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The Scope of an Access and Benefit-Sharing Regime for Marine Genetic Resources in Areas Beyond National Jurisdiction

Future Prospects and Potential Challenges

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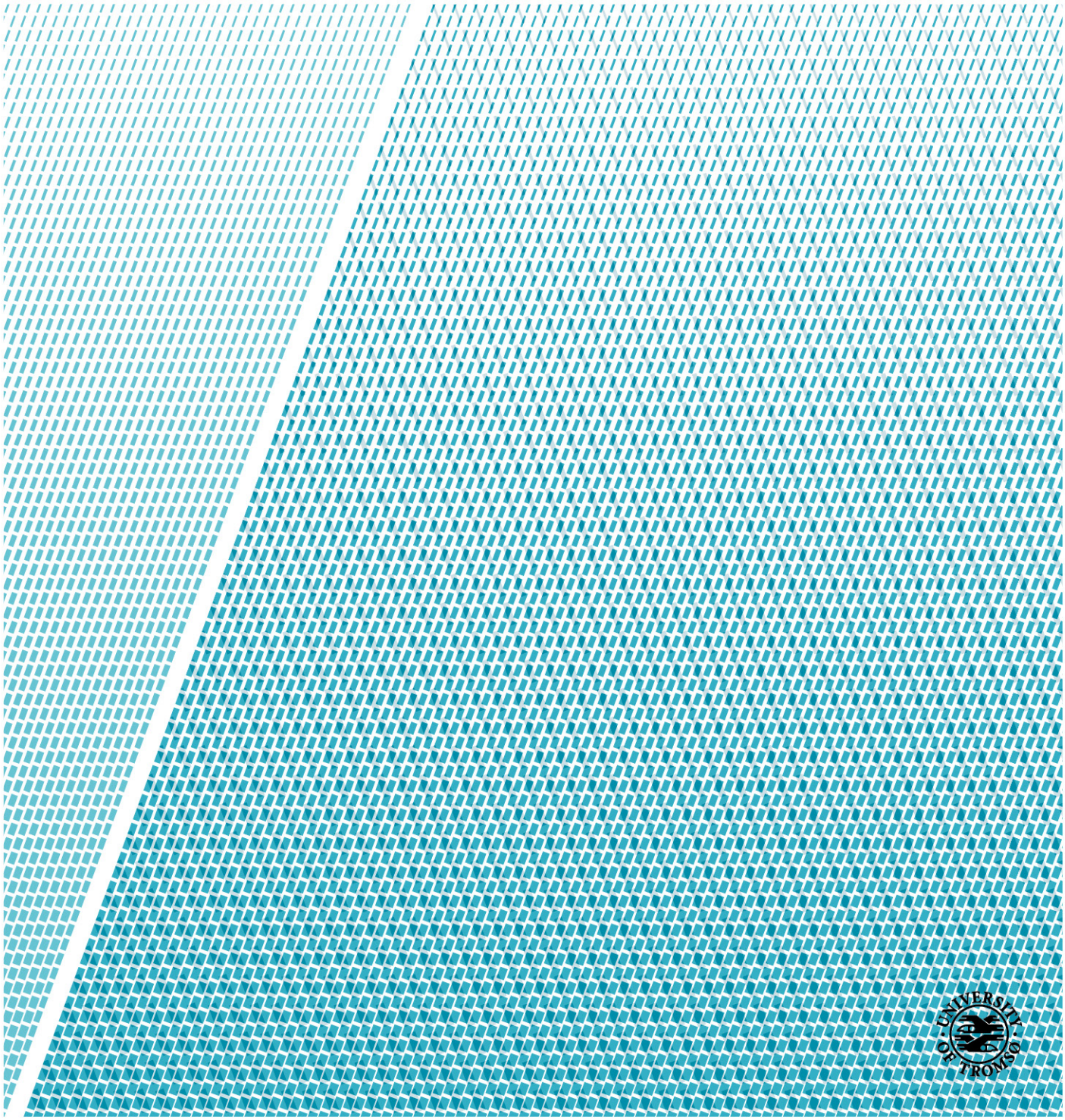

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Abbreviations

ABS	Access and Benefit-Sharing
ABNJ	Areas Beyond National Jurisdiction
BBNJ	Biodiversity Beyond National Jurisdiction
CBD	Convention on Biological Diversity
CCH	Common Concern of Humankind
CHM	Common Heritage of Mankind
DSI	Digital Sequence Information
G77/China	Group of 77 and the Republic of China
ILBI	International Legally Binding Instrument
FAO Treaty	International Treaty on Plant Genetic Resources for Food and Agriculture
LOSC	United Nations Convention on the Law of the Sea
MGRs	Marine Genetic Resources
MSR	Marine Scientific Research
OA	Open Access
OPEN	Obligatory Prior Electronic Notification
PrepCom	Preparatory Committee
UN	United Nations
UNGA	United Nations General Assembly
UNCLOS III	Third United Nations Convention on the Law of the Sea
VCLT	Vienna Convention on the Law of Treaties

1 Introduction

1.1 Background and Topicality of the Thesis

The United Nations Convention on the Law of the Sea (LOSC)[1] has been referred to as the 'Constitution for the Oceans'[2]. As the superior legal instrument to regulate 'all issues relating to the law of the seas'[3], and the provider of the rights and obligations between the States in this respect, the nickname is not unfitting. The LOSC functions as a framework convention in the sense that many of its provisions are open-textured and depend on implementation by external means. Examples of such means are through 'general accepted international rules or standards'[4] set out by the International Maritime Organisation[5], and by global and regional cooperation via diplomatic conferences and relevant international, regional and subregional organisations[6].

Although the LOSC is measured as the key legal instrument to regulate all activities connected to the seas, there are major regulatory gaps in ocean governance concerning the conservation and sustainable use of biodiversity in ocean areas beyond national jurisdiction (ABNJ). Findings from scientific and commercial research have also revealed gaps in the legal status and regulation of marine genetic resources (MGRs) in these areas.[7] In areas within national jurisdiction, MGRs are systematically managed by the Convention on Biological Diversity (the CBD) and its Nagoya Protocol[8], but no such regime currently exists for the genetic resources found beyond these ocean areas. Regulatory gaps in governance of marine biodiversity in ABNJ, have been an important catalyst behind the ongoing process regarding marine biodiversity beyond national jurisdiction (BBNJ). The original purpose of this process

[1] United Nations Convention on the Law of the Sea (LOSC) (adopted 10 December 1982, entered into force 16 November 1994) 1834 UNTS 397.
[2] See e.g. Tommy T. B. Koh, 'A Constitution for the Oceans', Remarks by the President of the third United Nations Conference on the Law of the Sea (UNCLOS III).
[3] Preamble, para 4 LOSC.
[4] See for example articles 21(2), 94(2)(a) and 211(2) LOSC.
[5] International Maritime Organization, a special agency of the United Nations. Established by the Convention on the Maritime Organization (adopted 6 March 1948, entered into force 17 March 1958) 298 UNTS 48.
[6] The principle of cooperation is enshrined several parts of the LOSC, see for example article 278 regulating cooperation among international organizations. Examples of international organisations are the UN Oceans and the United Nations Environment Programme (UNEP) and the International Seabed Authority (ISA).
[7] Angel Horna, 'Marine Genetic Resources, Including Sharing of Benefits', Proceedings of the ASIL Annual Meeting, Volume 111 (2017), p. 245.
[8] Convention on Biological Diversity (adopted 5 June 1992, entered into force 29 December 1993) 1760 UNTS 79 and the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity (adopted 29 October 2010, entered into force 12 October 2014).

