against the new wave of seabed mining venture, is that there is plenty of potential in recycling metals, especially from modern technological devices. Recycling of aluminium, ferrous metals, copper, gold, palladium and platinum in mobile phones and computers components had got under way by the mid-2000s. Battery recycling has helped, for example, to bring down the nickel and cadmium prices. Furthermore, Europe has promoted research and innovation in raw materials, to find candidate materials for substitution, but this initiative is not based on a full and comprehensive analysis of materials' substitution sustainability.⁶⁸

For many analysts, recycling cannot meet the demand for rare metals, used in digital and green technologies⁶⁹ and the issues of metal supply would need a more careful governance,⁷⁰ as well as revised recycling strategies from the countries.⁷¹ Investors⁷² fiercely neglect metal shortage from land sources.⁷³ On the contrary, there are scientific studies projecting to only 150 years the availability of copper from land sources, at the current rate of dissipation during its use, for 8 billion people with standard of living of the western world.⁷⁴

The prices for metals fell sharply during the third quarter of 2015. The downturn reflected concerns about demand (notably from China), ongoing supply increases from land sources, renewed dollar

65 ISA: Protect our oceans (n 5).

66 Richard HT Garnett, 'Recent Developments in Marine Diamond Mining' (2002) 20 *Marine Georesources and Geotechnology* 137.

67 'Sub-sea diamond mining' (2010) 2 *Ship & Offshore* 25 <www.schiffundhafen.de/fileadmin/user_upload/Publikationen/ShipOffshore/2010-02/pdf/Air-lift-drilling-Sub-sea-diamond-mining.pdf> accessed 9 November 2018.

68 Elza Bontempi, *Raw Materials Substitution Sustainability* (SpringerBriefs in Applied Sciences and Technology 2017).

69 Andrew Bloodworth, 'Track Flows to Manage Technology-Metal Supply' (2014) 505 *Nature* 9.

70 Saleem H Ali and others, 'Mineral Supply for Sustainable Development Requires Resource Governance' (2017) 543 *Nature* 367.

71 Georg Rombach, 'Raw Material Supply by Aluminium Recycling-Efficiency Evaluation and Long-Term Availability' (2013) 61 *Acta Materialia* 1012.

72 Priscila Barrera, 'This Major Cobalt Producer Doesn't See a Tight Market Yet' (*Investingnews.com*, 30 October 2017) <<https://investingnews.com/daily/resource-investing/critical-metals-investing/cobalt-investing/major-cobalt-producer-doesnt-see-tight-market/>> accessed 9 November 2018.

73 'Indium Supply' <www.indium.com/metals/indium/supply/> accessed 9 November 2018.

74 Robert B Gordon, Marlen Bertram and Thomas E Graedel 'Metal stocks and sustainability' (2006) 103 *Proceedings of the National Academy of Sciences of the United States of America* 1209.



strength, and still high stocks of a number of metals.⁷⁵ Almost all metal markets tipped into surplus in late 2015. Copper is suggested to have a market behaviour comparable to crude oil, and for this reason is often used as an indicator of global slowdown in economy.

These prevailing economic conditions have made impossible for all the ISA contractors, which applied for an exploration licence in 2001 and 2002, to move into an exploitation phase in their permit areas after 15 years, and all applied for an extension of their exploration contracts for a further 5-year term.

Pursuant to regulation 2, of part 2 of the 'Consolidated Regulations and Recommendations on Prospecting and Exploration' for the three types of mineral resources of the Area,⁷⁶ prospecting shall not be undertaken in an area covered by an approved plan of work for exploration by a third party or in a reserved area by the ISA. This means that no other entities than the contractor may undertake marine research assessing composition, sizes and distributions of mineral deposits in an area, which is covered by an exploration license. Exception is made only for developing states, based on regulation 17 of the above, which are allowed to submit a plan of work for exploration with respect to a reserved area. In a certain sense, pragmatically speaking, contractors, having exploration licenses for a number of years and over a number of areas, are exerting a dominant position and a 'territorial right', by excluding any other kind of 'applied' marine research in their licensed areas.

Metal prices recovered in 2017, and was the first rise in the last five years, although they did not top the quotations of the 2000s. In 2017, metal prices were projected to jump 16 % by the end of the year due to strong demand, especially from China, and supply constraints, including mine disruptions in Chile, Indonesia and Peru.⁷⁷ Base metals have maintained a positive trend in the first months of 2018.⁷⁸ This is in line with the theory of the commodity super-cycle,⁷⁹ which predicts overall periods of about forty years, characterized by commodity prices steadily climbing for the first decade or two, followed by a second phase of the sub-cycle when prices slowly fall back to where they were at the beginning. According to this theory, commodity prices should start rising again in late 2010s,⁸⁰ in line with the theory of the super-cycle. In principle, the sum of these external factors, together with the completion of the mining code from the ISA, should favour the initiation of deep seabed mining activities in ABNJ, in the coming years.

⁷⁵ Debbie Carlson, 'Is a global economic recession coming? Copper price say 'yes'' (*The Guardian*, 14 January 2015) <www.theguardian.com/business/2015/jan/14/copper-prices-fall-fears-looming-global-recession> accessed 9 November 2018.

⁷⁶ ISA (n 36).

⁷⁷ World Bank, 'Industrial Commodity Prices to Rise in 2017' <www.worldbank.org/en/news/press-release/2017/04/26/industrial-commodity-prices-to-rise-in-2017-world-bank> accessed 9 November 2018.

⁷⁸ 'Commodity and Metal Prices' <www.infomine.com/investment/metal-prices/> accessed 9 November 2018.

⁷⁹ Colin Lloyd, 'Does the rising price of industrial metals herald the beginning of the next commodity super-cycle?' (*Seeking Alpha*, 1 September 2017) <<https://seekingalpha.com/article/4103677-rising-price-industrial-metals-herald-beginning-next-commodity-super-cycle>> accessed 9 November 2018.

⁸⁰ Erten and Ocampo (n 57).



6. Marine Genetic Resources

By conducting a search of the expression 'marine genetic resources' in Scopus, the largest database of peer-reviewed literature, and looking in article title, abstract and keywords, the first work dates back to 2000 and as of winter 2018, around 70 papers appear to have been published.⁸¹ The papers are mostly in the field of environmental and policy sciences, and very few in medicine. Marine bioprospecting, as a science and practice, sprouted more than 60 years ago. Several marine compounds have reached successful clinical investigation starting from the 1980s,⁸² but the majority of them are still in clinical trials and only few entered the market. Some successful examples include: the analgesic ziconotide developed from cone snail venoms by the former start-up Neurex; the DNA-interactive anti-cancer trabectedin, developed from the sea squirt, *Ecteinascidia turbinata*, by the Spanish company PharmaMar.⁸³ The sea squirt is an animal who lives attached to submerged mangrove roots in the Caribbean's areas. The derived pharmaceutical product is also known with the name of Yondelis' and commercialized by Zeltia and Johnson & Johnson in Europe, U.S., Russia and South Korea.

Other remarkable drugs include: the antiviral compound vidarabine, used against epithelial keratitis caused by herpes virus. This has been isolated from the sponge *Tectitethya crypta*. The antibody-conjugate anticancer agent brentuximab vedotin, commercialized with the name of Adcetris' in Europe, was extracted from the sea hare gastropod, *Dolabella auricularia*, which has a soft internal shell, made up of proteins. These proteins are used now for the cure of resistant Hodgkin disease, as a last chance when the patient is not responding to conventional medical treatments. The eribulin mesylate compound, extracted from sponge *Halichodria okadai*, is commercialized in Europe with the name Halaven' and used in late or terminal-stage breast cancer patients. As a matter of fact, the large majority of marine compounds, which entered in clinical trials in the late 1980s, are anticancer agents for rare diseases and have the status of orphan drugs.⁸⁴

All the above-mentioned marine compounds, which are available on the market, come from organisms living in shallow to very shallow waters (0-10 m water depth) and therefore within national jurisdiction. There are several other marine compounds that have entered clinical trials; the following list does not intend to be an exhaustive review; it rather offers a non-specialist standpoint on marine bioprospecting.

81 Elsevier's Scopus the largest abstract and citation database of peer-reviewed literature, 'marine genetic resources' <www.scopus.com/results/results.uri?numberOfFields=0&src=s&clickedLink=&edit=&editSaveSearch=&origin=search-basic&authorTab=&affiliationTab=&advancedTab=&scint=1&menu=search&tablin=&searchterm1=%22marine+genetic+resources%22&field1=TITLE_ABS_KEY&dateType=Publication_Date_Type&yearFrom=Before+1960&yearTo=Present&loadDate=7&documenttype=All&accessTypes=All&resetFormLink=&st1=%22marine+genetic+resources%22&st2=&sot=b&sdt=b&sl=41&s=TITLE-ABS-KEY%28%22marine+genetic+resources%22%29&sid=c2111c404b52408ddd883a005b07bcad&searchId=c2111c404b52408ddd883a005b07bcad&txGid=0515243cd36b78d8b95b26c89f1623ed&sort=plf-f&originationType=b&rr=>> accessed 9 November 2018.

82 Andrew P Desbois, 'How Might We Increase Success in Marine-Based Drug Discovery?' (2014) 9 Expert Opinion on Drug Discovery 985.

83 Burkhard Haefner, 'Drugs from the Deep: Marine Natural Products as Drug Candidates' (2003) 8 Drug Discovery Today 536.

84 Stefania Nobili and others, 'Natural Compounds for Cancer Treatment and Prevention' (2009) 59 Pharmacological Research 365.



The most successful species in terms of bioprospecting is *Bugula neritina*, a bryozoan sessile animal living at water depths from intertidal to shallow subtidal, from which protein inhibitors, called bryostatins, have been isolated and which are currently under clinical trials for oesophageal cancer. The gastropod sea slug, *Elysia rubefescens*, feeds on the algae *Bryopsis* sp., from which, most probably, derives the cyclodepsipeptide toxin isolated for the treatment of prostate cancer and other solid tumors. The marine tunicate, sea squirt, *Aplidium albicans*, which lives in shallow waters and from which PharmaMar extracted dehydridemnin B, is distributed only in Taiwan (as 2015) under the commercial name of Aplidin⁸⁵, for myeloma treatment. The spiny dogfish, *Squalus acanthias*, is an edible species commercialized for centuries in Europe for the classic 'fish & chips' recipe, but for which there is little consumer demand elsewhere.⁸⁵ The shark lives at 50-150 m water depth and has been under investigation for squalamine lactate, and was actually in phase II clinical trials for ovarian and non-small cell lung cancer at Genaera Corporation, when the company went out of business in 2009.⁸⁶ The nemertine worm *Amphiporus lactifloreus*, which lives in the lower shore, under stones and pebbles, and in seaweed meadows provided the GTS21 selective partial agonist and was under clinical trials at Taiho Pharmaceutical Co Ltd in the early 2000s, when proved potentiality to treat dementia.⁸⁷ It is now commercialized by Sigma-Aldrich, as a selective agonist at α -7 nicotinic receptors, with anti-inflammatory and cognition-enhancing capabilities. From the sponge *Verongia aerophoba*, which lives in water depth ranges 2-10 m, a secondary metabolite Aeroplysinin-1 has been isolated with a wide spectrum of bio-activities, with promising anti-inflammatory, anti-angiogenic and anti tumor effects.⁸⁸

There is still a lot of bioprospecting work to do on these and hundreds of other species, collected in the near shore areas of the world, mostly in the tropical and sub-tropical zones, which have been rich sources of biologically active natural products.⁸⁹ However, there is an increasing pressure on the establishment of a regulatory framework for deep sea genetic resources based on the presumption that the number of marine species used by humans is growing at unprecedented rates.⁹⁰

Many authors barely distinguish between deep sea species and shallow water species from coastal areas. The 'deep sea' term is often used inappropriately and in some cases, deep sea genetic resources

85 'Dogfish' (*Seafood Source*, 23 January 2014) < www.seafoodsource.com/seafood-handbook/finfish/dogfish > accessed 9 November 2018.

86 'Genaera Corporation: Company Overview' <www.bloomberg.com/research/stocks/private/snapshot.asp?privcapId=31023> accessed 9 November 2018.

87 Harumi Kitagawa and others, 'Safety, Pharmacokinetics, and Effects on Cognitive Function of Multiple Doses of GTS-21 in Healthy, Male Volunteers' (2003) 28 *Neuropsychopharmacology* 542.

88 Javier A García-Vilas and others, 'Aeroplysinin-1, a Sponge-Derived Multi-Targeted Bioactive Marine Drug' (2016) 14 *Marine Drugs* 1.

89 Cristopher C Thornburg, Mark Zabriskie and Kerry L Mcphail, 'Deep-Sea Hydrothermal Vents: Potential Hot Spots for Natural Products Discovery?' (2010) 73 *Journal of Natural Products* 489.

90 Jesus M Arrieta, Sophie Arnaud-Haond and Carlos M Duarte, 'What Lies underneath: Conserving the Oceans' Genetic Resources' (2010) 107 *Proceedings of the National Academy of Sciences* 18318.



are considered to derive from water depths exceeding 200 m,⁹¹ which is the average depth of the edge of the geologically-defined continental shelf. Defining the deep sea is not straightforward and mostly depends on the context and the scientific discipline or technology in use. Until a few years ago, hydrocarbon exploration, which was the driving factor in marine research, used to place the boundary of the deep sea at 200-400 m. Today, given the advances in the offshore technology, this boundary has been pushed to depths exceeding 3000 m. We have seen that, roughly, this limit coincides also with the outer boundaries of the national jurisdiction.

About 75 % of the ocean is comprised of water depths 3000-7000 m, and these remain unexplored for an astonishing 85 %; consequently, there is a lot still to discover in terms of biodiversity, chemical-physical processes occurring on the seabed, and metabolites dispersed in the biomass and in the sediments of the deep. Thus, statistically speaking, the largely unexplored deep ocean may likely contain the new frontier for MGRs compared to the terrestrial and shallow water sources. However, there are some aspects that have to be considered when talking about the future of bioprospecting in the deep sea.

Most of the current and future efforts in bioprospecting in the deep sea will focus on habitat communities of the hydrothermal vents⁹² and hydrocarbon seeps for two main reasons: 1) these hotspots of life are among the most explored sites in the deep sea. 2) They contain microbes that are defined hyperthermophile and extremophile organisms, because are capable of surviving in super-heated and toxic conditions,⁹³ which makes their DNA attractive to bioprospecting.⁸²

So far, a handful of products have been isolated from relatively deep hydrothermal vents, which are located in water depths exceeding 1000 m. The compounds are extracted from bacteria discovered in the East Pacific Rise at latitude 9°N and in the Guaymas Basin,⁹⁴ which are in the national jurisdiction of Mexico. The commercial products are distributed by BioLabs Inc. and are used as reagents in the DNA labelling procedure.

There are a number of reasons for being cautious about bioprospecting in these hotspots of extreme life, and not all of these relate to the overarching goal of protecting and conserving the biodiversity of the ocean.

Chemosynthetic habitats, such as hydrothermal vents and hydrocarbon seeps, are sparsely distributed across the seafloor. Multi-cellular organisms colonizing these sites have a low diversity despite the overall high biomass present. Approximately 50 % of the multi-cellular species are extremely

91 Harriet Harden-Davies, 'Deep-Sea Genetic Resources: New Frontiers for Science and Stewardship in Areas beyond National Jurisdiction' (2017) 137 *Deep-Sea Research Part II: Topical Studies in Oceanography* 504.

92 David Leary and others, 'Marine Genetic Resources: A Review of Scientific and Commercial Interest' (2009) 33 *Marine Policy* 183.

93 Robert A Zierenberg, Michael WW Adams and Alissa J Arp, 'Life in extreme environments: Hydrothermal vents' (2000) 97 *Proceedings of the National Academy of Sciences of the United States of America* 12961.

94 David Leary, 'Bioprospecting and the genetic resources of hydrothermal vents on the high seas: what is the existing legal position, where are we heading and what are our options' (2004) 1 *Macquarie Journal of International and Comparative Environmental Law* 137.



rare, represented by no more than five individuals in collections of tens of thousands of specimens. Finally, deep-water chemosynthetic ecosystems show high levels of endemism.⁹⁵ This means that every hotspot is a separate, irreplaceable, micro universe, with little potential for a commercial-scale production.

Furthermore, deep sea bacteria of the chemosynthetic habitats have to deal with so far very little known harmful viruses. Viruses infect the dominant organisms in the ocean and their role in emerging and established diseases in marine and terrestrial ecosystems as well as the cycling of viruses between these reservoirs is largely unknown.⁹⁶ Are we considering with sufficient scientific attention the potential harmful consequences of accessing natural agents that have remained so far in the dark deep sea?