was to consider the status and identify key issues and questions of the conservation and sustainable use of marine biodiversity in ABNJ, and the possible need for advancement of international cooperation.[9] This task was distributed to an 'Ad Hoc Open-ended Informal Working Group' (BBNJ Working Group) in 2004.[10] Findings over the years led the United Nations General Assembly (UNGA) to launch the resolution calling for an 'international legally binding instrument under [the LOSC] on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction.'[11]

The same resolution also stated that before establishing an intergovernmental conference to hold negotiations, a preparatory committee (PrepCom), taking into consideration the previous efforts from the BBNJ Working Group, would give suggestions and create elements of a working text for the future legal instrument.[12] Their mandate is enshrined in the package agreed in 2011 to encompass four aspects; 'the conservation and sustainable use of marine biological diversity of [ABNJ], in particular, together and as a whole, [MGRs], 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'.[13] Thus, making proposals for elements of a draft on the regulation of MGRs in ABNJ, and the potential benefit sharing of these, was considered an important aspect of the PrepCom's mandate.

After four sessions, the PrepCom provided a final report to the UNGA in 2017. However, the outcome of the report revealed that little consensus exists between the negotiating States on the future governance of MGRs in ABNJ.[14] Despite the fact that the regulation of MGRs in ABNJ has been a subject of discussion for more than a decade, a significant amount of unresolved issues still remains. One important aspect it appears to be consensus about is the fact that there are several legal gaps that need to be filled, and that a new legal instrument might be the solution. Hence, by a resolution in 2017, the UNGA launched the formal

[9] Arianna Broggiato et al., '*Mare Geneticum*: Balancing Governance of Marine Genetic Resources in International Waters', The International Journal of Marine and Coastal Law 33 (2018), p. 5.
[10] 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 (the BBNJ Working Group), established by UNGA A/RES/59/24 (17 November 2004), p. 13, para 73.
[11] UNGA A/RES/69/292 (19 June 2015), p. 2, para. 1.
[12] *Ibid.*, p. 2, para. 1(a).
[13] *Ibid.*, p. 3, para. 2. See the agreed package of issues in UNGA A/RES/66/119 (30 June 2011) p. 2, para 1 (b).
[14] Report of the Preparatory Committee (31 July 2017), A/AC.287/2017/PC.4/2, retrieved from http://www.un.org/depts/los/biodiversity/prepcom.htm#69/292 15 July 2018. See particularly Section B and the disagreement between the States around the future governance of MGRs.

Intergovernmental Conference to hold further negotiations and consider the recommendations of the PrepCom, with the anticipated outcome of implementing an agreement under the auspices of the LOSC.[15]

By looking at the history retrospectively, the traditional law of the sea has been confronted with an evolution of codification and systematisation into the legal instrument that can today be considered as the LOSC.[16] Hugo Grotius' maritime legal doctrine on the freedom of the seas continues to triumph, but in the shape of a relative freedom of the high seas.[17] Certain activities occurring in ABNJ have been regulated, and the Area and its mineral resources have been designated to the common heritage of mankind.[18] The BBNJ process represents another major shift in the development of the law of the sea, and the law does not only concern matters directly related to the oceans, but also environmental and ethical concerns. It is the first major attempt to determine, harmonise and codify the law governing marine biological biodiversity in ABNJ. Four sessions are planned, one organizational meeting has already taken place in April 2018, and the substantive part of the negotiations of the international legally binding instrument (ILBI) will take place from September 2018 at the UN's headquarter in New York.[19] It is thus timely to undertake further studies of one of the most essential and perhaps challenging aspects of the new ILBI; the future governance of MGRs in ABNJ.

1.2 Objective and Research Question

One of the 'package of issues' identified within the BBNJ process are the 'questions on the sharing of benefits'[20]. This refers to the possible creation of an access and benefit-sharing (ABS) regime for MGRs in ABNJ. However, as it turns out, whether and how such a regime ought to be created appears to be an issue with fundamentally conflicting views among the negotiators. In this context, the main objective of the thesis is to answer the question of what conditions must be met in order to create a regime that ensure fair and equitable access to and sharing of the benefits arising from the utilization of MGRs in ABNJ. In the writer's opinion, this question can only be answered in a realistic manner by partly undertaking an examination of the current state of law in regulating ABS of MGRs in ABNJ, and partly by an

[15] UNGA A/RES 72/249 (24 December 2017) p. 1, para 1.
[16] Angel Horna, *supra* note 7, p. 245.
[17] Article 87 LOSC.
[18] Article 87 and 136 LOSC.
[19] *Supra* note 15, p. 2, para 3.
[20] *Supra* note 11, p. 3, para. 2.

investigation of the positions of the negotiating States within the BBNJ process, combined with an active use of relevant legal sources of international law. By taking this approach, the thesis has two further intentions: First, to discover what premises that can and should form the normative basis of the implementing agreement to carry out an ABS regime, and second, to discuss the future prospects and potential challenges the negotiators for the new ILBI are facing with regards to the future governance of MGRs. In the spirit of these political events, the thesis seeks to present proposals that are principally based on justice and equity, while at the same time providing for a practicable and functional regime.

1.3 Legal Sources and Methodology

The generally accepted legal sources of international law[21] are enshrined in article 38 of the Statutes of the International Court of Justice[22], and several of these provide the principal methodological focus throughout the thesis. The main source in this thesis is 'international conventions', which primarily refers to the LOSC. However, as MGRs are a multi-sectoral issue, other conventions and treaties, such as the CBD and its accompanying Nagoya Protocol, and the FAO International Treaty on Plant Genetic Resources for Food and Agriculture (FAO Treaty)[23], are also, to different degrees, considered. Another important source is 'the general principles of law recognized by civilized nations', which is used as a means of establishing potential legal norms and in the search for certain answers. Furthermore, 'juridical decisions and the teachings of the most highly qualified publicists' are frequently referred to in order to shed light on different views in the current legal debates.

This thesis also considers soft law instruments, which have a non-binding nature. Herein, resolutions from the UNGA and statements[24] from individual or groups of States relevant for the BBNJ process, are included. Although soft law, as secondary sources, are not legally binding, they may bear a distinct political and normative weight, and they could eventually develop into hard law. As a supplement, the thesis also refers to the official documents

[21] Crawford refer to these as 'the formally recognized sources of international law', as a characterization of their customary status, see James Crawford, 'Brownlie's Principles of Public International Law', 8th Edition, Oxford University Press, UK, p. 20.
[22] Statute of the International Court of Justice (adopted 26 June 1945, entered into force 24 October 1945), UNTS 993.
[23] The International Treaty on Plant Genetic Resources for Food and Agriculture (FAO Treaty) (adopted 3 November 2001, entered into force 29 June 2004) 2400 UNTS 303.
[24] The statements provided by the different States throughout the BBNJ process may to some extent function as formal state practice.

provided through the BBNJ fora, such as reports from the respective working groups and the PrepCom and submissions of the negotiating parties. These are considered in order to assess the negotiating positions and to analyse the process that is ongoing. Finally, relevant scientific reports and articles are accounted for, in order to establish the necessary backdrop of MGRs.