There are also more pragmatic considerations, for example, pharmaceutical companies do not have to bioprospect for natural products, they may just use chemical libraries as templates for creating synthetic analogues, which sometimes are deemed to be more effective, in terms of cytotoxicity on cancer cells.⁹⁷

As a further warning bell, at least at the beginning of the research process, large quantities of the organisms have to be collected from the seafloor to obtain adequate amounts for clinical trials. For example, in the case of *Ecteinascidia turbinata*, more than half a tonne of the sea squirt needs to be harvested to obtain 1 gram of the compound. In the case of *Bugula neritina*, it took two years for divers to collect 17 tonnes of the organism off the southern California coast, where it is most abundant.⁹⁸ However, recently, aquaculture proved feasible for some MGRs in shallow waters, with costs that were deemed acceptable. On the contrary, in the deep sea, costs remain extremely high, due to deep water conditions and distance from the coast. Furthermore, harvesting for natural products is complicated by the spatial and temporal variability of these communities, which may substantially evolve and disappear in the time frame of months to a few years.⁹⁹

7. Conclusions

The idea of the ISA, an international authority with the mandate of administering mineral resources of the deep sea, was a response to an era of catastrophic predictions over the future of the Earth's resources and concerns about a fast-growing global population. Its establishment was an answer to those fears with an idealistic vision whereby the mineral wealth of the deep seabed could be shared by all countries, as the common heritage of humankind. After more than 130 years from the discov-

95 Christopher R German and others, 'Deep-Water Chemosynthetic Ecosystem Research during the Census of Marine Life Decade and beyond: A Proposed Deep-Ocean Road Map' (2011) 6 PLOS ONE e232259.

96 Curtis A Suttle, 'Viruses in the Sea' (2005) 437 Nature 356.

97 Evelyne Delfourne and Jean Bastide, 'Marine Pyrroloacridine Alkaloids and Synthetic Analogues as antitumor agents' (2003) 23 Medicinal Research Reviews 234.

98 Haefner (n 83).

99 Thornburg, Zabriskie and Mcphail (n 89).



ery of polymetallic nodules in the deepest abyssal plains of the ocean, although substantial progress has been made starting from the 1970s, accurate global estimate of mineral reserve and resource are not yet available and the ocean remains for the most part still unmapped.

MGRs were discovered around 60 years ago¹⁰⁰ and laboratory testing started in the 1980s; few marine compounds isolated from very shallow waters, near tropical and sub-tropical shores, have reached successful commercialization to date. Bioprospecting in deeper water depths has commenced, and now a handful of marine products, from areas within national jurisdiction, entered the commercialization phase. A large part of the deep mineral and associated biological resources form in marine areas of national jurisdiction. Moreover, the extension of the ocean floor located within the national jurisdiction is bound to increase, once all submissions to the CLCS relative to claims of coastal States to their extended continental shelf will be concluded. This means that, most probably, the exploitable biological resources of the Area are few or unlikely to be exploited, compared to those within national jurisdiction, where the UN Convention on Biological Diversity and its 2014 Nagoya Protocol, on access to genetic resources and the fair and equitable sharing of benefits arising from their utilization, apply. In ABNJ, a regulation similar to the Nagoya Protocol is perceived inequitable for states with no or limited economic capacity and know-how to undertake marine scientific research in the first place, let alone bioprospecting.

Marine scientific research is often invoked as an instrument to increase knowledge about the deep ocean for the benefit of humankind.¹⁰¹ However, scientific knowledge is often considered on the same level of importance of, for example, public opinion and participation in the decision-making process,¹⁰² which are rarely based on scientific data and competent analysis.

The revised guide for the implementation of UNCLOS provisions on marine scientific research, issued by the UN Division of Ocean Affairs and the Law of the Sea in 2010, reported on the challenges that states have encountered in the implementation of UNCLOS Part XIII. Difficulties concern knowledge and technology transfer, appropriate storage and handling of data, limited human and financial resources for capacity building and cooperation programmes, especially with developing countries. Marine scientific research is thought to flourish under conditions of minimal regulatory interference and in the absence of jurisdictional barriers.¹⁰³ In areas within national jurisdiction, compared to ABNJ, national legislation concerning for example environmental protection, may hinder efficient marine scientific research.¹⁰⁴ Thus, international legal instruments should focus on safeguarding the continued freedom of marine scientific research and supporting scientific efforts to achieve the complete knowledge of deep sea habitat, by leveraging, for example, already existing international initiatives with a vision to map the ocean by 2030.¹⁰⁵

100 Murray HG Munro and others, 'The discovery and development of marine compounds with pharmaceutical potential' (1999) 70 *Journal of Biotechnology* 15.

101 Harriet Harden-Davies (n 91).

102 Aline Jaeckel, Kristina M Gjerde and Jeff A Ardron, 'Conserving the Common Heritage of Humankind – Options for the Deep-Seabed Mining Regime' (2017) 78 *Marine Policy* 150.

103 Anna-Maria Hubert, 'The New Paradox in Marine Scientific Research: Regulating the Potential Environmental Impacts of Conducting Ocean Science' (2011) 42 *Ocean Development & International Law* 329.

104 *ibid.*

105 Martin Jakobsson and others, 'The Nippon Foundation – GEBCO Seabed 2030 Roadmap for Future Ocean Floor Mapping' (2017) <<https://seabed2030.gebco.net/>> accessed 9 November 2018.



Marine scientific data gathering, post-processing and interpretation are processes requiring a temporal scale, which is incomparably longer than the fast track lane imposed by the implementation of international laws. For example, it took only 10 years of conferences to conceive and write UNCLOS, and most of the principles were inspired by information available before the 1970s. Pursuant to article 133 (a) of UNCLOS, 'resources' means all solid, liquid or gaseous mineral resources *in situ* in the Area at or beneath the seabed, including polymetallic nodules. This very tight scientific language, which did not mention the biological component, caused the irony that today MGRs are considered more valuable than mineral resources. Even more ironic, the most promising MGRs are found around and float above the same seabed characterized by the deposition of mineral resources. The high seas (the water column) are open under the principle of conditional 'freedom of the high seas' (UNCLOS article 87), while the mineral resources of the Area (roughly the seabed and sub-seabed) are governed under the principle of 'common heritage of mankind' (UNCLOS article 136). The two types of resources, often referred to as biotic and abiotic, are thus perceived as distinct targets, but microbial and physical process are interdependent. It is well accepted that mineral precipitation, such as at hydrocarbons seeps, is catalysed by consortia of bacteria.¹⁰⁶ The role of microbial activity in the hydrothermal plumes¹⁰⁷ and in inactive hydrothermal sites¹⁰⁸ are understudied. Mineral deposits from inactive sites represent the next frontier for deep seabed mining, due to the fast rising call for protection of the hydrothermal vent ecosystems from the scientific community¹⁰⁹ and, thus, marine research on this subject will increase. New advancements in marine sciences will soon breach the gap, making the distinction between biological and mineral resources, and between physical and biological processes, scientifically outdated, favouring instead a much-auspicated holistic approach. In the opposite direction, the international community wish to spend efforts in the coming years to formulate a new legal instrument, and possibly establishing a new Authority, for administering, separately, the biological resource.

Finally, though a legally binding instrument may offer a unique opportunity to explore new models to promote innovation that does not rely on exclusive or sovereignty rights,¹¹⁰ the concept of 'utilization of genetic resources' could incentivize applied research at the expense of basic curiosity-driven research, such as for example taxonomy studies, further endangering the freedom of marine scientific research in ABNJ.

106 Max L Coleman, 'Microbial processes: controls on the shape and composition of carbonate concretions' (1993) 113 *Marine Geology* 127.

107 Gregory J Dick and others, 'The microbiology of deep-sea hydrothermal vent plumes: ecological and biogeographic linkages to seafloor and water column habitats' (2013) 4 *Frontiers in Microbiology* 124.

108 Likui Zhang and others, 'Bacterial and archaeal communities in the deep-sea sediments of inactive hydrothermal vents in the Southwest Indian Ridge' 6 *Scientific Reports* 25982.

109 Cindy L Van Dover and others, 'Scientific rationale and international obligations for protection of active hydrothermal vent ecosystems from deep-sea mining' (2018) 90 *Marine Policy* 20.

110 Carlos M Correa, 'Access to and benefit sharing of marine genetic resources beyond national jurisdiction: developing a new legally binding instrument' (2017) *South Centre Research Paper* 79.

Looking for “Submerged Commons”: Towards a New Era for Underwater Cultural Heritage?

Francesca VARVELLO*

Abstract

Even if not originally conceived of as related to cultural heritage, the common heritage of mankind (CHM) principle progressively makes its way into this field too. International norms regulating underwater cultural heritage (UCH) fit in the same evolving trend. However, they have to relate to an existing legal framework that has a completely different - and possibly opposite - primary objective. Indeed, the United Nations Convention on the Law of the Sea (UNCLOS) provided for archaeological and historical objects found at sea, prior to the adoption of an international convention specifically for UCH. Nevertheless, the related provisions of this convention have raised many doubts. The 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage would seem to intend to fill the vacuum, but it has not yet received the necessary acceptance and this surely impacts on the promotion of the UCH towards a more ‘common’ interest. This paper retraces the evolution of the protection of UCH as perceived through the prism of the CHM doctrine, wondering whether a tangential route is the best means to reconcile these two doctrines.

Keywords: underwater cultural heritage – 2001 UNESCO Convention – UNCLOS – common heritage of mankind

First published online: 21 November 2019

1. The Common Heritage of Mankind: an Overview of the Origins of the Doctrine

The doctrine of the Common Heritage of Mankind (CHM) is a unique exception to Westphalian sovereignty. The first reference¹ is attributed to Arvid Pardo, the Maltese ambassador, who in 1967 promoted the discussion on the adoption of a declaration concerning reserving the seabed and the

* Francesca Varvello, PhD in International law. At present project manager of the project *Dipartimento di Eccellenza* MIUR 2019/2022 of the Department of Law - University of Turin and member of the Centre de droit international of the University Jean Moulin.

1 A very ‘primordial’ reference is to be found in Hugo Grotius’s *Mare liberum* (1609), where the High Sea is identified as ‘[w]hatever cannot be seized or enclosed [...] not capable of being a subject of property [...] meaning that the vagrant waters of the ocean are necessarily free’.



ocean floor exclusively for peaceful purposes, ‘underlining [that] the seas beyond the limits of present national jurisdiction and the use of their resources [should be managed] in the interest of mankind’² Indeed, the first theorization on CHM referred to the ocean floor and the exploitation of its resources.³ Although in 1967 CHM doctrine was also associated with outer space and Antarctica,⁴ some authors believe that the law of the sea is the sole discipline in which the CHM is implemented.⁵ Part XI of the United Nations Convention on the Law of the Sea (UNCLOS) is devoted to ‘[...] the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction’, so-called ‘Area’ (art. 1). From articles 133 to 191 the Convention regulates what is Common Heritage of Mankind and, as such, excluded from appropriation. Humanity, whose interests in the Area are represented by the International Seabed Authority, is the exclusive holder of this area (art. 137) and any activity in it must be carried out for the benefit of mankind as a whole (art. 140).

The essential elements of the CHM, as defined by the General Assembly Declaration,⁶ are: the *common sovereignty*, meaning the non-appropriation principle;⁷ the *common benefit*, meaning the need to exploit the CHM and its resources for ‘the benefit of mankind as a whole’; the *common management*, meaning establishing a suitable international regime responsible for controlling and organising the exploitation activities; the *peaceful use* of the CHM. The clear equality and distributive approach means that ‘the common heritage of mankind had an intrinsic *emotive* (emphasis added)

2 UNGA Res 2340 (XXII) (18 December 1967) A/RES/22/2340.

3 UNGA Res 2574 (XXIV) (15 December 1969); UNGA Res 2749 (XXV) (17 December 1970) A/RES/2574 (XXIV).

4 Elena Sciso, *Le risorse dell’Antartide e il diritto internazionale* (Cedam 1990); Durante, *Spazio atmosferico e cosmico* (*Enciclopedia giuridica* vol. XXX 1993); Francesco Francioni, Fausto Pocar (eds), *Il regime internazionale dello spazio* (Giuffrè 1993); Francesco Francioni, Tullio Scovazzi (eds), *International Law for Antarctica* (Martinus Nijhoff 1996); Karen Scott, ‘Institutional developments within the Antarctic Treaty System’ (2003) *International & Comparative Law Quarterly* 473; Patrizia Vigni, *Concorrenza fra norme internazionali: il regime giuridico dell’Antartide nel contesto globale* (Giuffrè 2005); Daniel A Porras, ‘The “Common Heritage” of Outer Space: Equal Benefits for Most of Mankind’ (2006) 37(1) *California Western International Law Journal* 143; Carol R. Buxton, ‘Property in Outer Space: the Common Heritage of Mankind Principle vs. the “First in Time, First in Right” Rule of Property Law (2004) 69(4) *Journal of Air and Commerce* 689; Jennifer Frakes, ‘The common heritage of mankind principle and the deep seabed, outer space, and Antarctica: will developed and developing nations reach a compromise?’ (2003) 21(2) *Wisconsin International Law Journal* 409.

5 Christopher C. Joyner, ‘Legal Implications of the Concept of the Common Heritage of Mankind’ (1986) 35 *International & Comparative Law Quarterly* 190 but also Natalino Ronzitti, *Introduzione al diritto internazionale* (Giappichelli 2013) 85; Prue Taylor, ‘The Earth Charter, the Commons and the Common Heritage of Mankind Principle’ in Laura Westra, Miriam Vilela (eds), *The Earth Charter, Ecological Integrity and Social Movements* (Routledge 2014); Maria Fernanda Millicay, ‘The Common Heritage of Mankind: 21st Century Challenges of a Revolutionary Concept’ in Lilian Del Castillo (ed), *Law of the Sea, from Grotius to the International Tribunal for the Law of the Sea: Liber Amicorum Judge Hugo Caminos* (Martinus Nijhoff 2015); Surabhi Ranganathan, ‘Global Commons’ (2016) 27(3) *The European Journal of International Law* 693; Nico Schrijver, ‘Managing the Global Commons: Common Good or Common Sink?’ (2016) 37(7) *Third World Quarterly* 1252; Prue Taylor, ‘The Concept of the Common Heritage of Mankind’ in Douglas Fisher (ed), *Research Handbook on Fundamental Concepts of Environmental Law* (Elgar 2016).

6 A/RES/2574 (XXIV) (n 3).

7 ‘En effet, les biens qui font partie de l’ensemble du patrimoine commun de l’humanité en droit International entraînent des obligations qui non seulement engagent les Etats et les organisations Internationales, mais interdisent également aux individus ou aux particuliers, ainsi qu’à tout autre sujet de droit International, de s’en approprier à des fins exclusive [...] Si l’on admettait qu’il y a dans ce monde un ensemble de biens, avoirs, droits et intérêts, qui n’appartient et ne peut appartenir à personne, à aucun Etat en particulier, mais qui demeure propriété de l’ensemble de la communauté Internationale, ou mieux encore, qui appartient à l’homme en tant que membre de l’espèce humaine, ou à l’humanité tout entière, cet ensemble de biens, avoirs, droits et intérêts devrait correspondre aux caractéristiques du patrimoine commun de l’homme’. Sompong Sucharitkul, ‘Evolution continue d’une notion nouvelle le patrimoine commun de l’humanité’ (1989) Publication Paper 668 <https://digitalcommons.law.ggu.edu/cgi/viewcontent.cgi?article=1665&context=pubs> accessed 12 February 2018.



appeal.⁸ Its ‘importance sociale’ is the reason behind the international interest.⁹ In view of this, UNCLOS regulates the equitable sharing of financial and economic benefits and the use for peaceful purposes together with the non-appropriation principle, making the Area the first heritage explicitly recognized as a CHM by an international instrument.

Nevertheless, due to the reluctance of industrialised countries, the Implementation Agreement, and the subsequent 1994 Agreement,¹⁰ toned down this approach limiting, for example, the sharing principle to mineral resources founded in the Area and restricting the so-called ‘parallel system’ for exploration and exploitation.¹¹

The frameworks for the systems governing respectively Antarctica and outer space are similar: both the Protocol on Environmental Protection to the Antarctic Treaty and the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies recognize ‘the benefit and the interest of mankind as a whole.’¹² But neither of these systems has been able to establish an operational organisation guaranteeing equitable management and exploitation of resources,¹³ nor firmly supporting other CHM elements which, actually, give the impression here of having been markedly tempered.¹⁴

Nevertheless, the CHM doctrine, even if toned down or adjusted, and thus not in its ‘pure form’, has progressively extended its application to include the cultural dimension.

8 Moragoage Christopher Walter Pinto, ‘The Common Heritage of Mankind: Then and Now’ (2013) 361 *Collected Courses of the Hague Academy of International Law* 9, 24.

9 Alexandre Kiss, ‘La notion de patrimoine commun de l’humanité’ (1982) 175 *Collected Courses of the Hague Academy of International Law* 99.

10 The 1994 Agreement relating to the Implementation of Part XI of UNCLOS was adopted when it became clear that the majority of industrialised countries were not willing to sign the convention with such a ‘progressive’ approach. This additional instrument introduced a more ‘diluted’ version (Tullio Scovazzi, ‘The Concept of Common Heritage of Mankind and the Resources of the Seabed Beyond the Limits of National Jurisdiction’ (2006) 25 *Agenda International* 11) of the CHM doctrine, stating that some ‘[...] political and economic changes, including in particular a growing reliance on market principles, have necessitated the re-evaluation of some aspects of the regime for the Area and its resources’.

11 According to the original UNCLOS version, a ‘parallel system’ was to have been established for exploration and exploitation of the international seabed area. All activities in this area were to have been under the control of an International Seabed Authority, to be established under the Convention. The authority was to conduct its own mining operations via its operating arm, called the ‘Enterprise’, and contract with private and state ventures to give them mining rights in the Area, so that they could operate in parallel with the authority. Nevertheless, the 1994 Agreement modified this system, stating that: the Enterprise will be established when mining operations are concretely feasible. Mandatory technology transfer, as well as the preferential regime originally accorded to the Enterprise were abolished with the result that, the Enterprise is now on a par with any other commercial enterprises. For a brief and introductory analysis, Natalino Ronzitti, *Introduzione al diritto internazionale* (Giappichelli 2013).

12 Protocol on Environmental Protection to the Antarctic Treaty (adopted October 4, 1991, entered into force January 14, 1998) UNTS 2941 (Environmental Protocol or Madrid Protocol); Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (adopted January 27, 1967, entered into force October 10, 1967) UNTS 610 (p. 205) (Outer Space Treaty).

13 The Outer Space Treaty makes no reference to an international administration system, not even as future possibility.

14 The Outer Space Treaty limits peaceful use to the moon and other celestial bodies alone (ignoring any other parts of outer space) and meaning ‘non-aggressive use’. Most importantly, it does not deal with the equitable sharing of benefits derived from potential resource exploitation.



2. The ‘Cultural’ Heritage of Mankind

When considering the cultural dimension, the CHM doctrine proves even more elusive.¹⁵ Nevertheless, the idea that cultural heritage belongs to everyone rather than being a *domain réservée* of states arose in the eighteenth century. The very first legal reference to it is to be found in the international rules of war adopted during the twentieth century, such as, for example, the regulations annexed to the 1907 Hague Conventions on the Laws and Customs of War on Land, which contain several provisions regarding the protection of cultural heritage during armed conflict.¹⁶ The regional Treaty for the Protection, in Time of War and Peace, of Historic Monuments, Museums and Institutions of Arts and Science, adopted by states of the Pan American Union in 1935, is worthy of attention in this regard.¹⁷

Events during the Second World War demonstrated that only multilateral cooperation between states could preserve cultural heritage. The United Nations Educational, Scientific and Cultural Organization (UNESCO) began codification efforts, progressively adopting several conventions, recommendations and declarations aimed at protecting cultural heritage, recognized to be a common *concern* of mankind.¹⁸ Unfortunately, most instruments adopted under the auspices of UNESCO avoid explicit reference to CHM. Only the 1978 Recommendation for the Protection of Movable Cultural Property, in the 5th recital of the Preamble, states that ‘movable cultural property representing the different cultures forms part of the *common heritage of mankind* (emphasis added) and that every State is therefore morally responsible to the international community as a whole for its safeguarding’. The other instruments prefer a more ambiguous allusion to the ‘outstanding *interest* [...] of mankind as a whole’¹⁹ (emphasis added) or a slightly braver reference to the ‘*cultural* heritage of all mankind (emphasis added)’, the preservation of which ‘is of great importance for all the people of the world’.²⁰ The 2005 Convention on the Protection and Promotion of the Diversity of Cultural Expressions,

15 Trpimir Šošić, ‘The common heritage of mankind and the protection of underwater cultural heritage’ in Budislav Vukas, Trpimir Šošić (eds), *International Law: New Actors, New Concepts - Continuing Dilemmas. Liber Amicorum* (Martinus Nijhoff Publishers 2010) 319.

16 Convention (IV) respecting the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land. The Hague, 18 October 1907.

17 Maja Seršić, ‘Protection of Cultural Property in Time of Armed Conflict’ (1996) 27 *Netherlands Yearbook of International Law* 5 as mentioned by Šošić, *ibid* 33.

18 The Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict (adopted May 14, 1954, entered into force August 7, 1956) UNTS 249 (p. 215); The Convention on the Means of Prohibiting and Preventing the Illicit Traffic of Cultural Property (adopted November 11, 1970, entered into force April 24, 1972) UNTS 823 (p. 231) (1970 UNESCO Convention); The Convention for the Protection of the World Cultural and Natural Heritage (adopted November 16, 1972, entered into force December 17, 1975) UNTS 1037 (p. 151) (1972 UNESCO Convention); The Convention on the Protection of the Underwater Cultural Heritage (adopted November 2, 2001, entered into force January 2, 2009) UNTS 2562 (2001 UNESCO Convention); UNESCO (General Conference, 31st, 2001 p. 61) “The Universal Declaration on Cultural Diversity” 31 C/Resolutions + CORR; The Convention for the Safeguarding of the Intangible Cultural Heritage (adopted October 17, 2003, entered into force April 20, 2006) UNTS 2368 (p. 3) (2003 UNESCO Convention); The Convention on the Protection and Promotion of the Diversity of Cultural Expressions (adopted October 20, 2005, entered into force March 18, 2007) UNTS 2440 (2005 UNESCO Convention).

19 6th recital 1972 UNESCO Convention.

20 2nd and 3rd recital of the 1954 UNESCO Convention.



proposes that the ‘common heritage of humanity’ (rather than mankind) should be preserved ‘for the benefit of all’.²¹

Almost all of these instruments reveal some evidence of a CHM principle. Most notable in this regard are the 1954 Hague Convention²² and the so-called World Heritage Convention of 1972.²³ The former is permeated with the idea that cultural heritage impacted by armed conflict should be preserved in the interest of all mankind. The Preamble states that ‘cultural property belong[s] to any people’ and, as such, when damaged its loss affects ‘all mankind’.²⁴ Furthermore, article 1 defines cultural property as one that is ‘of great importance to the cultural heritage of *every people*’; however, none of the articles determines how this great importance should be protected.²⁵

Nonetheless, the 1954 Convention laid the foundations for the 1972 World Heritage Convention’s more inclusive and fully-developed approach. In addition to recognising the great importance of cultural heritage for ‘all the nations of the world’,²⁶ this Convention has two relevant impacts: In article 6 it formalises ‘the duty of the international community as a whole to *co-operate*’ to preserve cultural heritage; on the other hand in article 11 it provides for a system of international protective measures (consisting of two different Lists, the World Heritage List and the List of World Heritage in Danger) under the supervision of the World Heritage Committee.

The Committee may be compared with other international administrative agencies (such as the Financial Committee organised into the International Seabed Authority) and its powers remain under the control of states parties (with the remarkable exception of the measures arranged for the World Heritage in Danger²⁷) but regardless cultural heritage protection is, in some way, subtracted from the ‘domestic affair’ realm of the state, which is no longer ‘[...] free to actively demolish or passively impoverish cultural heritage which is considered to be of outstanding universal value’.²⁸

Article 4 of the Convention adds a further element which shows the extent to which the CHM approach is reflected within it, namely that state parties must ensure the ‘identification, protection, conservation, presentation and transmission to future generations’ of world heritage.

Therefore, UNESCO would appear to be the promoter of the concept of a ‘cultural heritage of mankind’ and states are under a general obligation to protect and preserve such a heritage in the interest

21 2nd recital 2005 UNESCO Convention.

22 The 1954 Convention for the Protection of Cultural Property in the Event of Armed Conflict.

23 That is the 1972 Convention concerning the Protection of the World Cultural and Natural Heritage.

24 2nd recital.

25 This lacuna leads the doctrine to affirm that this Convention only contains a ‘proclamation of an idea’ and should have been more assertive. Genius-Devime, *Bedeutung und Grenzen des Erbes der Menschheit im völkerrechtlichen Kulturgüterschutz* (Nomos 1996) as quoted by Trpimir Šošić (n 15) 318.

26 2nd recital of the Preamble.

27 Article 11.4 states that “[...]The Committee may at any time, in case of urgent need, make a new entry in the List of World Heritage in Danger and publicize such entry immediately”.

28 Šošić (n 15) 339.



of all humanity, present and future.²⁹ Such an awareness surely brings the cultural dimension into contact with the pure and highly theoretical CHM discipline, even if an adjustment enabling the former to make use of the latter is unavoidable.³⁰

3. At the Bottom of the Sea: the CHM Principle to the Test of Underwater Cultural Heritage Law

As evidenced above the law of the sea, through UNCLOS, is the high point for the CHM. However, UNCLOS probably does not represent the best reference to underwater cultural heritage (UCH). The two dimensions are closely linked, however, and the question becomes how best to reconcile them. The answer is to be found in the relevant legal frameworks which consist of two different conventions: UNCLOS and the 2001 UNESCO Convention on the protection of the UCH.³¹ The latter is the most recent progress regarding underwater cultural heritage, but the former, while not exclusively UCH focused, was the only legal reference for some time – at least from 1994 to 2009 (when the UNESCO convention came into force) – and therefore its influence cannot be underestimated. Indeed, a number of eminent authors have argued that UNCLOS represents ‘[...] the main obstacle to the full recognition of a public interest in the protection of the UCH’.³² The two systems overlap and therefore both are analysed here.

3.1 UNCLOS: Articles 149 and 303

UNCLOS devotes two articles to underwater cultural heritage: articles 149 and 303. The former belongs to Part XI of the Convention, dedicated to the Area, while the latter is included in Part XVI, listing the General Provisions.

Article 149 introduces two ideas: first of all ‘[a]ll objects of an archaeological and historical nature found in the Area shall be preserved or disposed of *for the benefit of mankind as a whole* (emphasis added) [...]’; secondly ‘[...] the State or country of origin, or the State of cultural origin, or the State of historical and archaeological origin [...]’ has a *preferential right* regarding these objects.

²⁹ As Šošić (n 15) 341 recalls, ‘[...] cultural heritage of mankind concept involves more than a mere moral duty [...] there are also evident legal implications’.

³⁰ Neglecting the undeniable organisational and structural differences that emerges at a comparison with the CHM doctrine as stated by UNCLOS, when applied to the cultural dimension, the CHM doctrine needs to be adjusted essentially because of the marked and (for the moment) undeniable presence of state sovereignty. States retain control over their cultural heritage: whilst they are not allowed to intentionally destroy cultural properties, theirs is the exclusive input in protection. The sole exception consists in the protection of endangered cultural heritage that the World Heritage Committee has the power to add to the List of the cultural heritage in danger with or without states’ consent.

³¹ United Nations Convention on the Law of the Sea (adopted December 10, 1982, entered into force November 16, 1994) UNTS 1833 (p. 3), 1984 (p. 3), 1985 (p. 3) (UNCLOS).

³² Tullio Scovazzi, ‘Underwater Cultural Heritage as an International Common Good’ in Federico Lenzerini, Filipa Vrdoljak (eds), *International Law for Common Goods* (Hart Publishing 2014) 219.



Although allusion to CHM doctrine clearly emerges, the concrete meaning of these two principles is left ‘vague and ambiguous.’³³ Indeed, the Convention does not specify how archaeological and historical objects should be preserved or disposed of,³⁴ nor does it indicate the content of the preferential right enjoyed by certain states and its position regarding benefits to mankind as a whole.³⁵

Another challenge with regard to article 149 pertains to its relationship with the CHM regime. Indeed, even if physically placed in part XI of UNCLOS and according to article 136, ‘[t]he Area and its resources *are* (emphasis added) the common heritage of mankind’, cultural objects found in there cannot be considered a ‘resource’ as defined by article 133 of UNCLOS. As a matter of fact, this definition refers to mineral resources alone and it is thus clear that the intention of those drafting the convention was to exclude cultural heritage from the regime of Part XI.³⁶ As a consequence of this exclusion, the CHM regime, as stated by part XI of UNCLOS, cannot be applied to the UCH. Therefore, the cultural objects located in the Area are thus not covered by the jurisdiction of the International Seabed Authority (ISA) and no international administration or agency is responsible for preserving them. The obligation to preserve mineral resources lies with individual states alone.³⁷

A final aspect to reflect on concerns underwater cultural heritage-related activities encompassed by the provision of article 149 which makes no reference whatsoever to archaeological research or exploration in the Area implying that only archaeological and historical objects ‘*found* in the Area shall be preserved or disposed of for the benefit of mankind as a whole (emphasis added),’ with the exclusion of any other related activities.³⁸

Its limits and vagueness notwithstanding, the regime established by article 149 of UNCLOS represents the first legally binding regulation on underwater cultural heritage considered as a sort of ‘common interest’ of mankind.

33 Craig Forrester, *International Law and the Protection of Cultural Heritage* (Routledge 2010) 322.

34 Although, as Šošić (n 15) 343 has correctly observed, UNCLOS was adopted before the consolidation of many principles concerning cultural heritage preservation, including the well-established principle of preservation *in situ*.

35 Apparently, the various categories of states encompassed by the final part of article 149 – ‘the State or country of origin, or the State of cultural origin, or the State of historical and archaeological origin’ – was conceived of as a negotiating alternative. Inexplicably, they were all left in the final version of the convention. Craig Forrester (n 32)

36 See Šošić (n 15) 342.

37 As a distinguished doctrine notes ‘[c]ette disposition de la Convention manqué malheureusement de précision et sa mise en oeuvre est laissée à la discrétion des Etats. Elle omet par ailleurs de reconnaître une quelconque responsabilité à l’Autorité internationale du fond des mers pourtant charge par la Convention des Nations Unies sur le droit de la mer d’organiser et de contrôler les activités menées dans cette partie du fond des mers’, Djamchid Momtaz, ‘La convention sur la protection du patrimoine culturel subaquatique’, in Tafsir Malick Ndiaye, Rudiger Wolfrum, Chie Kojima (eds), *Law of the sea, Environmental Law and Settlement of Disputes: Liber Amicorum Judge Thomas A. Mensah* (Martinus Nijhoff 2007) 444. See also Lucius Caflisch, ‘Submarine Antiquities and the International Law of the Sea’ (1982) 13 *Netherlands Yearbook of International Law* 3, 26; Roberta Garaballo, *La convenzione UNESCO sulla protezione del patrimonio culturale subacqueo* (Giuffrè 2004);

38 Šošić (n 15) 343.



However, this article must be read in light of article 303, which appears to move in a completely contrary direction.³⁹ Article 303 Paragraph 1 provides that ‘[s]tates have the duty to protect objects of an archaeological and historical nature found at sea and shall cooperate for this purpose.’⁴⁰ Whilst it does contain a mere invitation to cooperate, article 303 does not reference the CHM, preferring a more general approach.⁴¹ Paragraph 2 contributes to the uncertainty by its manifestly extending some coastal state rights beyond the external limits of their territorial sea, but neither the content nor the geographical limits of its application are clear.⁴² Indeed, article 303 paragraph 2, references article 33; article 33 concerns the contiguous zone, the zone where the coastal state ‘[...] may exercise the control necessary to [...] prevent infringement of its customs, fiscal, immigration or sanitary laws and regulations [and to] punish infringement of the above laws and regulations committed within its territory or territorial sea.’ The protection afforded to cultural objects found in this zone is thus merely collateral: the coastal state obviously has no rights over this cultural heritage and may intervene only as a consequence of its jurisdiction over matters that ‘have little or nothing to do with underwater cultural heritage’.⁴³ Furthermore, coastal states have the right to intervene to protect cultural heritage only when ‘removal from the seabed in the zone referred to’ contradicts one of the cited norms. The risk of ‘in situ’ destruction is not addressed.

Further uncertainty relates to the geographical limits of the application of article 303. The norm defines no regime relating to archaeological and historical objects found on the continental shelf or

39 According to a distinguish doctrine ‘[t]he two provisions are in conceptual contradiction with one another, as one (Article 149) aims at the benefit of mankind and the other (Article 303) at the benefit of finders and salvors.’ Tullio Scovazzi, ‘The Relationship Between Two Conventions Applicable to Underwater Cultural Heritage’ in James Crawford, Abdul Koroma, Said Mahmoudi, Alain Pellet (eds), *The International Legal Order: Current Needs and Possible Responses Essays in Honour of Djamchid Momtaz* (Martinus Nijhoff 2017) 518.

40 The content of such a duty is unclear, as the convention in no way specifies. Some authors have argued that it should be interpreted broadly: to embrace a range of activities such as the maintenance of known sites, archaeological excavation in accordance with accepted standards, material conservation and displayed of, etc. (Patrick O’Keefe, ‘The Draft Convention on the Protection of the Underwater Cultural Heritage’ (1994) 25 *Ocean Development and International Law* 391, 393); to encompass national legislation provisions on the obligation to preserve, conserve and protect UCH (Anastasia Strati, *The Protection of the Underwater Cultural Heritage: An Emerging Objective of the Contemporary Law of the Sea* (Martinus Nijhoff 1995)); to imply the obligation not to destroy, damage or mutilate UCH and also presume the *in situ* preservation (Luigi Migliorino, ‘*In Situ* Protection of Underwater Cultural Law under International Treaties and National Legislation’ (1995) 10 *International Journal of Marine and Coastal Law* 483).