In part, the thesis adopts a descriptive doctrinal analysis of the current international law governing MGRs (*lex lata*), and a normative analysis and assessment of central aspects within the scope of the new ILBI (*lex ferenda)*. The Vienna Convention on the Law of Treaties (VCLT)[25] section 3 is used as a guide for the interpretation of international treaties, and in this regard particular emphasis is placed on article 31 in which rules for treaty interpretation reflect customary international law.[26] Article 31(1)(a) provide the general rule of interpretation, as it prescribes that treaties shall be interpreted in 'good faith in accordance with the ordinary meaning […] in their context and in the light of its object and purpose'. Paragraphs (2) and (3) are also considered where interpretation of the convention text is not sufficient to arrive at any conclusions. Furthermore, as a supplementary means, interpretation by Article 32 are sought when article 31 '[l]eaves the meaning ambiguous or obscure' or '[l]eads to a result which is manifestly absurd or unreasonable'.[27]

There is a methodological question of whether the emphasis in the legal analyses should be placed on a resource (MGRs) or an activity, such as bioprospecting (which is considered the main research activity in the search for MGRs). As the LOSC focuses both upon the regulation of certain resources and activities, it is the writer's opinion that both should be focused. Accordingly, both MGRs and bioprospecting are addressed throughout the thesis where this is found natural. Furthermore, within the discussions regarding the BBNJ, the scope of MGRs has been encapsulated into a geographical, material and personal scope.[28] As some of the issues discussed throughout this thesis sometimes falls within several categories, a choice was made to focus on the different subject matters themselves.

[25] Vienna Convention on the Law of Treaties (VCLT) (adopted 23 May 1969, entered into force 27 January 1980) 1155 UNTS 331.
[26] See *inter alia* the '*Case concerning sovereignty over Pulau Ligitan and Pulau Sipadan'* (Indonesia/Malaysia), ICJ, Reports (2002), p. 645.
[27] Robert Kolb, 'The Law of Treaties: An Introduction, Edward Elgar Publishing (2016) ISBN, p. 135.
[28] See for example Non-Paper, Chair of the PrepCom, 28 February 2017 (Chair's non-paper), retrieved from https://www.un.org/depts/los/biodiversity/prepcom_files/Chair_non_paper.pdf 19 July 2018, p. 11.

1.4 Scope and Limitations to the Thesis

The scope of this thesis is limited to ABNJ and the discussions are set out on the basis of the BBNJ process. As a consequence, the thesis focuses on the questions and issues dealt with in the context of this process. However, not all the issues of relevance to MGRs and ABS are analysed or dealt with in-depth. These include the relationship to intellectual property rights (IPRs)[29], several of the existing global and regional ABS regimes that could regulate MGRs[30], and procedural aspects of the ILBI. There are several reasons for these delimitations. Firstly, the legislation of IPRs represents a complex and comprehensive regime, which in itself would require an in depth-analysis. Secondly, if the thesis were to examine other ABS modalities, it would require an analysis of global, regional, and probably domestic applicable regimes on ABS of genetic resources. Furthermore, the procedural aspects bring up several questions of a more principal character, such as the relationship between different conventions and their potential conflicts[31]. Hence, making a comparative study of where these aspects are included would go beyond the scope of a thesis of this length.

1.5 Further Structure of the Thesis

The thesis is structured in the following manner: Chapter 2 provides the scientific background by outlining the commercial interest and use of MGRs in general and in ABNJ. As this chapter is generally descriptive, Chapter 3 takes an alternating descriptive and normative focus, and addresses how activities and the use of MGRs are regulated in international law within three different aspects; firstly, how they are defined, secondly, the role of ABS of MGRs in ABNJ, and finally, the current legal regimes regulating MGRs. Chapter 4 forms the key normative focus of the thesis and provide the writer's arguments and assessment of the potential scope of the new ILBI (with regard to MGRs), in light of existing legal and political challenges. This analysis is done through an examination of the different elements that, in the writer’s opinion, are necessary to decide upon the scope of an ABS regime. Chapter 5 outlines conclusions on the normative basis and provide some observations of what future prospects and potential challenges the negotiators of the future ILBI are facing.

[29] Relevant instruments in regard to IPRs are *inter alia* the World Trade Organization Agreement on Trade-Related Aspects of Intellectual Property Rights, (adopted 15 April 1994, entered into force 1 January 1995) Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 869 UNTS 299.
[30] This could for instance have included the global regime of Pandemic Influenca Preparedness Framework or the draft Framework Agreement on Access to Biological and Genetic Resources developed by the Association of South East Asian Nations (ASEAN), which is a regional ABS regime.
[31] See e.g. article 311 LOSC.

2 Factual and Scientific Background

Our oceans contain a rich diversity of biological molecules within million species of plants, animals and bacteria.[32] Genetic material from marine organisms represents a major source of diversity and novelty, and the exploitation of these genetic resources has received notable attention during the last decades.[33] With enormous expansions in technological capabilities and the developments of advanced methods, scientists and bioprospecting companies are now able to explore a greater part of the marine biodiversity. In particular, the ever-increasing biomolecular knowledge and innovative genetic techniques have given researchers the opportunity to collect and sample a great variety of MGRs. This chapter gives an introduction and overview of MGRs by providing examples of their application, significance and value, and what benefits they might provide to scientific and commercial research.

2.1 Utilization and Application of MGRs

The great diversity in our oceans gives rise to several opportunities within scientific research and development, probably far beyond our current knowledge. However, due to the difficulties of access, technology and work hours required to develop novel products from marine organisms, this vast marine genetic diversity has until rather recently remained nearly unexploited.[34] Terrestrial organisms have provided the main source for research and discoveries of genetic material. It is only during the last decades that our knowledge and capacity for collecting and identifying biomolecules through intricate screening processes have advanced to such a degree, that the potential for exploration and exploitation of marine organisms is now considered to be feasible. Not only with the prospects of the potentially vast monetary income a new drug represents, but also as a necessity in order to face the future challenges associated with drug resistance of pathogenic bacteria, viruses, parasites and fungi.[35]

For biotechnological companies or research institutions seeking to develop new drugs, MGRs

[32] Moritz Bollmann, et al, 'World Ocean Review: Living with the Oceans', Hamburg, Germany, Maribus GmbH (2010), p. 114.
[33] Thomas Greiber, 'Access and Benefit Sharing in Relation to Marine Genetic Resources from Areas Beyond National Jurisdiction – A Possible Way Forward', Bonn, Federal Agency for Nature Conservation, IUCN, ISBN (2011), p. 1.
[34] Arianna Broggiato, et al., 'Fair and equitable sharing of benefits from the utilization of marine genetic resources in areas beyond national jurisdiction: Bridging the gaps between science and policy', Marine Policy 49 (2014), p. 177.
[35] James McIntosh, 'Antibiotic resistance: What you need to know', Medical News Today (2018). Retrieved from: https://www.medicalnewstoday.com/articles/283963.php, 19 August 2018.

represent a seemingly unlimited source of novel compounds with interesting properties. The oceans accommodate a much greater diversity than the terrestrial ecosystems; e.g. 34 of 36 known major animal groups (phyla) have been discovered in the oceans in comparison to the 17 revealed on land.[36] The deep sea has been revealed as a particularly interesting area for marine organisms shown capable of surviving in extreme environments to thrive. These organisms are found in various ecosystems, such as hydrothermal vents, saline lakes, seamounts, and cold-water coral reefs,[37] and are especially interesting for research as the molecules which allow these so-called extremophiles to exist often have unique properties yet to be utilized in modern science.

One prominent example of the various scientific advances that have revolutionized out genetic technology is the development of the polymerase chain reaction (PCR). PCR allows us to clone billions of copies of a certain gene or genome within a short amount of time, made possible by the discovery of the enzyme Taq polymerase from a thermophilic bacterium, Thermus aquaticus (incidentally an aquatic organism). [38] Through the development of PCR and other methods, genetic material coding for a product can now be identified, cloned, and inserted into the genome of other organisms such as E. coli.[39] These can be mass-produced in a laboratory setting, thereby removing the need to harvest large quantities of the original organism in which a molecule was first isolated. The extended effects of these discoveries for humanity are immense and serve as a reminder to the importance of the continued commitment to research.

Within pharmaceutical industries, discoveries from marine natural products have led to the development of *inter alia* anti-carcinogenic, HIV and leukaemia drugs.[40] Furthermore, complex molecules such as pigments and lipids from marine organisms have influenced the cosmetic industry to include 'extracts made from coastal plants, seaweeds algae and sea

[36] Michael Banks, et al., 'Use of Marine Genetic Resources', The First Global Integrated Marine Assessment (First World Ocean Assessment), United Nations General Assembly – A Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socio-economic Aspects, United Nations, New York, Cambridge University Press (2017), Chapter 29, p. 1.
[37] Jesús M. Arrieta, Sophie Arnaud-Haond and Carlos M. Duarte, 'What lies underneath: Conserving he oceans' genetic resources', PNAS, vol. 107, no. 43, (2010), p. 18322.
[38] Kary B. Mullis, 'The Unusual Origin of the Polymerase Chain Reaction', Scientific American (1990), pp. 56-65.
[39] Laura Sanchez-Garcia, et al., 'Recombinant pharmaceuticals from microbial cells: a 2015 update', Microbial Cell Factories (2016), p. 2.
[40] Tadeusz F. Molinski et al., 'Drug development from marine natural products', Nature Reviews Drug Discovery 8 (2009), pp. 69-85.

minerals' as part of components in cosmetic products.[41] Other areas of significance are within industrial applications, such as antifouling, where particularly marine algae, mangroves and sponges have been found to be a significant source of novel antifouling compounds.[42] Products of MGRs have been developed to facilitate the production of second-generation biofuels (biofuels made from left-over organic material from e.g. food production).[43] In mariculture of Atlantic Salmon, the selective development of a salmon strain adapted to rapid growth is a direct product of MGRs, both through artificial selection and transgenic fish, such as those produced by the American company AquaBounty Technologies.[44] MGRs have also shown to be vital into fields of basic research, such as taxonomy and barcoding, by e.g. admitting scientists to explore, identify and determine species into the taxonomic hierarchy.[45] For an extensive review on applications of MGRs, see Leary et al. (2009).[46]

Findings from the utilization of MGRs may give rise to various benefits for a range of sectors within scientific research. However, there are not many examples of a straight development-path from the sampling and collecting of marine organisms that leads all the way toward a commercial product derived from MGRs, despite often including numerous attempts.[47] For example, in the US, any new drug takes an average of 10 to 15 years to develop, and must thereafter be subjected to rigorous clinical trials, with an average total cost of more than $1.3 billion before it can be approved for human use.[48] Thus, increased knowledge within basic research fields might be highly significant for the so-called applied research fields more concerned with the utilization of MGRs for commercial purposes. In fields of basic research, the scientific discoveries and the increased knowledge they represent, are a key motivation in itself, while fields of applied research have a clear economic and profitable incentive for its research. Accordingly, two key benefits in the research of MGRs is the expansion of basic

[41] Ana Martins, et al., 'Marketed Marine Natural Products in the Pharmaceutical Industries: Tips for Success', Marine Drugs (2014), pp. 1066–1101.
[42] Michael Banks et al., *supra* note 36 at p. 4.
[43] David Leary et al., 'Marine genetic resources: A review of scientific and commercial interest', Marine Policy 33 (2009), p. 184.
[44] AquaBounty Technologies, see webpage at https://aquabounty.com/. Incidentally, the transgenic salmon produced by AquaBounty was first approved for sale in 2017, despite being developed in the 1980's, see https://www.theguardian.com/world/2017/aug/09/genetically-modified-salmon-sales-canada-aqua-bounty. Retrieved 25 July 2018. This reflects on the largely negative opinion of the general public toward GMOs.
[45] Bevis Fedder, 'Marine Genetic Resources, Access and Benefit Sharing – Legal and biological perspectives', Routledge, Taylor & Francis Group, London and New York (2013), p. 15-16.
[46] David Leary et al., *supra* note 43, pp. 183-194.
[47] Sophie Arnaud-Haond et al., 'Use of Marine Genetic Resources', The First Global Integrated Marine Assessment: World Ocean Assessment I, United Nations, Division for Ocean Affairs and the Law of the Sea, Office for Legal Affairs, Cambridge University Press (2017), Chapter 29, p. 455.
[48] Gail A. Van Norman, 'Drugs, Devices, and the FDA: Part one: An Overview of Approval Processes for Drugs', JACC: Basic to Translational Science (2016), p. 171.

scientific understanding of marine biology and biochemistry, and the economic incomes and success by way of marketing commercial products derived from the collection and sampling of genetic material.[49]

Furthermore, regarding the emerging focus in international law and science upon integrated ecosystem-based management, marine biodiversity and advanced ecosystem processes, further scientific research upon MGRs are a vital part of the advancement of knowledge that is necessary to understand the complexities in the world's oceans.[50] Thus, the increased knowledge about the marine ecosystems and the health of our oceans is another vital environmental and social benefit. For illustration, the utilization of MGRs may offer discoveries toward antibiotic resistant bacteria, on the one hand resolving an emerging antibiotic-resistant crisis as a life-saving pharmaceutical for the benefit of all humankinds, that on the other hand may be worth billions in the pharmaceutical industry.[51]

2.1.1 Significance of MGRs in ABNJ and States Research Capacities

This section provides for the application and commercial value of MGRs in ABNJ. However, first it must be clarified what ABNJ comprise. Covering almost two thirds of the world's oceans[52], ABNJ encompass two distinct maritime zones. On the one hand there is the Area, which is 'the deep seabed and ocean floor', including the 'subsoil thereof'.[53] On the other hand there are the high seas, comprising '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'.[54] Within this definition it is implied that the high seas comprises the water column superjacent the Area and the coastal States' extended continental shelf.