41 Part of the doctrine implies the existence of some legal obligations from this 1 paragraph. Professor Scovazzi, for example, considers that ‘[a]n obligation to cooperate can be seen as implying a duty to act in good faith in pursuing a given objective and in taking into account the position of the other interested states.’ Tullio Scovazzi, ‘Underwater Cultural Heritage as an International Common Good’ (n 32) 219.

42 The paragraph states that ‘[i]n order to control traffic in such objects, the coastal State may, in applying article 33, presume that their removal from the seabed in the zone referred to in that article without its approval would result in an infringement within its territory or territorial sea of the laws and regulations referred to in that article.’

43 On this point see Scovazzi (n 32) 220. Scovazzi declares himself unconvinced by UNCLOS logic, which ‘[...] implies that underwater cultural heritage does not deserve to be protected *per se* [...]’.



in the exclusive economic zone (EEZ),⁴⁴ which remain unprotected.⁴⁵

Nevertheless, the main concern relates to article 303 paragraph 3, which states that ‘[n]othing in this article affects the rights of identifiable owners, the law of salvage or other rules of admiralty, or laws and practices with respect to cultural exchanges’. As the doctrine strongly underlines, the openness to the law of salvage or other rules of admiralty ‘greatly threaten the protection of cultural heritage’,⁴⁶ as these evoke a ‘first come first served’ approach.⁴⁷ Article 303 paragraph 3 gives it overarching status: in the event of conflict the UCH protection goal is overridden by the law of salvage or other rules of admiralty. A distinguished scholar has highlighted the fact that ‘[t]he danger of freedom of fishing for underwater cultural heritage is far from being merely theoretical’⁴⁸ arguing that the application of the law of salvage or other rules of admiralty ‘[...] gives the salvager a lien over the object’, leading to the application of the so-called ‘freedom of fishing approach’.⁴⁹

The UCH protection offered by UNCLOS would thus appear to be incomplete and fragmented. The connection between the CHM and underwater cultural heritage is weak and, above all, limited to a restricted geographical area. The 2001 UNESCO convention represents a more explicit and comprehensive approach to underwater cultural heritage of mankind.

3.2 The 2001 UNESCO Convention

The 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage represents a significant development for UCH protection. The 2001 treaty succeeded 1954 and 1972 conventions which themselves succeeded earlier CHM principle provisions.

This trend emerges from the text of the 2001 UNESCO Convention, notably from the Preamble, which states that UCH is ‘an integral part of cultural heritage of humanity and a particularly important element in the history of peoples, nations, and their relations with each other concerning their

44 According to article 55 ‘[t]he exclusive economic zone is an area beyond and adjacent to the territorial sea, subject to the specific legal regime established in this Part, under which the rights and jurisdiction of the coastal State and the rights and freedoms of other States are governed by the relevant provisions of this Convention’. It includes the Contiguous zone and it extends up to 200 nautical miles.

45 Nevertheless, an other part of the doctrine considers that ‘[t]he fact that article 303(1) imposes duty to protect archaeological and historical objects ‘found at sea’ would reinforce the conclusion that article 303(1), (3) and (4) apply to all the maritime zone [while] article 149, being specifically drafted for application in the Area, would take preference over the general provision set out in [the previous] article’. See Forrester (n 33) 325.

46 Scovazzi (n 32) 221.

47 Accordingly, the freedom of the sea principle that is at the base of this approach gives no guarantees that the object would be disposed of for the benefit of mankind as a whole.

48 Scovazzi (n 32) 221.

49 Scovazzi (n 32) 222-223. Other commentators do not share this view arguing that ‘coastal states custom, fiscal and sanitary law should be extensively constructed so as to include the coastal state cultural heritage regulation’. Bruce E. Alexander, ‘Treasure Salvage Beyond the Territorial Sea: An Assessment and Recommendation’ (1989) 20 *Journal of Maritime Law and Commerce* 1-20, 17. Others argue that ‘the effect of article 303 is to establish an archaeological zone which is not necessarily dependent on the coastal state having declared a contiguous zone’. Anastasia Strati (n 40) 225.



common heritage’, and from article 2, providing that ‘States Parties shall preserve [it] for the benefit of humanity [...]’. Paragraph 2 of the same article introduces the obligation to ‘[...] cooperate in the protection of underwater cultural heritage’, which can be viewed as an additional echo of the CHM doctrine.⁵⁰

The path to the adoption of this Convention was not straightforward: the final text was adopted with a considerable number of abstentions and the Convention only entered into force eight years after its adoption. Despite these difficulties and whilst undoubtedly inspired by its article 149, the 2001 UNESCO Convention tried to address the gaps left by UNCLOS.⁵¹

Firstly, the 2001 convention’s range of action is much more extensive and includes all maritime zones. Thus, the protection afforded to UCH in the interest of humanity as a whole is not limited to the Area, which is the geographical scope of application of UNCLOS article 149.

Secondly, state of origins’ preferential rights are not included in the list of general principles in article 2 of the convention. However these are not entirely excluded, as they are dealt with in several other provisions pertaining to the EEZ, the continental shelf and the Area,

The most innovative provisions, as compared with UNCLOS, are threefold: the elimination of the negative effects of the law of salvage and finds; the exclusion of the “first-come-first-served” approach to the continental shelf and in the EEZ; the strengthening of regional cooperation.

Concerning the elimination of the negative effects of the law of salvage and finds, the 2001 UNESCO Convention article 4 provides that ‘[a]ny activity relating to underwater cultural heritage to which this Convention applies shall not be subject to the law of salvage or law of finds [...]’. The progress implied by this provision is undeniable even considering the second part of the same article 4 which came to a necessary compromise solution in which states participating in the negotiations had to agree to reach agreement with the minority of states not ready for an absolute ban on the law of salvage.⁵² Indeed, article 4 does not rule out the application of the law of salvage when it ‘[...] (a) is authorized by the competent authorities, and (b) is in full conformity with this Convention, and (c) ensures that any recovery of the underwater cultural heritage achieves its maximum protection’. Nevertheless, this provision has to be read in conjunction with paragraph 7 of article 2 and with rule 2

50 Whilst the Convention specifies no concrete measures that states can take to cooperate with it.

51 An eminent scholar has argued that ‘[t]he CPUCH may be seen as a reasonable defence of the underwater cultural heritage against the results of the counterproductive regime of UNCLOS’. Scovazzi (n 32) and the same author in ‘La notion de patrimoine culturel de l’humanité dans les instruments internationaux’, *Académie de droit international de La Haye* (Martinus Nijhoff, 2008) 3; ‘2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage’, in Nafziger, Nicgorski (eds), *Cultural Heritage Issues The Legacy of Conquest, Colonization and Commerce* (Martinus Nijhoff, 2009) 287; ‘The entry into force of the 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage’ (2010) 1 *Aegean Review of the Law of the Sea and Maritime Law* 19; ‘The Law of the Sea Convention and Underwater Cultural Heritage’ (2012) 27 *The International Journal of Marine and Coastal Law* 753; as well as Vincent Cogliati Bantz, Craig J. Forrest, ‘Consistent: the Convention on the Protection of the Underwater Cultural Heritage and the United Nations Convention on the Law of the Sea’, (2013) 2(3) *Cambridge Journal of International and Comparative Law* 536; Sorna Khakzad, ‘Underwater Cultural Heritage Sites on the Way to World Heritage: To Ratify the 2001 Convention or not to Ratify?’ (2014) 1(2) *Journal of Anthropology and Archaeology* 1.

52 See Scovazzi (n 32) 224-225.



of the Annex, which explicitly excludes any commercial exploitation of the UCH.⁵³

Regarding the 2001 UNESCO Convention's second innovative provision, it is noteworthy that the Convention introduces a procedural mechanism designed to involve all states linked to the UCH, wherever the latter is found. This mechanism, once again a compromise, nonetheless has a positive outcome in that it represents a step in the direction⁵⁴ of extending the jurisdiction of coastal states to UCH found on the continental shelf or in the EEZ. The first part of this procedural mechanism consists of the reporting obligation, provided in article 9(4) upon nationals or vessels flying a flag of a state party in UCH-related activities, or when an artefact is found on the continental shelf or in the EEZ of another state that is party to the convention. Reports received by the states must be transmitted to the UNESCO's Director-General. The second part of the mechanism, comprised in articles 10(3) and 9(5) involve the coastal state assuming the role of 'coordinating state'⁵⁵. As such it is obliged to consult all states parties declaring an interest in being consulted, to determine together the most effective way to protect the UCH in question. Finally, Article 10(4) provides that the coordinating state has the right to adopt 'all practicable measures [...] to prevent any immediate danger to the underwater cultural heritage, whether arising from human activities or any other cause, including looting'.

The third innovation is the encouragement in article 6 of the 2001 UNESCO Convention to states parties to conclude 'bilateral, regional or other multilateral agreements or develop existing agreements, for the preservation of underwater cultural heritage'. The approach of this article is a multilevel one, similar to the approach generally used in the environmental field, where general agreements are, in a way, integrated and specified by regional and sub-regional ones⁵⁶.

Article 2(3) of the 2001 UNESCO Convention states that UCH found in the Area must be 'preserve[d] [...] for the benefit of humanity' (emphasis added). Nevertheless, articles 11 and 12 retain some form of a preferential right for the state of origin (even if excluded from article 2): states with a 'verifiable link' to this heritage have a right to be consulted on how to protect it.

The 2001 UNESCO Convention potentially represented a giant leap forward for UCH protection and its relationship with the CHM. Unfortunately, its low implementation reflects its overlap with UNCLOS and the limited attention provided to the 'common nature' of UCH. Assuming then, that interaction is inevitable, should we consider other means of achieving the desired result?

53 As the Annex states 'the commercial exploitation of underwater cultural heritage for trade or speculation or its irretrievable dispersal is *fundamentally incompatible with the protection and proper management of underwater cultural heritage*. Underwater cultural heritage *shall not be traded, sold, bought or bartered as commercial goods*' (emphasis added).

54 In any event, Scovazzi regrets that '[...] despite all the efforts to reach a reasonable compromise, a consensus could not be achieved at the moment of the adoption of the CPUCH on the procedural mechanism envisaged for the heritage located on the continental shelf or in the exclusive economic zone'. See Scovazzi (n 32) 227.

55 Unless another state has an interest in assuming this role.

56 Scovazzi (n 32) 227. For a practical example see Mariano J Aznar, 'The *Titanic* as Underwater Cultural Heritage: Challenges to its Legal International Protection' (2013) 44 *Ocean Development & International Law* 96.



3.3 New Perspectives: Protecting Cultural Heritage in Tangential Ways? Looking for an Interaction with other Disciplines

UNCLOS's vagueness, difficulties in implementing the 2001 UNESCO Convention, and the challenges concerning the coexistence of the two has prompted consideration of alternative ways of protecting UCH.⁵⁷

A feasible path would seem to be an environmental protection approach. Indeed, archaeological objects lying under the sea are very frequently completely embedded into the marine ecosystem surrounding them with multiple species of flora and fauna living in them. Thus, the two dimensions are inextricably linked and any activity affecting the UCH in question or surrounding natural resources, may have dangerous consequences for both.

Article 56 of UNCLOS states that, within the limits of its EEZ, '[...] the coastal State has [...] sovereign rights for the purpose of *exploring and exploiting, conserving and managing the natural resources*, whether living or non-living, of the waters superjacent to the seabed and of the seabed and its subsoil, and with regard to other activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds [...](emphasis added)'. Whilst, as we have already underlined, UCH cannot be considered a 'natural resource' *per se*,⁵⁸ this reference to the duty to conserve natural resources is worthy of attention as it may potentially leave space for collateral protection of connected UCH.

Regarding the continental shelf, article 77 of UNCLOS states that '[t]he coastal State exercises over the continental shelf sovereign rights for the purpose of exploring it and exploiting its natural resources'. It specifies also that '[t]he natural resources referred to in this Part consist of the mineral and other non-living resources of the seabed and subsoil together with living organisms belonging to sedentary species, that is to say, organisms which, at the harvestable stage, either are immobile on or under the seabed or are unable to move except in constant physical contact with the seabed or the subsoil'. UCH would again seem to be explicitly excluded from this, nevertheless any exploration or exploitation in this area potentially affects both dimensions and should necessitate a proper protection system.

Finally, considering the Area, some commentators have speculated whether the norms applicable to the protection of the environment in this sector could fill any existing gaps in the protection of UCH

⁵⁷ According to Aznar, '[...] some of the complaints about the vagueness and limited guidance of Article 303 ignore how the treaty is a framework convention and that detail about rights and responsibilities in article 303 may be found in other provisions of the Convention'. The UCH discipline should then be complemented with other norms of the same convention, even if not directly and specifically consecrated to the cultural dimension. Mariano J Aznar, 'The Legal Protection of Underwater Cultural Heritage: Concerns and Proposals' in Carlos Espósito, James Kraska, Harry Scheiber, Moon-Sang Kwon (eds), *Ocean Law and Policy Twenty Years of Development Under the UNCLOS Regime* (Martinus Nijhoff, 2016) 124, 137.

⁵⁸ Indeed, as explicitly explained by the International Law Commission (ILC), the rights the coastal states can exercise over the natural resources located on their continental shelf '[...] do not cover objects such as wrecked ships and their cargoes (including bullion) lying on the seabed or covered by the sand of the subsoil' (in this case the Commission was commenting art. 68 of its report on the law of the sea, published in 1956. Yearbook of the International Law Commission – vol. II (1956), 298). This exclusion can be seen as referring to the underwater cultural heritage category as a whole.



located here.⁵⁹ Articles 11 and 12 of the 2001 UNESCO Convention, which, as we have already seen, provide for a complex system of notifications and coordination between interested states, govern the activities *directed* at the UCH. Nevertheless, some activities, such as mining, for example, incidentally affect underwater cultural heritage, potentially disturbing or damaging it. The system would thus appear to be incomplete. In this context the environmental protection regime established under UNCLOS may be of assistance. The solutions proposed by the doctrine include: the application of a similar monitoring system to that foreseen for the marine environment that involves the Authority;⁶⁰ the establishment of ‘preservation reference zones’ to protect UCH located there too;⁶¹ the use of emergency orders, such as suspending or adjusting operations endangering UCH in the Area;⁶² the general inclusion of the ‘archaeological variable’ in the idea of ‘serious harm to the marine environment’ so as to allow for the application of all related norms.

In this latter sense, the 2001 UNESCO Convention can be seen as having a more open approach, which includes explicit references to the ‘natural environment’ or ‘context’ that surrounding the underwater cultural heritage in question.⁶³ The Annexed Rules, more proactively, consider the two dimensions together, rule 10(1) providing that any archaeological project submitted to the competent authorities for authorisation ‘[...] shall include [...] an environmental policy’. Rule 29 sets out: This policy should be ‘[...] adequate to ensure that the seabed and marine life are not unduly disturbed’. Rule 10(a) provides that an evaluation ‘of previous or preliminary studies’ shall also be included into the project and further, through rule 14, it ‘[...] shall include an assessment that evaluates the significance and vulnerability of the underwater cultural heritage *and the surrounding natural environment* [emphasis added] to damage by the proposed project [...]’.

Nevertheless, such references cannot be considered satisfactory. Their implementation does not achieve the expected results. Indeed, as noted in several academic works, activities directed to the UCH unfortunately still usually imply the destruction of the natural environment surrounding archaeological heritage sites.⁶⁴

59 A very recent reference is Mariano J Aznar, ‘Exporting Environmental Standards to Protect Underwater Cultural Heritage in the Area’, in James Crawford, Abdul Koroma, Said Mahmoudi, Allain Pellet (eds), *The International Legal Order: Current Needs and Possible Responses Essays in Honour of Djamchid Momtaz* (Martinus Nijhoff 2017) 253.

60 See Regulation 5(2) PNR/PSR/CCR; Regulation 31(6) PNR/CCR; Regulation 33(6) PSR; Regulation 32 PNR/CCR; Regulation 34 PSR as cited in Aznar (n 59) 253.

61 Prior ISA regulations established this kind of protected areas in order to safeguard biodiversity and the marine environment from mining.

62 This kind of remedy already exists to protect the environment of the Area and was adopted by the ISA.

63 Article 1(1)(a), lists some examples of the ‘traces of human existence having a cultural, historical or archaeological character’ that constitute the underwater cultural heritage protected by the Convention, also encompassing the ‘sites, structures, buildings, artefacts and human remains, *together with* their archaeological and *natural context* [emphasis added]’ (art. 1(1)(a)(i)) as well as ‘vessels, aircraft, other vehicles or any part thereof, their cargo or other contents, *together with their* archaeological and *natural context* [emphasis added]’ (art. 1(1)(a)(ii)).

64 Aznar is waiting for ‘[...] a return route from the environment to archaeology [as] both questions are inextricably linked: most historical wrecks, for example, have become artificial reefs deserving not only archaeological but also environmental protection’ (Aznar (n 59) 271).