Although the primary exploration and the exploitation of MGRs earlier have been limited to areas within national jurisdiction, e.g. the territorial sea, exclusive economic zone and the

[49] Kerry T. Kate and Sarah A. Laird, 'Biodiversity and business: coming to terms with the 'grand bargain', International Affairs, vol. 76 (2000), pp. 241-264.
[50] Arianna Broggiato et al., *supra* note 9, p. 11.
[51] Sarah K. Schaffer et al., 'Assessing the Value of New Antibiotics: Additional Elements of Value for Health Technology Assessment Decisions', Academy of Infection Management, United Kingdom (2017), pp. 37.
[52] ABNJ, and particular the high seas represent 40% of the surface of our planet, encompassing 64% of the surface of the oceans and almost 95% of its volume. See the Global Environment Facility, retrieved from https://www.thegef.org/topics/areas-beyond-national-jurisdiction 11 June 2018.
[53] Article 1(1) LOSC.
[54] Article 86 LOSC. The convention contains a residual definition of the high seas in the sense that this is the portion of seas (that still is counts for a massive part) remaining after defining all the other maritime zones.

continental shelf of the coastal States, this situation has changed.[55] Both the water column and the deep seabed belonging to ABNJ have turned out to be a hot spot for research and development. Notwithstanding the fact that marine organisms in ABNJ are far less documented than e.g. within coastal State's exclusive economic zone (EEZ),[56] due to difficulties of access, a myriad of complex ecosystems are found in these vast ocean areas. These include *inter alia* tropical and subtropical coral reefs, cold-water corals in the deep seas, and free-floating seaweeds (macroalgae), seamounts and sponge reefs, many of which are discovered particularly in ABNJ.[57] It has been exposed that the ABNJ even contains novel ecosystems that support a significant level of biodiversity and contribute to the chemical fruitfulness of adjacent waters.[58] With the expansion of scientific knowledge, methods and techniques in numerous fields of research related to the oceans, it is now possible to identify, describe & reproduce reliable marine substances more rapidly[59], also beyond ocean areas of national jurisdiction. This also implies that the findings and discoveries of MGRs from ABNJ bear potential of wide application within different industries and sectors, and within several research disciplines.

3 Regulation of MGRs in ABNJ and the Questions of ABS

Having outlined the essential factual and scientific background of MGRs, this chapter moves on to investigate the legal framework regulating activities and use of MGRs in ABNJ. This include the following configuration: firstly, the chapter describes how MGRs are defined and scoped within current legal frameworks. Secondly, an attempt to justify why there is a fundamental need for ABS of MGRs in ABNJ, and the particular challenges combined with pursuing an ABS policy in ABNJ, is outlined. Finally, the chapter gives an overview of the current legal regimes, or rather the lack of adequate regimes, regulating ABS of MGRs in ABNJ.

[55] Thomas Greiber, *supra* note 33, p. 1 and David Leary et al., *supra* note 43, p. 184-185.
[56] Sophie Arnaud-Haond, et al. *supra* note 47, p. 452.
[57] Michael Banks et al., *supra* note 36. p. 11-12.
[58] Jacqueline J. Espenilla, 'Access, Conservation, and Sustainable Use of Marine Genetic Resources Beyond National Jurisdiction: Emerging Issues of Consensus and Contention', Columbia Journal of Environmental Law, Field Report (2016), p. 2.
[59] Moritz Bollmann et al., *supra* note 32, p. 178.

3.1 Defining MGRs

There is no single universally accepted legal definition of MGRs as such, but rather several existing definitions at both national and international levels.[60] Nevertheless, article 2 of the CBD contains definitions of 'biological resources', 'genetic material' and 'genetic resources', and may thus serve as a base for guidance. For clarification, the CBD is applicable to both terrestrial and marine genetic resources as it in its definition of 'biological diversity' in art. 2 include 'terrestrial, marine and other aquatic ecosystems'. When referring to genetic resources, this is assumed to be homonymic to MGRs in the following assessment. Article 2 of the CBD applies the following definitions: 'Biological resources' includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity. 'Genetic material' means any material of plant, animal, microbial or other origin containing functional units of heredity. 'Genetic resources' refers genetic material of actual or potential value.

The definition of 'Biological resources' suggests that an unlimited range of marine organisms might comprise biological resources, and that genetic resources are a subset of biological resources. Turning to the definition of 'Genetic resources', there is a requirement that it contains 'genetic material', and this genetic material would only be characterized as a genetic resource if it has 'actual or potential value'. The prerequisite of 'actual or potential value', read in the context of the term 'resources', appears by a contextual interpretation to mainly target economic and commercial values. Furthermore, it encompasses both present and future values by the wording 'actual or potential'. It has been argued that 'value' is automatically attributed to genetic materials, as they could all have a 'potential' value.[61] This is evident as scientists are not able to estimate the definite value a genetic resource might comprise before conducting further research. Thus, by taking this approach, the prerequisite of value would often be fulfilled. One important point, however, is that in relation to genetic resources, the definite value is only created by human exploitation and application. This has the

[60] Thomas Greiber, 'IUCN Information Papers for the Intersessional Workshop on Marine Genetic Resources 2-3 May 2013, United Nations General Assembly 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', International Union for Conservation of Nature (IUCN) Environmental Law Centre. Bonn, Germany, p. 1.

[61] Lyle Glowka, et al., 'A Guide to the Convention on Biological Diversity', IUCN Environmental Law Centre, Environmental Policy and Law Paper No. 30, p. 22.

consequence that genetic resources are not merely biological material containing functional units of heredity; they are intrinsically tangled to utilization.[62]

In order to understand what 'genetic resources' are actually comprising, the meaning of the term 'genetic material' needs to be clarified. By a natural interpretation of the term 'genetic material', it appears to have a broad scope as it encompasses 'any material of plant, animal, microbial or other origin'. Thus, the literal interpretation implies that the entire biomass from any organisms or its mechanisms can be embraced into this definition. However, the term 'genetic material' is restricted in the sense that it must contain 'functional units of heredity'. An ordinary interpretation of 'functional units of heredity' implies a reference to genes as the principal unit of heredity. This presumably includes all genetic elements containing DNA, and in some circumstances also RNA.[63] Based on these interpretations, it can be determined that genetic resources might include every living organism of any size, as long as it can be identified by 'functional units of heredity'.

However, the term 'functional units of heredity' deserves some comments. The definition of 'genetic material' as stated in the CBD does not distinguish between the tissues or cells containing these functional units and the functional units themselves. This has led to diverging interpretations of 'functional units of heredity': Some of the core disagreement seem to be whether the 'units' only refer to the genes, or may be interpreted beyond the gene itself to include *inter alia* multiple DNA molecules, such as proteins and their sequences and thereby their information, and some even argue that the entire genome is included.[64] Some scholars have exemplified 'functional units' to even encompass 'seeds, cuttings, sperm or individual organisms'[65]. By using a scientific interpretation of the term 'genetic material', it only refers to the heredity material, i.e. the gene, DNA or RNA that is an inherent part of the living organism, and not the organism or biomass containing it.[66] Thus, 'there exists no

[62] Morten W. Tvedt and Tomme Young, 'Beyond Access: exploring implementation of the fair and equitable sharing commitment in the CBD, IUCN Environmental Policy and Law Paper No. 67/2, Gland, Switzerland (2007), p. 55.
[63] Lyle Glowka et al., *supra* note 61, p. 22.
[64] Bevis Fedder, *supra* note 45, p. 35-36. See further references to Barry Commoner, 'Unraveling the DNA myth. The spurious foundation of genetic engineering', Harper's Magazine (2002), pp. 39-47, p 5, and the CBD Working Group on Access and Benefit Sharing, 'The concept of "genetic resources" in the Convention on Biological Diversity and how it relates to a functional international regime on access and benefit-sharing', UNEP/CBD/WG-ABS/9INF/1 (2010), p. 16.
[65] Lyle Glowka, *supra* note 61, p. 22.
[66] In the Oxford Dictionary of Biochemistry and Molecular Biology, 'genetic material' is in fact defined as 'the molecular carrier of primary genetic information […]'. The natural interpretation is accordingly the hereditary units themselves, and not the biomass in which it is contained. See Oxford Dictionary of Biochemistry and Molecular Biology (2. edition), Oxford University Press (2006) online edition, retrieved from

uniform way to interpret 'functional units of heredity'. Nevertheless, what the definition clearly does not comprise is information extracted from genetic material that result in a lack of the gene or DNA itself, such as digital sequestration; the digital storage of genetic sequences as coded letters. Accordingly, with the current definition in the CBD, there is a requirement of the physical presence of a genetic material. In other words, genetic resources cannot exist *in silico* within this definition. This problematic exclusion is discussed further in chapter 4.3.

With the adoption of the Nagoya Protocol, the drafters sought to clarify the uncertainties surrounding the definitions of genetic resources.[67] In article 2 of the protocol, the concept of 'utilization of genetic resources' and 'derivative' [68] was introduced, with the objective of describing when the utilization of genetic resources would trigger benefit sharing.[69] 'Utilization of genetic resources' is defined as a 'means to conduct research and development on the genetic and/or biochemical composition of genetic resources, including through the application of biotechnology as defined in Article 2[d] of the Convention.' This is the main provision targeting benefits occurring from research and discoveries of the genetic resources.[70] Any detailed assessment of what is included in this scope requires a complex analysis beyond this chapter, but one can recapitulate three types of activities[71] that are typically encompassed into 'utilization of genetic resources': Biological processes such as 'cultivation', i.e. the act of growing or preserving cells and tissues in a culture, activities aiming towards isolation or modification of minor components of organisms, e.g. biological molecules, and according to Fedder, bioinformatics, i.e. the digital management of biological information are included in the scope.[72]

Furthermore, 'derivative' is defined as 'naturally occurring biochemical compounds resulting from the genetic expression or metabolism of biological or genetic resources, even if it does

http://www.oxfordreference.com/view/10.1093/acref/9780198529170.001.0001/acref-9780198529170-e-7817 29 June 2018.

[67] See *inter alia* Elisa Morgera, Elsa Tsioumani and Matthias Buck, 'Unraveling the Nagoya Protocol – A Commentary on the Nagoya Protocol on Access and Benefit-Sharing to the Convention on Biological Diversity', Brill Leiden, Boston (2015), pp. 59-60.

[68] See article 2 (c) and (e) Nagoya Protocol.

[69] Bevis Fedder, *supra* note 45, p. 37.

[70] See Thomas Greiber et al., 'An explanatory Guide to the Nagoya Protocol on Access and Benefit-Sharing', IUCN Environmental Policy and Law, Paper no. 83 (2012), p. 70.

[71] Lyle Glowka et al, *supra* note 61, p. 17.

[72] Bevis Fedder, *supra* note 45, p. 39. For a detailed review of what is encompassed within the scope of 'utilization of genetic resources', see Ad Hoc Open-Ended Working Group on Access and Benefit Sharing, 'Report on the Meeting of the Group of Legal and Technical Experts on Concepts, Terms, Working Definitions and Sectoral Approaches', UNEP/CBD/WG-ABS/7/2 (2008), pp. 21, p. 7-9, para 11-17.

not contain functional units of heredity'. As a starting point, this definition seeks to include components that are not considered 'functional units of heredity', but rather the direct product of genetic expression and thus intrinsically tied to the functional units. By opening up the scope of the definition of genetic resources to this extent, it also encompasses processes of expression or metabolism of genetic resources, although the resulting material does not contain such 'functional units.' The definition of derivatives in the Protocol appear to only include biochemical derivatives, i.e. the naturally occurring biochemical compounds that are a direct product of genetic expression or metabolism. This has the implication that naturally occurring biochemical compounds that are retrieved separately from genetic resources are not included in the scope of the Protocol,[73] which could suggest an exclusion of derivatives based on synthetic biology[74].

What can be determined from these findings is that scientists, legal scholars and policy makers practice different terminologies and apply different content to the terms, and the overall absence of universally agreed definitions of MGRs creates a great level of uncertainty among the research disciplines.[75] The Nagoya Protocol is an important contributor to clarify the relationship to utilization of genetic resources, but as Fedder has pointed out, a major shortcoming is the lack of a clear distinction between the different biological uses and processes that requires benefit-sharing.[76] All in all, this is problematic because a clear scope and definition of genetic resources are crucial as research institutions, bioprospecting companies and other entities depend upon predictability by knowing when a benefit-sharing obligation is triggered. These uncertainties also create challenges within the BBNJ process when deciding the scope of MGRs in the new implementing agreement. Some of the central questions being discussed within the BBNJ fora (and still within the debates of the CBD/Nagoya Protocol)[77], are the following: How will the new implementing agreement deal

[73] Thomas Greiber et al., *supra* note 70, p. 71.
[74] Synthetic biology may be described as the new generations of biotechnologies that includes methods of engineering, re-designing, re-structuring and synthesizing biological systems, also at the genetic levels. See the International Civil Society Working Group on Synthetic Biology, 'Synthetic Biology and the CBD'. Retrieved from http://www.etcgroup.org/sites/www.etcgroup.org/files/files/cbd_cop_13_syn_bio_brief_eng.pdf 26 August 2018.
[75] For instance, the inclusion of the definition 'utilization of genetic resources' and 'derivatives' in the Nagoya Protocol does not provide any guidance of how to understand the term 'genetic material', which are still left with ambiguities, and thus deserve the critical comments given above.
[76] Bevis Fedder, *supra* note 45, p. 41. On the same page Fedder has also criticized the exclusion of certain traditional uses of taxonomy (for identification of species) from the scope of 'utilization of genetic resources'.
[77] See generally the questions of digital sequence information being discussed within the CBD context: Ad Hoc Technical Expert Group on Digital Sequence Information on Genetic Resources, 'Fact-Finding and Scoping Study on Digital Sequence Information on Genetic Resources in the Context of the Convention on Biological Diversity and the Nagoya Protocol', Montreal, Canada, 13-18 February 2018, pp. 77.

with the relationship to derivatives of genetic resources? Should digital sequence information of genetic resources (*in silico*) be included in the scope of MGRs? How may the negotiators establish definitions that are precise and encompassing enough, without hampering the objective to facilitate research that is beneficial for all human beings? These and several other questions must be answered before providing a new implementing agreement in ABNJ.