According to the same doctrine, the norms regulating Marine Scientific Research (MSR) could constitute another tool.⁶⁵ Even if it is accepted that archaeological activities were not encompassed by marine scientific research during UNCLOS negotiations, recent commentators have argued that the sole fact that articles 149 and 303 exist demonstrates that UCH protection was one of the original purposes of UNCLOS and hence, the convention as a whole should be read in this light.⁶⁶ According to this doctrine, MSR could allow a collection of data useful for UCH and also for environmental protection.⁶⁷ Therefore, when research is related to UCH located in the EEZ or on a state's continental shelf, pursuant to article 246 of UNCLOS, this state should have the right to give or withhold its authorisation in order to protect such heritage.⁶⁸ The main advantage of resorting to this discipline is that it applies prior to intervention taking place, thereby avoiding site destabilisation, as well as potential enforcement challenges. It could also represent an important legal reference for states which at present have no intention of ratifying the 2001 UNESCO Convention, but are nonetheless concerned about UCH related activities.⁶⁹

65 Sarah Dromgoole, 'Revisiting the Relationship between Marine Scientific Research and the Underwater Cultural Heritage' (2010) 25 *The International Journal of Marine and Coastal Law* 33; Aznar (n 57); Tullio Scovazzi, 'Is the UN Convention on the Law of the Sea the Legal Framework for All Activities in the Sea? The Case of Bioprospecting', in Davor Vidas (eds), *Law, Technology and Science for Oceans in Globalisation IUU Fishing, Oil Pollution, Bioprospecting, Outer Continental Shelf* (Martinus Nijhoff 2010) 309; Tullio Scovazzi, 'The Negotiations for a Binding Instrument on the Conservation and Sustainable Use of Marine Biological Diversity Beyond National Jurisdiction' (2016) 70 *Marine Policy* 188. See also Eke Boesten, *Archaeological and/or Historic Valuable Shipwrecks in International Waters*, (TMC Asser Press 2002) 65; Keun-Gwan Lee, 'An Inquiry into the Compatibility of the UNESCO Convention 2001 with UNCLOS 1982', in Prott (eds), *Finishing the Interrupted Voyage: Papers of the UNESCO Asia-Pacific Workshop on the 2001 Convention on the Protection of the Underwater Cultural Heritage* (Institute of Art and Law 2006) 20; Katherine Croff, 'The Underwater Cultural Heritage and Marine Scientific Research in the Exclusive Economic Zone' (2009) 43 *Marine Technology Society Journal* 93.

Dromgoole at 38 argues that the gap in the UNCLOS provisions is due to the fact that, at the time of this convention was been negotiated and adopted, marine archaeology '[...] was barely a scientific discipline at all and understanding of the potential historical and archaeological value of the underwater cultural heritage (UCH) was limited and undeveloped'.

66 Ibid.

67 Sarah Dromgoole (n 65) 33.

68 The coastal state has various levels of discretion depending on the nature of the research project. A so-called 'pure' project implies research carried out 'exclusively for peaceful purposes and in order to increase scientific knowledge of the marine environment for the benefit of all mankind' (art. 246(3)). In this case coastal states usually consent. When a so-called 'applied' project is concerned, on the other hand, 'of significance for the exploration and exploitation of natural resources' (art. 246(5) (a)), coastal states may withhold their authorisation.

When considering UCH related activities in which research is being supervised by scientific institution and follows archaeological protocols internationally recognized by the scientific community, for example, a project may be classified as 'pure'. On the contrary, where activities such as treasure hunting or other commercial activities are concerned and considered an 'applied' project coastal states surely have the right to reject them. On this point see Aznar (n 57) 141.

69 Dromgoole(n 55) at 61 argues even that the application of MSR rules 'would help to bolster the regulatory mechanisms set out in the UNESCO Convention which – in respect of the continental shelf and EEZ – are complex and imperfect'.



4. Concluding Remarks

Both UNCLOS and the 2001 UNESCO Convention are the products of their time.⁷⁰ As far as the former is concerned, the cultural dimension pays the price of scarce technology which has placed the UCH as an ‘exotic subject of interest’.⁷¹ While the latter embodies an interest in humanity as a whole its concrete protection is difficult to apply. After lengthy debate on which of the two conventions should prevail over the other, contemporary doctrine has reached the conclusion that only constructive cooperation can achieve the desired result.⁷² On one hand, an extended interpretation of UNCLOS, which includes the clauses referring to marine environment or regulating marine scientific research, would provide the effectiveness that the 2001 UNESCO Convention lacks.⁷³ On the other hand promoting the adoption of bilateral, regional or multilateral agreements with a higher standard of protection and rooted in its same principles, the latter convention is capable of granting a more extensive and modern interpretation of UCH. The result from such a complex and multilevel interaction would also perfect the existing links between the common heritage of mankind and the cultural heritage of humanity: two sides of the same coin, but not yet supplied with the same legislative tools.

⁷⁰ Aznar (n 57) 144.

⁷¹ Aznar (n 57) 144.

⁷² Aznar (n 57) 145 argues that the concerns and the criticisms that the 2001 UNESCO Convention has attracted ‘[...] may be dispelled with an evolving and contextual interpretation of the UNESCO Convention as its ‘constructive ambiguities’ are being implemented consistent with international law *including* (emphasis added) UNCLOS’.

⁷³ UNCLOS and the ISA Mining Code include an effective enforcement mechanism that the 2001 UNESCO Convention lacks. See Aznar (n 59) 272.

The Common Heritage of Mankind in International Law: A Great Past but No Future?

Ornella FERRAJOLO*

Abstract

This paper addresses the Common Heritage of Mankind (CHM) with respect to marine and outer space resources, in light of relevant treaties. Possible developments concern internationally, the drafting of a special regulation on the conservation and sustainable use of marine biodiversity of areas beyond national jurisdiction and, nationally, newly-adopted regulations on the commercial use of space resources. CHM's current role is unclear because of many important political and legal developments. CHM appears to have found new roots in international environmental law and human rights law. However, this approach may not be effective in practice. The paper concludes that while CHM has a great past, its future looks less promising. There are limited prospects of implementation, or of a broadened scope of application. According to some scholars, non-consolidation of CHM in international law is primarily due to the predominance of a 'legal positivistic' approach taken by jurists, and the excessive weight accorded to the will of the states in the making of international law. In the author's view this argument is not entirely convincing, especially if its underlying idea is that further CHM achievements are only possible by drastically changing the fundamentals of international law.

Keywords: Common Heritage of Mankind, International Law, UNCLOS, Convention on Biological Diversity, the Area, International Seabed Authority

First published online: 20 December 2019

1. History of CHM in International Law

The CHM concept dates from the second half of the twentieth century. The core content of the CHM legal concept is that interests and benefits with regard to certain areas and resources whose conservation is essential to human beings are vested in humankind as a whole, including future generations. The CHM concept was embedded in the 'Declaration of Principles governing the Seabed

*The Author is senior researcher in international law at the Italian National Research Council of Italy (CNR) and acting director of the CNR Institute for International Legal Studies. She is grateful to the anonymous reviewers on their valuable comments, the dear colleague Gemma Andreone for sharing the final reading of the article, and the Journal editorial staff.



and the Ocean Floor, and the Subsoil Thereof, beyond the Limits of National Jurisdiction,¹ and it was designed to promote a New International Economic Order (NIEO), which the UNGA inaugurated in the post-colonial era, with input of newly independent countries.² According to the 'Charter of Economic Rights and Duties of States' adopted by the UNGA in 1974, the recognition that the deep seabed resources are a common heritage of humankind is one of the states' common responsibilities towards the international community.³ States were thus encouraged to regard the CHM as the guiding principle on managing resources in areas beyond national jurisdiction, in the same way that the principle of permanent sovereignty applies to natural resources in state territory.⁴

Article 11 of the 'Moon Agreement' of 1979,⁵ which declared the Moon and its natural resources the CHM, was the first treaty to use the concept. The United Nations Convention on the Law of the Sea (UNCLOS) of 1982⁶ went further, establishing in Part XI a CHM regime for the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction (the 'Area') and its mineral resources. The Implementing Agreement of 1994⁷ introduced some modifications concerning, inter alia, the institutional arrangements, costs and transfer of technology, and thus making the regime of the Area more widely acceptable to developed countries.

These treaty provisions represent the most significant evidence of the CHM concept. The meaning of 'common heritage of mankind' under general international law is subject to different interpretations. Within the definition of the CHM are certain elements. These are: (a) non-appropriation; (b) peaceful purposes and benefit sharing; (c) freedom of research; (d) environmental protection; and, (e) a common management regime by *ad hoc* international mechanisms, including, for example, through an intergovernmental organisation (IGO).⁸ The coexistence of these five components makes it possible to distinguish the CHM from *res communes omnium*, such the high seas, in respect of which, similarly, state appropriation by claims of sovereignty or by any other means is not allowed. Customarily, the high seas are free for use by all states, except for any act that might interfere with other states' freedom.⁹ These principles are reflected in the Convention on the High Seas (CHS)¹⁰ and

1 UNGA Res 2749 (XXV) (12 December 1970).

2 Declaration on the Establishment of a New International Economic Order, UNGA Res 3201 (S-VI) (1 May 1974) UN Doc A/RES/S-6/3201.

3 UNGA Res 3281 (XXIX) (12 December 1974) art 29.

4 Permanent Sovereignty over Natural Resources, UNGA Res 1803 (XVII) (14 December 1962).

5 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (adopted 5 December 1979, opened for signature 18 December 1979, entered into force 11 July 1984) 1363 UNTS 3 (Moon Agreement).

6 United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 396 (UNCLOS).

7 Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea (adopted 28 July 1994, provisionally applied by the participating states from 16 November 1994 and entered into force 28 July 1996) 1836 UNTS 3 (Implementing Agreement).

8 Rüdiger Wolfrum, 'The Principle of the Common Heritage of Mankind' (1983) 43 ZaöRV 312, 316.

9 Ian Brownlie, *Principles of Public International Law* (7th edn, OUP 2008) 169.

10 Convention on the High Seas (adopted 29 April 1958, entered into force 30 September 1962) 450 UNTS 11 (CHS). Based on the CHS, 'The term "high seas" means all parts of the sea that are not included in the territorial sea or in the internal waters of a State' (art 1). High seas freedoms include the freedom of navigation, fishing, laying submarine cables and pipelines, flying over the high seas, and others freedoms as 'recognized by the general principles of international law', to be exercised by states 'with reasonable regard to the interests of other states' (art 2).



the relevant UNCLOS provisions.¹¹ The 'Outer Space Treaty' (hereinafter OST)¹² and complementing conventions,¹³ with the exception of the Moon Agreement, set forth a regime very close to that of *res communes* for outer space, including the Moon and the other celestial bodies.

The CHM regime introduces significant advances vis-à-vis the regime of *res communes omnium*; traditionally the utilisation of common areas does not necessarily require state cooperation or solidarity. According to the OST, the exploration and use of outer space are 'the province of all mankind', and must be carried out for the benefit and in the interests of all states, irrespective of their degree of economic and scientific development.¹⁴ A non-binding instrument adopted by the UNGA in 1996 provides further guidance for the application of the 'benefit principle'.¹⁵ However, this did not change the reality that outer space and celestial bodies are subject, like the high seas, to a regime under which the freedom of utilisation puts the most developed states in the best position to explore and exploit resources and, therefore enables *de facto* inequalities. Determinations on cooperation with developing countries, including the sharing of the benefits are at the discretion of individual states.¹⁶ The OST does not impose detailed obligations, instead it sets out general principles governing activities, most of which are universally recognised as being of a customary nature and perhaps of peremptory character.¹⁷

With regard to the institutional framework, the constituent treaties of some UN Agencies, such the IMO (International Maritime Organization) and the ICAO (International Civil Aviation Organization) have conferred upon these IGOs competences on the regulation of safe navigation, environmental protection and the exploitation of natural resources in common areas. Similarly, the ITU (International Telecommunication Union) is authorised to manage the geostationary satellite orbit and radio frequencies 'efficiently and economically' and 'taking into account the special needs of the developing countries'.¹⁸ This practice highlights that the principle of state freedom provides a general legal framework for activities in common areas, but does not govern every aspect of the utilisation

11 UNCLOS, Part VII, arts 87 to 120.

12 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (adopted 19 December 1966, opened for signature 27 January 1967, entered into force 10 October 1967) 610 UNTS 205 (Outer Space Treaty-OST).

13 These are: the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (adopted 22 April 1968, entered into force 3 December 1968) 672 UNTS 119 (Rescue Agreement); the Convention on International Liability for Damage Caused by Space Objects (adopted 29 March 1972, entered into force 1 September 1972) 961 UNTS 187 (Liability Convention); and the Convention on Registration of Objects Launched into Outer Space (adopted 14 January 1975, entered into force 15 September 1976) 1023 UNTS 15 (Registration Convention).

14 OST, art I.

15 UNGA Res 51/22 (13 December 1996).

16 With regard to the poor legal effects of the 'common benefit clause', see Stephan Hobe, 'Article I' in Stephan Hobe, Bernhard Schmidt-Tedd, Kai-Uwe Schögl (eds), *Cologne Commentary on Space Law*, vol I (Wolters Kluwer 2009), 36 and 56.

17 Vladimir Kopal, 'Comments and Remarks' in *Proceedings of the Workshop on Space Law 'Disseminating and Developing International and National Space Law: The Latin-America and Caribbean Perspective'* (UN Publications 2005) 25, fn 7.

18 Cf art 33 para 2 of the International Telecommunication Convention (as revised in Nairobi on 6 November 1982, and entered into force 1 January 1984) 33 UKTS 1 (ITU Convention). On the wide range of the ITU regulatory powers see Setsuko Aoki, 'Efficient and Equitable Use of Orbit by Satellite Systems: 'Paper Satellite' Issues Revisited' in *Proceedings of the International Institute of Space Law 2013* (Eleven International Publishing 2014) 229.



of these areas and resources. As will be discussed in Sections 2 and 3, an international mechanism managing areas beyond national jurisdiction in accordance with a CHM regime, seems more adequate to protect the interests of all states and future generations. The principle of state freedom, indeed, is most particularly unable to safeguard common interests such as safety, security, prevention of pollution and resource depletion, avoiding contentious issues, dispute settlement, and the needs of vulnerable populations. The lack of authority to exercise jurisdiction and control over these areas makes it difficult to enforce such protection measures as may be provided for by global or regional treaties, especially *vis-à-vis* non-party states.

Unsurprisingly, a CHM-oriented perspective is part of the debate about the requirements for legitimately recovering and exploiting outer space natural resources, anticipated to become operational within a few decades.¹⁹ Moreover, governments have invoked the CHM as an opposing principle to the freedom of the high sea, in the framework of negotiating a new agreement, possibly supplementing UNCLOS on the subject of the conservation and the sustainable use of marine biodiversity, including genetic resources, from areas beyond national jurisdiction.²⁰ In addition, the idea has emerged from the 1992 Rio Declaration on Environment and Development²¹ that state policies and legislation concerning biodiversity, climate, forests, and other resources that are essential to human survival on Earth, should conform to the principles of sustainable development enshrined in the Declaration, notably the inter generation equity.²² From this point of view, it does not really matter whether so-called 'global commons' lie in state territory or beyond areas of national jurisdiction, because their conservation and sustainable use partly transcends the concept of state sovereignty.²³

That the CHM has become anachronistic since the demise of the NIEO as a political project is unconvincing.²⁴ It is true that important changes have occurred since the CHM was introduced. However, few developing countries have benefitted from economic globalisation.²⁵ Consequently, the problem with the CHM is a need for reinterpretation.²⁶

19 Steven Freeland, 'Common heritage, not common law: How international law will regulate proposals to exploit space resources' (2017) 35 QIL, Zoom-in, 19, <http://www.qil-qdi.org/wp-content/uploads/2017/01/03_Space-Resources-Mining-FREELAND.pdf> accessed 6 December 2019.

20 UNGA Res 69/292 (9 June 2015).

21 UNGA 'Report of the UN Conference on Environment and Development. Rio de Janeiro 3-14 June 1992' (12 August 1992) UN Doc A/CONF.151/26 (Vol I).

22 See Surabhi Ranganathan, 'Global Commons' (2016) 27 EJIL 693.

23 Nico Schrijver, 'The dynamics of State sovereignty in a changing world' in Konrad Ginther, Erik Denters and Paul J.I.M. de Waart (eds) *Sustainable Development and Good Governance* (Martinus Nijhoff 1995) 80.

24 Ruth Gordon, 'The Dawn of a New, New International Economic Order?' (2009) 72 LCP 131 (also available online: <<https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1548&context=lcp>>, accessed 6 December 2019).

25 Cf. Vai Io Lo and Mary Hiscock (eds) *The Rise of the BRICS in the Global Political Economy: Changing Paradigms?* (Elgar 2014).

26 Daniel Bethlehem, 'The End of Geography: The Changing Nature of the International System and the Challenge to International Law' (2014) 25 EJIL 9.



2. Marine Resources

2.1 The CHM under UNCLOS and Implementing Agreement

Provisions for the Area and its mineral resources set out in UNCLOS and the Implementing Agreement²⁷ are the most complete expression of the CHM ever realised. Sovereignty claims over the Area, its mineral resources, and any part thereof are prohibited.²⁸ The utilisation of the Area is open to all parties for peaceful purposes.²⁹ Any activity within the Area must be carried out for the benefit of 'mankind as a whole', taking particular consideration of the interests and needs of the developing countries.³⁰ Scientific research is free, if peaceful and in the interest of humanity.³¹ When carrying out activity in the Area, states must take measures to ensure the protection of the environment and human life.³²

The international mechanism that manages the Area is the International Seabed Authority (ISA), established under UNCLOS and of which all parties are *ipso facto* members.³³ The ISA has the power to adopt rules on the equitable sharing of benefits derived from activities in the Area, and for securing compliance with its determinations by states parties.³⁴ States have the responsibility of ensuring that private activities carried out in the Area conform to UNCLOS, the Implementing Agreement and ISA regulations; they are liable for any damage caused by activities carried out under their jurisdiction or control.³⁵

Part XI of UNCLOS provided for the establishment of the 'Enterprise',³⁶ which should carry out exploration and exploitation activity, directly, including by entering into joint ventures with commercial operators. This is not yet operational, and the ISA Secretariat currently performs some of these functions. Postponing the establishment of the Enterprise was a result of the Implementing Agreement's successful efforts to address the most problematic areas of UNCLOS,³⁷ in order to facilitate wider acceptance of the Convention among developed states. Both instruments have been widely rat-

27 Under UNCLOS, art 136, 'The Area and its resources are the common heritage of mankind'. As already noted, the word 'Area' indicates 'the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction' (UNCLOS, art 1 para 1). The resources of the Area mentioned in art 136 are intended as 'all solid, liquid or gaseous mineral resources *in situ* in the Area at or beneath the seabed, including polymetallic nodules'; when recovered from the Area, these resources are designated as 'minerals' (UNCLOS, art 133).

28 UNCLOS, art 137.

29 UNCLOS, art 141.

30 UNCLOS, arts 140 and 148.

31 UNCLOS, art 143.

32 UNCLOS, art 139.

33 UNCLOS, arts 156-185.

34 The ISA is provided with an Assembly, in which each member state is represented (UNCLOS, art 159); an executive body (the Council) and a Secretariat assist the Assembly in the performance of its functions (UNCLOS, arts 161-169).

35 UNCLOS, arts 156-185.

36 UNCLOS, art 170.

37 These areas are addressed in the different sections of the Annex to the Implementing Agreement: 'Costs to state parties and institutional arrangements', 'The Enterprise', 'Decision-making', 'Review Conference', 'Transfer of Technology', 'Production Policy', 'Economic Assistance', 'Financial Terms of Contracts', and 'The Financial Committee'. Under Section 1, para. 4, the setting up and the functioning of the ISA organs and subsidiary bodies are based on "an evolutionary approach" in order that "they may discharge effectively their respective responsibilities at various stages of the development of activities in the Area".



ified (US non-participation to UNCLOS is an important exception).³⁸ The modifications introduced by the Implementing Agreement have weakened the CHM regime attached to the Area.³⁹ Indeed, it has been underlined how the Agreement, rather than dealing with ‘implementation’, is effectively an amendment to UNCLOS, and has substantively changed certain aspects of the CHM concept.⁴⁰ However, others highlight that the fundamental aspects of the regime of the Area (international managing authority, sharing of benefits) remain unchanged.⁴¹ However, the original innovations of Part XI were weakened even if the substantive content of the CHM legal concept was preserved.⁴²

To conclude, UNCLOS states that the Authority shall perform its functions ‘on behalf of mankind as a whole’.⁴³ This norm reflects the most accredited international law concept of CHM. However, it also harbours ambiguities, such as those related to interpretations of the meaning of ‘humankind’ (which, as discussed in Section 4.2., is not a legal person).

State and ISA practice concerning the CHM regime of the Area suggests states are in favour of its consolidation for certain aspects. While the ISA has entered in a number of contracts on exploration and prospecting of minerals in certain parts of the Area,⁴⁴ no mining activity has been undertaken to date. This, together with the failure to establish the ‘Enterprise’, has prompted some commentators to speak of a ‘halved implementation’ of the CHM. Others highlight further serious deficiencies, such as the non-effective representation of ‘humankind’ in ISA decision-making processes, and the fact that there is no consensus on the understanding of the term ‘equitable’ as an attribute of the benefit sharing system.⁴⁵ On the other hand, the implementing practice is also enhancing the CHM regime of the Area in some important aspects, such the non-admissibility of sovereignty claims, the protection of the marine environment, and the freedom of scientific research, including results distribution.⁴⁶

The existence of a broader institutional framework established under UNCLOS, including the International Tribunal for the Law of the Sea (ITLOS), is one further element facilitating CHM in-

38 The UNCLOS has 168 contracting parties and the Implementing Agreement 150 contracting parties, <http://www.un.org/depts/los/reference_files/status2010.pdf>, accessed 6 December 2019.

39 As observed by Antonio Cassese, *International Law* (OUP 2001) 63, ‘[...] although the notion of common heritage of mankind has not been scuttled, in practice all its major implications for developing countries, with regard to seabed resources, have been watered down [...]’. See also John E. Noyes, ‘The Common Heritage of Mankind: Past, Present and Future’ (2012) 40 DJILP 464.

40 Cf. Tullio Scovazzi, ‘The Exploitation of Marine Genetic Resources in Areas beyond National Jurisdiction’ in Gemma Andreone (ed.) *Jurisdiction and Control at Sea. Some Environmental and Security Issues* (Giannini 2014) 41-42.

41 Thus e.g. Edward Guntrip, ‘The 1994 Agreement does not alter the content of the common heritage of mankind principle. It merely reworks the provisions that were preventing universal acceptance’ (Edward Guntrip, ‘The Common Heritage of Mankind: An Adequate Regime for Managing the Deep Seabed?’ (2012) 4 MelbJIntLaw 376).

42 Sergio Marchisio, ‘Patrimonio comune dell’umanità (Dir. Internaz.)’ (2007) *Enciclopedia Il Sole* 24 Ore, 730.

43 UNCLOS, art 152 para 1.

44 Information on these contracts is available on the ISA official website, <<https://www.isa.org.jm/deep-seabed-minerals-contractors/overview>> accessed 6 December 2019. For an overview of the situation in 2016, see also UNGA Res 71/257 (23 December 2016) UN Doc A/RES/71/57 (2017) 18-19, paras 70-78.

45 Marie Bourrel, Torsten Thiele, Duncan Currie, ‘The common heritage of mankind as a means to assess and advance equity in deep sea mining’ (2016) *Marine Policy* 3.

46 John E. Noyes, ‘The Common Heritage of Mankind’ [39], 465.



terpretation and application. In 2011, the ITLOS Seabed Disputes Chamber⁴⁷ issued an Advisory Opinion concerning the responsibilities and obligations of the states sponsoring private activities in the Area.⁴⁸ In clarifying the content of these obligations, the Chamber considered, *inter alia*, whether there are differences in the content of the obligations imposed upon developed and developing countries respectively. This issue is relevant to the CHM regime, because its main objective is to ensure that developing countries can participate, and benefit from resource exploitation on an equal footing with developed states. The Advisory Opinion in this respect is arguably an authoritative reading of certain aspects of the CHM concept.⁴⁹ For the Chamber, all contracting parties sponsoring activities in the Area have, in principle, the same obligations. Differentiated legal treatment can be however justified, and less stringent obligations imposed upon the developing states based on non-UNCLOS principles or norms in ISA regulations. For example, the 'precautionary approach', under which states parties are allowed to apply 'according to their capabilities', due to a *renvoi* to Principle 15 of the Rio Declaration made by the ISA *Nodule Regulation* and *Sulphides Regulation*.⁵⁰

2.2 From Minerals to Biodiversity?

Equal access to and sharing of revenues from the utilization of resources from areas beyond national jurisdiction have come into focus also with regard to marine genetic resources (MGRs). State and private interests in prospecting and utilizing these resources are continuously growing, also in relation to scientific research and discovery activities, which are for the most part oriented towards commercial use. This situation raises novel and complex legal questions.⁵¹ Whether adequate principles to govern such activities exist, currently, under international law remains unclear. However, UNCLOS and the Convention on Biological Diversity (CBD)⁵² are two important reference points.

Under UNCLOS, the legal regime of the Area covers minerals but not biological resources. Moreover, the water column superjacent to the Area – where the majority of marine living resources are located – is subjected to the regime of the high sea.⁵³ Detailed regulation is laid down in Part VII of

47 The Seabed Disputes Chamber of the ITLOS may give advisory opinions on legal questions, at the request of the ISA Assembly or Council (UNCLOS, art 191).

48 Responsibilities and obligations of states sponsoring persons and entities with respect to activities in the Area, Case No 17, Advisory Opinion (ITLOS Seabed Dispute Chamber 1 February 2011) <https://www.itlos.org/fileadmin/itlos/documents/cases/case_no_17/adv_op_010211.pdf> accessed 6 December 2019. See also: David Freeman, 'Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area' (2011) 105 AJIL 755; Tim Poisel, 'Deep Seabed Mining: Implications of Seabed Dispute Chamber's Advisory Opinion' (2012) 19 AustILJ 213.

49 Cf. Peter Holcombe Henley, 'Minerals and Mechanisms: The Legal Significance of the Notion of the 'Common Heritage of Mankind' in the Advisory Opinion of the Seabed Dispute Chamber' (2011) 12 MelbJlntLaw 125, <<http://www5.austlii.edu.au/au/journals/MelbJIL/2011/14.html#Heading106>> accessed 6 December 2019.

50 *ibid* ch III ('Responsibilities of sponsoring states').

51 Eve Heafy, 'Access and Benefit Sharing of Marine Genetic Resources from Areas beyond National Jurisdiction: Intellectual Property-Friend, Not Foe' (2014) 14 CJIL 493.

52 Convention on Biological Diversity (opened for signature 5 June 1992, entered into force 29 December 1993) 1760 UNTS 79 (CBD).

53 UNCLOS, arts 87 and 89.



UNCLOS,⁵⁴ whose second section provides limits on the use of biological resources,⁵⁵ in partial derogation from the *res communes* regime. The objective is, on the one hand, fostering living resource conservation and, on the other, securing coordination of the obligations of contracting parties under UNCLOS and under a number of fishing conventions and other relevant treaties. The ‘Fish Stocks Agreement’ of 1995, which supplements UNCLOS provisions with respect to straddling and highly migratory species is also relevant;⁵⁶ further, Part XII of UNCLOS provides the general legal framework on environmental protection in all marine areas.⁵⁷

The CBD, with its holistic approach to biodiversity conservation, offered a corrective to the excessive fragmentation in international biological diversity regulation. The chosen solution was a framework convention establishing guiding principles on the subject, which was expected to have, in addition to normal treaty effects, the ability of influencing the implementation of the pre-existing legal instruments. Actually, a significant number of global and regional treaties on wildlife concluded in the 1970s and 1980s have been aligned with the CBD, either through formal revision or by means of interpretation.⁵⁸

The CBD main purposes concern the management of MGRs: (a) biodiversity conservation (b) the sustainable use of biodiversity components and (c) a fair and equitable sharing of the benefits deriving from the utilization of genetic resources.⁵⁹ The CBD applies to both terrestrial and marine resources, with differences depending on whether the resources lie in areas under or beyond national jurisdiction.⁶⁰ In marine areas, application must be consistent ‘with the rights and obligations of states under the law of the sea.’⁶¹ This proviso is interpreted in various ways, and not necessarily as a without-prejudice clause in favour of UNCLOS; it refers to specifically the rights and obligations of the states, rather than the law of the sea in its entirety.⁶²

The interplay between UNCLOS and the CBD has many further aspects. However, there remain important legal and regulatory gaps concerning a framework for the conservation and the sustainable use of marine biodiversity in areas beyond national jurisdiction. This is especially true with regard to access and benefit sharing from MGRs UNCLOS contains no specific rules on MGRs (ex-

54 UNCLOS, arts 86-120.

55 UNCLOS, arts 116-120.

56 Agreement for the Implementation of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (adopted 4 August 1995, entered into force 11 December 2001) 2167 UNTS 3. The Agreement applies in areas beyond national jurisdiction and, for certain aspects, in areas of national jurisdiction (see arts 3, 6, and 7).

57 UNCLOS, arts 192-237.

58 On a well-known case of formal revision, see Tullio Scovazzi, ‘The Updating of the Barcelona System for the Protection of the Mediterranean Sea Against Pollution’ in Sergio Marchisio *et al.* (eds) *Sustainable Development and Management of Water Resources: A Legal Framework for the Mediterranean* (CNR Publ. 1999), 48. Updating a treaty regime through dynamic interpretation has characterised, by contrast, the protection of wetlands: cf. Ornella Ferrajolo, ‘State Obligations and Non-Compliance in the Ramsar System’ in (2011) 14 *JIWLP* 243.

59 CBD, art 1.

60 CBD, arts 4-5.

61 CBD, art 22 para 2.

62 Rüdiger Wolfrum, Nele Matz, ‘The Interplay of the United Nations Convention on the Law of the Sea and the Convention on Biological Diversity’ (2000) 4 *Max Planck YBUNL* 445, at 463.



cept indirectly, through provisions on living resources), while the CBD, to which issues on genetic resources are of central concern, is only a framework convention.⁶³ The regime resulting from the Nagoya Protocol,⁶⁴ which supplements the CBD, is more detailed; however, the Protocol applies only to marine and terrestrial genetic resources in areas under national jurisdiction. In addition, neither UNCLOS nor the CBD is particularly helpful in solving further legal problems, such non-enforceability of biodiversity protection measures in maritime areas beyond national jurisdiction. UNCLOS allows states to take more stringent measures for the protection of marine rare or fragile ecosystems (article 194 para 5), in addition to their general obligation of protecting the marine environment (article 192). No zonal restriction is provided. In addition, UNCLOS explicitly allows states to take preservation measures in certain areas of the exclusive economic zone (EEZ) where the environment is particularly at risk (article 211 para 6). The provisions above also set out that coastal states may take protection measures in areas beyond the limits of their territorial waters. To become effective, however, such measures require further *ad hoc* intergovernmental arrangements, especially in the case where marine protected areas are established in international waters.⁶⁵

As already observed, a process to complement the existing regulation through a new agreement on marine biodiversity is ongoing. It was launched by the UNGA in 2004, with the establishment of the *Ad Hoc* Open-ended Informal Working Group to Study Issues Relating to the Conservation and Sustainable Use of Marine Biological Diversity beyond Areas of National Jurisdiction (hereinafter 'WG').⁶⁶ The WG Reports illustrate the importance states attach to marine biodiversity and its role in relation to food security and poverty alleviation, especially in small island developing states. The lack of a common regulatory framework may easily frustrate conservation efforts of individual states, because genetic resources are often transboundary in nature, or their status is otherwise relevant to the conservation of a coastal ecosystem as a whole.⁶⁷

Although states expressed differing views about concluding a new agreement or instead strengthening the implementation of existing ones, the WG was eventually able to recommend the former approach. The UNGA endorsed this recommendation in 2015, through establishing a preparatory committee in charge with elaborating elements of a draft-treaty.⁶⁸ The UNGA recommended that the committee address a 'package' of issues agreed on by the WG in 2011, namely the utilisation of genetic resources beyond areas of national jurisdiction and the sharing of benefits derived therefrom; marine protected areas and other area based management tools; environmental impact assessment; capacity building and marine technology transfer.⁶⁹

63 *ibid* 469-471.

64 Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity (adopted 29 October 2010, entered into force 12 October 2014), < <https://treaties.un.org/doc/Publication/UNTS/No%20Volume/30619/A-30619-08000002802b5335.pdf> >, accessed 6 December 2019.

65 Cf. Ornella Ferrajolo, 'Specially Protected Areas and Biodiversity in the Mediterranean' in Sergio Marchisio *et al.* (eds) *Sustainable Development and Management* [58], 68.

66 UNGA Res 59/24 (4 February 2005) paras 73-76.

67 'Letter Dated 13 February 2015 from the Co-Chairs of the Ad Hoc Open-ended Informal Working Group to the President of the General Assembly', UN Doc A/69/780 (13 February 2015) Annex, 4, para 10.

68 *Supra* [20].

69 'Letter Dated 13 February 2015 from the Co-Chairs[...]' [67], 5, para 12.



Predicting the principles that are likely to inspire the future treaty would be premature, as during the WG sessions some delegations supported CHM-related concepts while others favoured the regime of living resources in the high sea.⁷⁰ Legally there is no reason against broadening the material scope of the regime of the Area and enlarging existing ISA competencies to cover also marine biodiversity in areas beyond national jurisdiction. However, this is not universally accepted, which raises a dilemma between choosing a satisfactory technical solution and adopting a more politically palatable approach.⁷¹

However, considering UNCLOS as the only source material for a future treaty might be misleading: despite its importance as a ‘constitution for the oceans’, UNCLOS does not regulate all activities.⁷² The same observation is valid with respect to the OST, whose ability to provide a comprehensive legal framework for commercial exploitation of space resources is discussed in the next Section.