3.2 ABS – The Legal Concept

We have now clarified the legal definitions and material scope of MGRs, and some of the problematic aspects that are relevant to the BBNJ negotiations. This section moves on to explain what ABS is, why there is a general need to develop an ABS regime in ABNJ, and some of the practical implications of pursuing an ABS policy in ABNJ in light of the BBNJ negotiations.

The UNGA has several times referred to the 'questions on the sharing of benefits'[78] when addressing MGRs, but in these wordings there is no mention of the term 'access'. However, questions of access to MGRs forms an integral part of the benefit sharing discussions, and has been, and continue to be a highly relevant topic of discussion within the BBNJ fora.[79] Hence, it is natural to discuss an ABS regime as a whole. The LOSC does not provide any concrete definition of ABS as such, but the CBD provides for and promote a regime of ABS, although, without defining it. Thus, for the purpose of this thesis, the following definitions can be applied: the term access can be defined as the opportunity to make use of genetic resources, either *in situ*, *ex situ* or *in silico*; Access *in situ* can be further defined as the physical gathering and sampling of living organisms in the areas they occupy. *Ex situ*, on the other hand, refers to the access to organisms in areas outside of their natural habitats, such as in laboratories. Finally, *in silico* means the direct access to genetic data, where genomes or genetic sequences of marine organisms can be digitalized into a computer, without the presence of the physical gene.[80] When someone benefits from genetic resources, they gain certain advantages from them either in the form of monetary or non-monetary benefits. When there is an obligation to share the benefits, the advantage the benefit provides, or at least parts of it, is transferred to someone else.

[78] UNGA Resolution A/66/119 (30 June 2011) p. 2, para 1(b).
[79] Chair's Non-Paper, *supra* note 28, p. 24-27.
[80] Arianna Broggiato, *supra* note 9, p. 17.

ABS is a somehow 'unclear legal phenomenon in international law'[81] containing highly complex mechanisms, which are not dealt with in this thesis in detail. However, briefly speaking, regulations and systems of ABS seek to establish guidelines towards how and when genetic resources may be accessed, and provides a system that aims to facilitate the equitable sharing of the benefits arising from their utilization.[82] The objective of ABS in relation to genetic resources is thus to define rules that ensure a fair balancing of the rights and interests among the stakeholders involved with the entire process of utilization of the resources.

3.2.1 The Fundamental Need for an ABS Regime to Govern MGR in ABNJ

As demonstrated above, researchers and commercial industries have shown significant interests in the study and utilization of MGRs as they bear the potential of great values and numerous benefits. Benefit-sharing mechanisms are a deeply integrated part of the regulation of MGRs in areas within national jurisdiction, but these regulations are profoundly based upon the principle of States' sovereign rights over natural resources within their jurisdiction.[83] Regulations of ABS in domestic ocean areas have proven necessary to accommodate and balance the interests of the relevant stakeholders in this respect, which can be divided into so-called users and providers.[84] The situation of ABNJ would, however, differ in the absence of national jurisdiction and sovereignty. Hence, one could ask what justifies an ABS regime for MGRs in ABNJ.

Throughout the BBNJ process, MGRs, including the questions of ABS, have been a highly contentious topic, and States disagree upon the necessity of such a regime at all, and furthermore the details of one.[85] In this context, this section attempts to investigate, and justify on the basis of international law, why there is a fundamental need for fair and equitable sharing of benefits derived from the utilization of MGRs in ABNJ. The intention is not to search for the legal regime, or basis *per se*, that govern MGRs, and their potential ABS (as this is being discussed in section 3.3). This section rather attempts, in the realm of conflicting

[81] Elisa Morgera, 'The Need for an International Legal Concept for Fair and Equitable Benefit Sharing', The European Journal of International Law Vol. 27 no. 2 (2016), p. 353.
[82] The Secretariat of the Convention on Biological Diversity, 'Convention on Biological Diversity: ABS, Introduction to access and benefit-sharing', Factsheets in the ABS series (2011), p. 3, retrieved from https://www.cbd.int/abs/infokit/brochure-en.pdf 12 July 2018.
[83] Article 193 LOSC and article 3 CBD.
[84] See *inter alia* Article 2(4) and (5) CBD, which defines users as the State, entity or unit seeking to access resources for further utilization (although with the wording '*country of origin*') and providers as the State, entity or unit that provide the access, respectively.
[85] See *inter alia* Chair's non-paper on the different positions of the States within the BBNJ negotiations, *supra* note 28, p. 21-33, and particularly from p. 24. See also Report from the PrepCom, *supra* note 14, p. 17.

norms and interest, to provide some reflections and thoughts on the ethical rationales behind ABS of MGRs in ABNJ.

3.2.1.1 ABNJ and the Global Commons

In order to search for an answer to the question above, one could examine the original formal regime of ABNJ, including its resources. A common denominator is that the ocean areas beyond the jurisdiction of States are considered a part of the global commons.[86] This term refers to certain areas and natural resources that are not subject to the jurisdiction of any State, but instead are shared among all States within the international community.[87] To place the concept of global commons within its historical frame, it has its origin from public international law[88], and could, in fact, be traced all the way back to natural and Roman law.[89] One of the main pioneers and contributors behind the idea of the global commons, was the Dutch scholar Hugo Grotius in his maritime legal doctrine 'The Free Sea' (generally known as *Mare Liberum*) in 1608.[90] The idea behind this doctrine was mainly based on three different approaches to identify the oceans: as the property of no one (*res nullis)*, a common possession (*res communis*) and a public property (*res publica*).[91]

Grotius endeavoured to prove that the oceans were a *res communis omnium*, and were thus not capable of any exclusive appropriation by any State.[92] As with the air, Grotius considered the ocean 'common to all, because it is so limitless that it cannot become a possession of any one, and because it is adapted for the use of all, whether we consider it from the point of view of navigation or of fisheries'.[93] Hence, as a freedom provided to all States, the oceans should be freely accessed and shared by all nations. As an effect of this notion, biological elements

[86] Other areas naturally belonging to the global commons, or to the roman legal definition of *res communes omnium*, includes *inter alia* the flowing water, outer air space and the atmosphere.
[87] Nico Schrijver, 'Managing the global commons: common good or common sink?', Third World Quarterly, 37:7, 1252-1267 (2016), pp. 1252-1253.
[88] For authors discussing the global commons, see *inter alia* Susan J. Buck, 'The Global Commons: An Introduction', Taylor & Francis Group, UK (1998) and John Vogler, 'The Global Commons: A regime Analysis', Chichester, Vol. 40, No. 2 (1996).
[89] See e.g. Kemal Baslar, 'The Concept of the Common Heritage of Mankind in International Law', Martinus Nijhoff Publishers, Kluwer Law International (1998), pp. 420.
[90] Hugo Grotius, 'Freedom of the Seas: The Right which Belongs to the Dutch to Take Part in the East Indian Trade', Oxford University Press, New York, 1633 trans, 1916 rep (see translated edition by Ralph Magoffin et al.) Originally, the *Mare Liberum* was written to protect Dutch interests in the high seas and deny claims of sovereignty by Portugal, Spain and other States. However, Grotius dedicated a significant portion of his work to analysis of the principles behind the global commons.
[91] *Ibid.*, p. 20.
[92] Nico Schrijver, *supra* note 87, p. 1254.
[93] Hugo Grotius, *supra* note 90, p. 24. *Res communis omnium* is a counterpart to the principle of *res nullis*, which entails that the global commons do not belong to anyone until occupied or appropriated by someone (this principle refers to resources as being mainly inexhaustible).