3. Outer Space Resources

3.1 The General Legal Framework

During the Moon Agreement drafting process, a parallel debate on the CHM was ongoing with regard to the future convention on the law of the sea. This is why the drafters of the Moon Agreement specified in article 11 that the CHM concept applicable to the Moon and its natural resources ‘finds its expression in the provisions of this Agreement, in particular in paragraph 5 of this Article,’⁷³ thus downplaying any influence from other treaties.⁷⁴

The key components of the CHM are however the same in both the Moon Agreement and UNCLOS. Article 11 of the Moon Agreement embeds the principle of non-admissibility of sovereignty claims over any part of the Moon and the resources thereof. It further prohibits appropriation of any part of the Moon and resources by states, IGOs, non-governmental organisations (NGOs), public bodies, private entities, and natural persons.⁷⁵ This precision is necessary because under the OST non-international persons may carry out activities in outer space, if ‘under the authority and supervision of the appropriate state.’⁷⁶

Other constituent elements are the denuclearisation of the Moon, the utilisation for only peaceful

⁷⁰ *ibid* 6, para 16.

⁷¹ Dire Tladi, ‘The Common Heritage of Mankind and the Proposed Treaty on Biodiversity in Areas Beyond National Jurisdiction: The Choice between Pragmatism and Sustainability’ (2015) 25 YIEL 113-132.

⁷² Tullio Scovazzi, ‘Negotiating Conservation and Sustainable Use of Marine Biological Diversity in Areas beyond National Jurisdiction: Prospects and Challenges’ (2014) XXIV IYIL 63.

⁷³ Moon Agreement, art 11 para 1.

⁷⁴ Cf. Marco Gestri, *La gestione delle risorse naturali d'interesse generale per la Comunità internazionale* (Giappichelli 1996) 316.

⁷⁵ Moon Agreement, art 11 paras 2 and 3.

⁷⁶ OST, art VI; based on the same article, states bear international responsibility for any ‘national activities’ in outer space. These principles are present also in the Registration Convention and the Liability Convention, as well as in the Moon Agreement, art 14, and are reputed to have acquired the status of customary norms of international law.



purposes,⁷⁷ and the freedom of exploration and use,⁷⁸ with a focus on scientific investigation.⁷⁹ Article 7 sets out duties of protection of the Moon environment; a novelty in space law, given that the OST only envisages the possible pollution of the Earth from extra-terrestrial matters (so called 'back contamination').⁸⁰ Under the OST, some protection of the outer space environment from man-made activity has been inferred, by means of interpretation, from the principle of non-interference with the other states' freedoms and from the obligation to notify other parties of any 'potentially harmful interferences' that might result from a planned activity or project.⁸¹ By contrast, the Moon Agreement expressly set forth a 'due diligence' obligation of states parties to protect the lunar environment and preventing the disruption of the existing balance of the same, whether by introducing adverse changes, by contamination from exogenous matter, or in any other manner.⁸² This regime further benefits from the *in situ* inspection system, which applies, on a reciprocity basis, to all manned or unmanned stations, facilities, installations, equipment, vehicles, etc., which contracting parties may establish and/or utilize on the Moon.⁸³

The Moon Agreement is weak, compared with UNCLOS, with regard to CHM procedural elements. Drafted when the exploitation of lunar resources was only theoretical, article 11 postponed the setting up of a benefits sharing system, including 'appropriate procedures', to further arrangements. Parties should agree on these procedures once resource exploitation will become imminent (paragraph 5).⁸⁴ This clause contains a *pactum de contrahendo* or, rather, *de negotiando*.⁸⁵ It leaves unresolved some legal issues, starting from the question of whether article 11 contains an implicit moratorium on the exploitation of lunar resources, at least pending the adoption of the CHM regime envisaged in paragraph 5. Based on the drafting history and the absence of an express provision, an implicit moratorium seems unlikely.⁸⁶ Parties to the Moon Agreement wishing to undertake resource exploitation should conform, however, to the guiding principles of the future regime, which are listed in article 11 paragraph 7. The most important principle for establishing a CHM regime and not a *res communis* one is the ensuring of equitable benefit sharing through the balancing of interests of the investor states and the interests and needs of the developing countries.⁸⁷

⁷⁷ Moon Agreement, art 3.

⁷⁸ Moon Agreement, art 11 para 4.

⁷⁹ Moon Agreement, art 6.

⁸⁰ OST, art IX.

⁸¹ *ibid.*

⁸² Moon Agreement, art 7 para 1.

⁸³ Moon Agreement, arts 9 and 15.

⁸⁴ Moon Agreement, art 11 para 5 reads: 'States Parties to this Agreement hereby undertake to establish an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the moon as such exploitation is about to become feasible.'

⁸⁵ In the view of many scholars, a treaty cannot create upon contracting parties a legal obligation, in proper sense, to give their consent to be bound by a future treaty; therefore, so-called *pacta de contrahendo* should be interpreted, merely, as creating for the states an obligation of undertaking future negotiation and engaging in such negotiation in good faith. Cf. Paolo Fois, *L'accordo preliminare nel diritto internazionale* (Giuffrè 1974), 18-23.

⁸⁶ Bin Cheng, *Studies in International Space Law* (Clarendon Press 1997) at 374.

⁸⁷ Moon Agreement, art 11 para 7.



The idea that article 11 represents a serious obstacle to the commercial exploitation of space resources has underpinned poor acceptance of the Moon Agreement. In accordance with its article 59 para 2, the Moon Agreement entered into force in 1980, following ratification by five states. That same year, ratification was rejected by the US Congress,⁸⁸ soon followed by the USSR (and, later, the Russian Federation), as well as a great majority of both developed and developing states participating in the OST. The Moon Agreement has 17 contracting parties, and most space-faring nations have not ratified the Agreement.⁸⁹

In this situation, prospects on negotiating further arrangements to supplement article 11 appear unrealistic. This does not mean that, once commenced, the commercial exploitation of space resources will be carried out in a *vacuum iuris*. The OST is applicable to resource 'exploitation' even if the words utilised in the text are 'exploration' and 'use'; in its ordinary meaning, the term 'use' is broad enough to include exploitation.⁹⁰ The OST preparatory works⁹¹ and the fact that this Treaty regularly applies to, *inter alia*, satellite commercial services, support this interpretation.⁹²

Thus, a legal framework exists, under the OST and general international law, relevant to the extraction and commercialisation of natural resources from the Moon and the other celestial bodies. Whether these principles, which are sometimes vague, are able to govern such activities in all their aspects is a different question.

3.2 The Debate on Requirements for Legitimately Exploiting Outer Space Resources

A number of legal issues have arisen in the two last decades. A central question is whether states may allow public bodies, private companies and individuals to acquire property rights or other real rights over space resources in the domestic legal order, or whether this would be inconsistent with states' international law obligations.

One precedent could be found in a practice of private companies, which consists in selling portions of the Moon, Mars or asteroids as 'extraterrestrial real estates'. These contracts are wrongful and without legal effect, *prima facie*, in light of article 11 of the Moon Agreement, which expressly prevents any form of outer space appropriation, including by natural or juridical persons. However, the Moon

88 Cf. Thomas Gangale, 'Common Heritage in Magnificent Desolation' (paper presented to the 46th American Institute of Aeronautics and Astronautics (AIAA) *Aerospace Sciences Meeting and Exhibit*, 7-10 January 2008, Reno, Nevada, < <https://doi.org/10.2514/6.2008-1467>>, accessed 6 December 2019).

89 As at 6 December 2019, the states having ratifying the Moon Agreement were Australia, Austria, Belgium, Chile, Kazakhstan, Kuwait, Lebanon, Mexico, Morocco, Netherlands, Pakistan, Peru, Philippines, Saudi Arabia, Turkey, Uruguay, and Venezuela. Cf. 'Status of International Agreements relating to activities in outer space as at 1 January 2017', UN Doc A/AC.105/C.2/2017/CRP.7 (2017).

90 Based on the 'General rule of interpretation' ex art 31 of the Vienna Convention on the Law of Treaties, a treaty should be interpreted according to the ordinary meaning of the words utilised in the text.

91 Carl Quimby Christol, *Space Law: Past, Present and Future* (Kluwer Law and Taxation Publishers 1991) 68.

92 Cf. Stephan Hobe, 'Adequacy of the Current Legal and Regulatory Framework Relating to the Extraction and Appropriation of Natural Resources in Outer Space' (2007) XXXII *AnnAir&SpaceL* 116.



Agreement is legally binding upon few states. Though more concise, article II of the OST prohibits 'national appropriation' of outer space and celestial bodies. This norm should be read in conjunction with article VI of the OST, imposing upon contracting parties the obligations of subjecting national private activities in outer space to prior authorisation and secure continuous conformity of these activities with the OST.

The Board of Directors of the International Institute of Space Law (IISL) issued a statement in 2004⁹³ where it is affirmed that under international law, states parties to the OST: 'are under a duty to ensure that, in their legal systems, transactions regarding claims to property rights to the Moon and other celestial bodies or parts thereof, have no legal significance or recognized legal effect'.⁹⁴ A second statement from the Board issued in 2009 further clarified the concept: 'Since there is no territorial jurisdiction in outer space or celestial bodies, there can be no private ownership of parts thereof, as this would presuppose the existence of a territorial sovereign competent to confer such title of ownership'.⁹⁵ In the opinion of the IISL experts, special regulation is needed, and should be elaborated on the input of the UN, to improve 'clarity and legal certainty in the near future'.⁹⁶

Some states have commenced domestic regulation. The United States (US) passed the 'Commercial Space Launch Competitiveness Act' in 2015.⁹⁷ The Act contains provisions on various aspects of national activities in outer space, including the exploration and exploitation of space resources. Accordingly, US nationals engaged in recovering resources from celestial bodies are entitled '[...] to any asteroid resource or space resource obtained, including to possess, own, transport, use, and sell the asteroid resource or space resource obtained in accordance with applicable law, including the international obligations of the United States'.⁹⁸ Other parts of the text mention the need to respect international obligations. A clearer formula is found in the 'Disclaimer of Extraterritorial Sovereignty' clause, expressly affirming that the US does not intend to assert, through the Act, '[...] sovereignty or sovereign or exclusive rights or jurisdiction over, or the ownership of, any celestial body'.⁹⁹

In December 2015, the IISL Board of Directors has made an initial assessment of the US Act in the light of the UN space treaties.¹⁰⁰ The assessment notes, among other things, that while it is clear that international law does not allow appropriation of 'territory' in outer space, no commonly shared

93 IISL Position Paper, 'Statement by the Board of Directors of the International Institute of Space Law (IISL) on Claims to Property Rights Regarding the Moon and Other Celestial Bodies' (2004) <http://iislweb.org/wp-content/uploads/2015/03/IISL_Outer_Space_Treaty_Statement.pdf> accessed 6 December 2019. See also Ricky J. Lee, 'Article II of the Outer Space Treaty: Prohibition of State Sovereignty, Private Property Rights, or Both?' (2004) 11 AustILJ 128.

94 IISL Position Paper, 'Statement by the Board of Directors' [93].

95 IISL Position Paper, 'Statement of the Board of Directors of the International Institute of Space Law' (29 March 2009) <<http://iislweb.org/wp-content/uploads/2015/03/Statement-BoD.pdf>> accessed 6 December 2019.

96 *ibid.*

97 US 'Commercial Space Launch Competitiveness Act', Public Law 114-90 (25 November 2015) <<https://www.congress.gov/bills/114/congress/house-bill/2262/text>> accessed 6 December 2019.

98 *ibid* ch IV para 51303.

99 *ibid.*, s 403.

100 IISL, 'Position Paper on Space Resource Mining, adopted by consensus by the Board of Directors on 20 December 2015', <<http://www.iislweb.org/docs/SpaceResourceMining.pdf>> accessed 6 December 2019.



view exists on whether the expression ‘free use’ utilised in the Treaties includes ‘the right to take and consume non-renewable natural resources’, such minerals or water, from celestial bodies.¹⁰¹ The assessment concludes that the US Act should be regarded as ‘a possible interpretation’ of the non-appropriation principle under the OST.¹⁰²

The fact that states cannot in any way regard mining activities in outer space as a means of asserting sovereignty over, or exclusive rights to celestial bodies should be, logically, a minimum threshold requirement for complying with the OST (*‘in claris non fit interpretatio’*). However, any such concern is absent from the Luxembourg Act of 20 July 2017,¹⁰³ which states in article 1: ‘Les ressources de l’espace sont susceptible d’appropriation’ [‘Outer space resources are susceptible to appropriation’]. In this case, contradiction between national and international law is evident. The US has taken a more cautious approach. However, this has not prevented the Russian Federation from viewing the enactment of the US “Commercial Space Launch Competitiveness Act” as a threat to the role of international law in the governance of space activities.¹⁰⁴

The content of the US Commercial Space Launch Competitiveness Act is assessed along with further measures established in the ‘American Space Commerce Free Enterprise Act’ of 24 April 2018.¹⁰⁵ The 2018 Act entitles the Commerce Department to govern all ‘non-traditional’ space activities carried out by US citizens and entities, including mining activity. It reiterates that limits to such activity may be imposed upon the operators as required by US international obligations under the OST.¹⁰⁶

The role of the CHM in this debate is unclear. The IISL Position Paper of 2015 does not refer to the concept, but expressly refers to the ‘common benefit’ principle. This document correctly observes that the provisions of the Moon Agreement – a treaty to which the US is not a party – have not gained the status of customary norms of international law.¹⁰⁷ It does not further consider, however, if legal consequences can derive to non-party states from the fact that article 11 of the Agreement has proclaimed the Moon and its resources the CHM. Yet, the doctrine stated that the Moon Agreement is relevant to the OST interpretation as ‘subsequent practice’ in the meaning of article 31 para 3 b of the Vienna Convention on the Law of Treaties.¹⁰⁸ This, because the states participating in the UNCO-

101 *ibid.*, s II para 1 b.

102 *ibid.*, s II para 2.

103 ‘Loi des 20 juillet 2017 sur l’exploration et l’utilisation des ressources de l’espace’ [Law of 20 July 2017 governing space resource exploration and use] <<http://legilux.public.lu/eli/etat/leg/loi/2017/07/20/a674/jo>> accessed 6 December 2019

104 UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS), ‘Reviewing opportunities for achieving the Vienna consensus on Space Security encompassing several regulatory domains, Working Paper submitted by the Russian Federation’ (2016) UN Doc A/AC.105/C.1/2016/CRP.15 (16 February 2016) <http://www.unoosa.org/oosa/oosadoc/data/documents/2016/aac.105c.12016crp/aac.105c.12016crp.15_0.html> accessed 6 December 2019.

105 US ‘American Space Commerce Free Enterprise Act’, 115th Congress 2017–2018, Bill, (24 April 2018) <<https://www.congress.gov/bill/115th-congress/house-bill/2809/text?r=40>> accessed 6 December 2019.

106 The 2018 Act specifies, however, that ‘to the maximum extent practicable, the Federal Government shall interpret and fulfil its international obligations to minimize regulations and limitations on the freedom of United States nongovernmental entities to explore and use space’ (Sec. 2, para 2 and 3). Moreover, it is stated in § 80308 that ‘[...] outer space shall not be considered a global commons.’

107 IISL, ‘Position Paper on Space Resource Mining’ [100] s II para 1 c.

108 Stephan Hobe, ‘Adequacy of the Current Legal and Regulatory Framework’ [92], 123–124.



PUOS adopted the Moon Agreement, by consensus, about ten years after the OST, and at a time in which the commercialisation and privatisation of space activities had become a reality.

Unsurprisingly, the UNCOPUOS Sixtieth session (2017) addressed the relationship between the CHM and national regulations on the extraction and commercialisation of space resources. In the view of some delegations, rapid developments in the national legal framework would put at risk 'multilateralism in space diplomacy'.¹⁰⁹ In another opinion, '... as space was to be considered the common heritage of humanity, belonging to all States on an equal footing, legislation regarding the commercialization of outer space should neither exist or be promoted'.¹¹⁰ The UNCOPUOS Report clearly illustrates how states are far from achieving consensus on solutions.

4. Re-Founding the CHM Concept in International Law

4.1 Environmental Law

Are there other treaties that employ a CHM regime? The answer depends on the interpretation of the CHM concept. Many conventions drafted in the 1970s utilise the words 'heritage', 'mankind', 'interest of future generations'. However, this does not necessarily mean that a CHM-relevant practice has developed from these treaties.¹¹¹

The 1959 Antarctic Treaty¹¹² recognised in its preamble that preserving Antarctica for peaceful uses is 'in the interest of all mankind'. This Treaty also provides a cooperative mechanism, wherein the 'Consultative Parties' – i.e. states carrying out concrete activities in Antarctica – have special conservation responsibilities. The Madrid Protocol of 1991 and its Annexes introduced environmental concerns into the 'Antarctic system'.¹¹³ The Protocol established, *inter alia*, a moratorium on mining in Antarctica¹¹⁴ and, thus, suspended *sine die* the application of a previous treaty, the Wellington Convention (CRAMRA) of 1988, containing a detailed regulation on the exploitation of Antarctic mineral resources.¹¹⁵

109 UNCOPUOS, 'Report of the Committee on the Peaceful Uses of Outer Space, Sixtieth session (7-16 June 2017)', UN GAOR, 72th Session supp No 20 (2017), 26 para 193 and 30 para 237.

110 *ibid* 30 para 233. See also UNCOPUOS, 'Report of the Committee on the Peaceful Uses of Outer Space, Sixty-first session (20-29 June 2018)', UN GAOR, 73th Session supp No 20 (2018), 36 para 282-288.

111 Kemal Baslar, *The Concept of Common Heritage of Mankind in International Law* (Martinus Nijhoff 1998), 311.

112 Antarctic Treaty (adopted 1 December 1959, entered into force 23 June 1961) 402 UNTS 71. See also Christopher C. Joyner, *Governing the Frozen Commons. The Antarctica Regime and Environmental Protection* (South Carolina UP 1998).

113 Protocol on Environmental Protection to the Antarctic Treaty (adopted 4 October 1991, entered into force 14 January 1998) 30 ILM 1455 (Madrid Protocol).

114 'Any activity relating to mineral resources other than scientific research shall be prohibited' (Madrid Protocol, art 7).

115 Convention on the Regulation of Antarctic Mineral Resource Activities (adopted 2 June 1988, open for signature 25 November 1988, not in force) 27 ILM 686 (CRAMRA).



Similarly, the UNESCO World Heritage Convention of 1972¹¹⁶ enshrines certain responsibilities for preserving the sites included in the 'World Heritage List' to all contracting parties and to the World Heritage Committee, in addition to the primary responsibility of the territorial sovereign. Moreover, the Convention includes a mechanism on technical and financial assistance, primarily for the benefit of developing countries.¹¹⁷ The World Heritage Convention has been crucial to introducing environmental elements into the CHM concept.¹¹⁸

However, none contains a CHM regime as explicit as that set out in the Moon Agreement or in UNCLOS. Most importantly, these treaties do not set out a system for equitable benefit sharing, nor establish an international organisation that may function as trustee to manage respectively Antarctica or the World Heritage sites on behalf of humanity.

International conservation law, in particular, has failed to recognise living resources in general or migratory species in particular as part of the CHM, in terms similar to the UNCLOS CHM regime. The 'International Undertaking on plant genetic resources for food and agriculture' adopted by the FAO in 1983, for example, declared these resources to be 'a common heritage of humankind'.¹¹⁹ However, the subsequent International Treaty, adopted under FAO auspices in 2001, abandoned the CHM concept in favour of the concept of 'common concern of all countries'.¹²⁰ Similarly, the CBD does not have a CHM clause, despite the World Commission on Environment and Development (WCED) suggestion, in its report 'Our Common Future', to draft a global convention on wild species qualifying the same as 'a common heritage'.¹²¹ It is true that the concept of CHM was utilised, in this document, in a hortatory sense. This meant that the management of wild species would imply: (a) the collective responsibility of states (though not collective rights), while respecting the state sovereignty over natural resources; (b) equitable sharing of revenues; and (c) the establishment of a trust fund to collect contributions and support conservation programmes. The CBD eventually adopted the concept of 'common concern of humankind',¹²² which also occurs in the UN Framework Convention on Climate Change (UNFCCC).¹²³ The concept of 'common concern' has a more delimited normative and operational scope than 'common heritage' because it does not involve the 'internationalisation' of areas or resources. It implies a degree of flexibility, and is more deferential to sovereignty; therefore, it is probably more adequate than the CHM to define the legal status of natural resources lying in areas under state jurisdiction.

116 Convention Concerning the Protection of the World Cultural and Natural Heritage (adopted 16 November 1972, entered into force 17 December 1975) 1037 UNTS 151 (World Heritage Convention).

117 World Heritage Convention, art 13.

118 Alexandre Kiss, Jean-Pierre Beurier, *Droit international de l'environnement* (3th edn, Pedone 2004), 147.

119 FAO Conference Res 8/83 (23 November 1983).

120 International Treaty on Plant Genetic Resources (adopted 3 November 2001, entered into force 29 June 2004) 2004 UNTS 379, preamble para 3.

121 World Commission on Environment and Development (WCED) (1987) UN doc. A/42/427.

122 CBD, preamble para 3.

123 UN Framework Convention on Climate Change (adopted 9 May 1992, entered into force 21 March 1994) 1771 UNTS 107 (UNFCCC), preamble para 1.



The shifting from CHM to the concept of ‘common concern’ in the drafting of global environmental treaties confirms that a majority of states – be they developed or developing – are not ready to accept the CHM as a legal concept. Attempts have been made, including by legal scholarship, to modify the core content of the CHM to render it more acceptable, especially to industrialised states. However, these attempts have proved detrimental to the consolidation of the concept, especially with regard to the procedural components, which are as important as the substantive ones and which have proved to be controversial among the states.¹²⁴ These attempts include the idea that, once a treaty has declared a common good as part of the CHM, states have a duty to comply with the relevant legal regime even if no international benefit sharing system and implementing mechanism are in place. The reason is that the CHM is able, like all norms of international law, to be applied ‘in a decentralized manner’ by the states.¹²⁵ At the conceptual level, this assertion is correct. However, lessons drawn from the implementation of the Moon Agreement suggest that leaving out procedural elements significantly weakens the legal force of the CHM, and misses the opportunity to establish a regime of common goods different from the regime of *res communes*.

4.2 Human Rights Law

After the demise of the NIEO, the CHM has found new roots, some authors suggest, in the ‘modern natural law’ that developed after the Second World War, and of which the protection of human dignity is the most relevant expression.¹²⁶ However, the African Charter of 1981¹²⁷ is the only legally binding instrument that mentions ‘the equal enjoyment of the common heritage of mankind’, in relation to peoples’ right to economic, social and cultural development.¹²⁸ This proviso is too vague, because it does not specify, unlike the Moon Agreement and UNCLOS, which areas or resources are covered by the CHM regime, nor does it explain in which manner the CHM and the right to development are interlinked. Since treaty effects attach to all African Charter provisions however, considering article 22 as ‘a sort of declaration with no legal value’¹²⁹ is arguably excessive.

The occurrence of a variety of inconsistent expressions in the relevant instruments is a further element militating against regarding the CHM as a concept well established in human rights law. The

124 With regard to proposals of modifying the CHM concept under the Moon Agreement in a manner inconsistent with its core legal content see Ornella Ferrajolo, ‘Il trattato ‘incompiuto’. L’accordo sulla luna del 1979 e altre norme internazionali rilevanti per l’uso delle risorse naturali nello spazio esterno’ in Lina Panella, Ersilia Grazia Spatafora (eds) *Studi in onore di Claudio Zanghi* (Giappichelli 2011) 51.

125 Francesco Francioni, ‘Genetic Resources, Biotechnology and Human Rights: The International Legal Framework’ in Francioni (ed) *Biotechnologies and International Human Rights* (Hart Publishing 2007), 10.

126 Cf. Kemal Baslar, *The Concept of Common Heritage* [111], 21.

127 African (Banjul) Charter on Human and Peoples’ Rights (adopted 27 June 1981, entered into force 21 October 1986) 21 ILM 58 (African Charter).

128 African Charter, art 22 para 1.

129 Kemal Baslar, *The Concept of Common Heritage* [111], 349. For this Author, reference to the CHM in the African Charter does not differ, as for legal value, from article 17 of the ‘Universal Declaration of the Rights of Peoples’ (so called Algiers Charter), a political document adopted, on NGOs input, on 4 July 1976. Text published on the official website of the ‘Permanent Peoples’ Tribunal’ – Lelio and Lisli Basso Foundation, <<http://permanentpeopletribunal.org/algiers-charter/?lang=en>>, accessed 6 December 2019.



UNESCO ‘Universal Declaration on the Human Genome and Human Rights’¹³⁰ is significant in this respect. After declaring that ‘[T]he human genome underlies the fundamental unity of all members of the human family, as well as the recognition of their inherent dignity and diversity’, the Declaration further proclaims the human genome ‘a heritage of humanity’, but ‘in a symbolic sense’. The Declaration is not legally binding, the chosen formula is such as to weaken, rather than reinforce, the *legal* concept of CHM. Independent from the wording, however, international soft law instruments cannot *per se* create customary rules of international law, if state practice remains uncertain and contradictory.¹³¹

Nonetheless, the question of whether the CHM can be envisaged in human rights law, either in the form of an autonomous right, or by virtue of its relationship with other, more universally accepted rights, to which individuals and/or peoples are entitled deserves attention. Recognising a human right to the CHM could help to realise the effective enjoyment by the individuals of their rights to life, to food, to water and to a sound environment. Similarly, the CHM has, in theory, a strong functional relationship with the rights of peoples to peace, to self-determination, to development. This functional relationship rests on the fact that the realisation of these rights would be significantly facilitated if resources in areas beyond national jurisdiction (and other global commons, such water, forests, climate, biodiversity, etc.) were subjected to a CHM regime universally recognised, and effectively implemented.

The degree to which this line of reasoning would enhance the role of the CHM and consolidate its status in general international law is however modest. As a matter of fact, human rights of so-called ‘third generation’ – and notably people’s rights – encounter many problems with regard to their effective implementation. One relevant question is individuating the relevant legal subjects entitled to these rights. Which judicial or other remedies should states make available, internationally and/or domestically, for repressing violations is another critical issue. In the case of the CHM, these problems are even more complex because ‘humankind’ is not a legal person under either international or national law. According to an early and arguably still valid interpretation, the relevant UNCLOS provisions do not consider humankind as a ‘subject’ in deep seabed activities, but rather as an ‘object’ whose interests the ISA must take into account.¹³² The same is true with regard to future generations, who also do not have legal personality. Recent studies suggest that managing common goods from a human rights perspective requires enabling recourse to states’ extra territorial jurisdiction to a much larger degree than is currently the case in the international legal order and by national legislation.¹³³

130 UNESCO General Conference Res No 16 (11 November 1997).

131 Louis Frederick Edward Goldie, ‘A Note on Same Diverse Meanings of the ‘Common Heritage of Mankind’ (1983) 10 SJILC 70.

132 Rüdiger Wolfrum, ‘The Principle of the Common Heritage’ [8], 318.

133 Daniel Augenstein, ‘Paradise Lost: Sovereign State Interest, Global Resource Exploitation and the Politics of Human Rights’ (2016) 27 EJIL 669.



5. Furthering the CHM as Legal Concept Without Changing the Fundamentals of International Law Is Possible

In the opinion of many scholars, the most important obstacle to significant developments in international law concerning the CHM is legal positivism.¹³⁴ The argument is that such theoretical approach inevitably brings with it concepts and principles that are inimical to the CHM, such as state sovereignty and an individualistic approach to natural resource use. Indeed, the fact that the norms of international law are primarily consent-based, has prompted scholars to explore whether there are other avenues than treaty obligations for establishing a more successful cooperative management of the global commons.¹³⁵

These arguments prompt objections. One is that the CHM and the related legal principles are relevant mainly to the management of resources from areas beyond national jurisdiction. Moreover, the exercise of sovereign rights in state territory encounters limits too, in accordance with international law. State legal obligations for protecting individual, collective, and peoples' rights, preserving the environment and utilising natural resources in a sustainable manner are numerous. When crystallised in customary norms, these obligations are binding upon all international legal persons. If treaty-based, they are often binding upon a great majority of states, thanks to wide participation to these treaties by countries from all regions. Almost all states participate in the UN 'core treaties' on human rights.¹³⁶ The same is true for global, regional and bilateral conventions on environmental matters. Moreover, states comply, on a voluntary basis, with the recommendations stemming from UN and other soft law documents.

From this viewpoint, one of the most important merits of CHM is its relevance to the initial building, and the subsequent development of a progressive interpretation of the concept of territorial sovereignty, distant from the Westphalian model, and rather functional to the protection of life on Earth. This alternative articulation of sovereignty has emerged, largely, thanks to the principles enshrined in UNCLOS and in other widely ratified treaties adopted in the twentieth century and concerning territory, sea, air, outer space and natural resources.¹³⁷

The alleged incompatibility between CHM-related issues and legal positivism is disproved by the fact that the CHM does form part of positive international law. A CHM regime is in force, and is

134 Kemal Baslar, *The Concept of Common Heritage* [111], 347, has pointed out that the traditional sources of international law "are generally used by 'formalists' to crucify the common heritage of mankind". The Author reports an opinion from so-called 'naturalists', according to which the general principles of international law should be interpreted as broadening the concept of sources of international law beyond the limit of legal positivism (352-352). Hence, the conclusion that "The binding force of the common heritage of mankind should not be sought in the free will of states, as they are not the only entities that represent people" (357).

135 Nico Krisch, 'The Decay of Consent: International Law in an Age of Global Public Goods' (2014) 108 AJIL 1.

136 The International Convention on the Elimination of All Forms of Racial Discrimination (ICERD) of 1965 has 182 states parties; the 1966 International Covenants on Civil and Political Rights (ICCPR) and on Economic, Social and Cultural Rights (ICESCR) both have 173 states parties; the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) of 1979 has 189 states parties; the 1989 Convention on the Rights of the Child (CRC) is the most ratified human rights treaty, with 196 states parties (source: United Nations Treaty Collection, Status of treaties, Chapter IV, Human Rights, <https://treaties.un.org/Pages/Treaties.aspx?id=4&subid=A&clang=_en> accessed 6 December 2019).

137 Antonio Cassese, *International Law* [39] 64.



binding upon many states by virtue of UNCLOS. Wide acceptance of UNCLOS, together with the implementing practice of the ISA, have reinforced the legal status of the regime of the Area. Indeed, it is widely argued that the CHM regime can be applied also to non-party states to UNCLOS.¹³⁸ Hence, the possibility of a competing deep sea bed regime ‘appears extremely remote’, and ‘would surely be condemned as inconsistent with international law’.¹³⁹

Many authors believe that taking a positivistic approach when dealing with CHM issues is counterproductive to the consolidation of CHM in international law as a set of customary rules widely applicable in areas beyond national jurisdiction. This because positivism is supposed to coincide with a conservative attitude towards existing norms, which qualify such areas as *res communes omnium*, with the only exceptions being the Area and, in part, the Moon. If correctly interpreted, however, legal positivism is not the enemy of change in international law, in accordance with change that might occur in the international community’s factual situation. Social changes are insufficient to produce legal developments, however, if no new rules come from a recognised legal source (custom or treaty). As Dionisio Anzilotti has suggested, positivism presupposes that legal norms change over time much more than the theories on “natural law” do.¹⁴⁰ It is true, however, that no further developments have occurred in relation to the CHM, after the adoption of UNCLOS and the Moon Agreement. It does not seem that so-called global commons – a concept later emerged in the terminology of treaties and successfully utilised by international jurists – qualify as part of the CHM in proper sense. As noted, a new debate on the CHM has developed in the context of the ongoing negotiations towards a new treaty on marine biodiversity in areas beyond national jurisdiction, where the question of MGRs is central. Some governments support CHM-related principles, while others support freedom of access and use, on the model of the high seas regime.¹⁴¹ Meanwhile, developments in space-related national legislation are encouraging state unilateral regulation and thus putting at risk prospects of implementing an effective CHM regime for the Moon and other celestial bodies. To conclude, it is unclear whether or not states are ready to accept new, consent-based obligations in near future, with a view of proclaiming MGRs, space resources or other common goods as CHM.

The CHM remains a treaty-based concept, as no generally accepted practice and *opinio iuris* of states concerning its application to the global commons has developed. Moreover, the CHM concept varies depending on the relevant instrument, and its interpretation by both governments and scholars varies. Effective and widespread application of the CHM to the global commons encounters many obstacles, mostly linked with the will of the states to maintain a margin of appreciation for the management of natural resources. Nonetheless, there is nothing in the international community or in the fundamentals of international law preventing further consolidation of the CHM concept and principles, by treaty or custom.

138 Cf. Rüdiger Wolfrum, ‘The Principle of the Common Heritage’ [8], 333.

139 John E. Noyes, ‘The Common Heritage of Mankind’ [39], 465.

140 Giorgio Gaja, ‘Positivism and Dualism in Dionisio Anzilotti’ (1992) 3 EJIL 123, 125-126.

141 Debate is ongoing within the intergovernmental conference convened under UNGA Res 72/249 (19 January 2018), < <https://undocs.org/A/RES/72/249>>, accessed 6 December 2019. The first session of the Conference was held from 4 to 17 September 2018, the second and third sessions from 25 March to 5 April 2019 and from 19 to 30 August 2019, respectively. Cf. UNGA Res ‘Oceans and the law of the sea’, UNGA Res 73/124 (31 December 2018), 41-42, para 248-249.