such as fish and aquatic animals in the oceans were also treated as a *res communis*[94], freely to be accessed and utilized by all States. Without touching into all its complexities, this ideology has been further shaped and conceptualized throughout the times. The perception of the global commons has been intervened by increased State sovereignty and ownership over ocean areas and laid important foundations in the subsequent legal instruments governing the seas.[95] By the adoption of the LOSC, the freedom of the high seas principle were codified, and the legacy of Grotius sustained.[96] However, the geographical scope of this freedom has been reduced to certain extent[97], mainly due to increased coastal state jurisdiction and the establishment of the Area, where the mineral resources were governed by the principle of common heritage of mankind (CHM).[98]

The concept of CHM was originally proposed by the Maltese ambassador, Arvid Pardo, in 1967,[99] as a response to concerns of allowing the mineral resources of the deep seabed to fall into the hands of a few developed States. Due to advancements in technology, it was expected that exploitation of mineral resources (mainly polymetallic nodules) laying on the surface of the deep seabed, would in the present future become commercially viable.[100] The introduction of CHM would prevent that these minerals were placed under a 'first come-first served'[101] regime as a freedom of the seas. The preferred legal basis of the CHM approach was to rather place these natural resources within the heritage of mankind as a whole, so that everyone

[94] However, here one must distinguish between the natural resources in its collective individual form: For instance, fish stocks, which are belonging to the entire society (and follows the *res communis* principle), are treated differently than a single fish, which can be occupied (according to *the* res *nullis* principle).
[95] Nico Schrijver, *supra* note 87, p. 1255.
[96] Article 87 LOSC. See also article 89 stating 'No State may validly purport to subject any part of the high seas to its sovereignty'. This provision has the consequence that no State validly can claim territorial jurisdiction over any parts of the high seas. This is a natural result of the high seas being outside any State's sovereignty. As the provision refers to the spatial or geographical scope of the high seas, the natural resources as such are not restricted from sovereignty claims. See Konrad J. Marciniak, 'Marine Genetic Resources: Do They Form Part of the Common Heritage of Mankind Principle?', JurisNet, LLC 2017, Chapter 16, pp. 373-405, p. 380.
[97] Arianna Broggiato et al, *supra* note 9 at p. 5.
[98] See Article 136 LOSC. Some States argues that the principle of CHM also has the status as customary international law, see 'Statement on behalf of the Group of the Group of 77 and China […] at 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' (New York, 31 May 2011), retrieved from http://www.g77.org/statement/getstatement.php?id=110531 19 June 2018.
[99] Arvid Pardo, 'The Common Heritage: Selected Papers on Oceans and world order 1967-1974, Malta University Press (1975), pp. 549. See also Statement by Arvid Pardo, International Ocean Institute, before the third United Nations Conference on the Law of the Sea, 9 April 1976.
[100] Tullio Scovazzi, 'The Concept of Common Heritage of Mankind and the Genetic Resources of the Seabed beyond the Limits of National Jurisdiction', Agenda Internacional 25 (2007), p. 11-12.
[101] 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, UN Doc. A/66/119 (2011 Report of the UNGA Working Group), p. 5, para 17.

would benefit from them.[102] One could thus argue that the concept of CHM constitutes an alternative, and a relatively new concept in comparison with the classical Roman Law concept of *res communis*.[103] Baslar has argued that it expanded the classic *res communis omnium* principle, as the CHM can be explained as the *res communis humanitatis*.[104]

Currently, the law of the sea in ABNJ is governed both by the principles of freedom of the high seas and the CHM. The resources in the high seas are considered to be common goods (in the context that they do not belong to any specific State and that every State can exploit them)[105], and freedoms are based upon an individualistic approach (except the inherent limitations, *inter alia* to have due regard to other States' rights and interests[106]). On the other hand, the regime of the Area builds upon a collective perspective, where States are not entitled to claim sovereignty or sovereign rights over the resources situated in the Area.[107] The rights to resources are instead inherently 'vested in mankind as a whole', by the control and management of the International Seabed Authority (ISA).[108] Individual units carrying out 'activities in the Area' must do this for the benefit of mankind as a whole.[109] The practical consequence is thus entirely different sets of norms governing these ocean areas.

Despite these major practical implications, what these set of legal regimes, or principles, in fact have in common, is that they both represent different sides of, or ways to describe, the global commons of ABNJ. The main reason is because both the freedom of the high seas and the CHM represents the legal basis of ABNJ within the law of the sea, and they are both results of different explanations of the perception of the global commons. Having established that these two global commons exists parallel within our oceans beyond national jurisdiction, a natural follow-up question is in which category can one place, or describe, MGRs originated from the global commons.

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[102] As Baslar has correctly pointed out, the Grotian ideology has been 'a useful tool in the hands of the powerful nations of Europe until the emergence of the common heritage of mankind', see Kemal Baslar, *supra* note 89, p. 31.
[103] Jean Buttigieg, 'The Common Heritage of Mankind – From the Law of the Sea to the Human Genome and Cyberspace', University of Malta (2012), retrieved from https://www.um.edu.mt/library/oar/handle/123456789/6883 15 August 2018.
[104] Kemal Baslar, *supra* note 89, p. 42.
[105] Konrad J. Marciniak, *supra* note 96, p. 375.
[106] Article 87 (2) LOSC. The ICJ referred to this as 'a recognition of the duty to have due regard to the rights of other States and the needs of conservation to the benefit for all' in the '*Fisheries Jurisdiction cases'* (UK, Germany and Iceland) (1974), ICJ, Reports, 3.
[107] Article 131(1) LOSC.
[108] Article 137(2) LOSC.
[109] Article 140(1) LOSC.

3.2.1.2 The Potential Role of MGRs in the Global Commons

Besides the principles of freedom of the high seas and the CHM, there are many examples of global commons; the conservation of biodiversity and the global climate may be considered examples within environmental law, sharing the feature that they are both characterized as a 'common concern of humankind' (CCH).[110] Terrestrial plant genetic resources may also be considered as such within the context of the FAO Treaty. With the characteristic of being a 'common concern', these global commons represent parts of the global environment that are so intrinsically significant, and thus necessary to protect and preserve, that they have been designated as a CCH.[111] Although these conventions and treaties have their main emphasis within areas of national sovereignty, the concept of 'common concerns' introduces a notion where there is a clear public interest in the protection and cooperation of certain resources or parts of the global environment.[112] It is thus noteworthy that throughout developments in contemporary international law, certain indicators of a process of 'public inflection of international law'[113] can be identified. Hence, one could suggest that a public rationale, or perception, is to an increasing extent forming and shaping the decision making in shared global and environmental concerns between the nations of the world.

Placing these notions within the context of MGRs, one could start by stating that they qualify as a biological resource both within the scope of the CBD, but also generally, taken into consideration the definition presented above. As being elements of biological biodiversity, they are one of the three objectives set out by the CBD, that is, the conservation of biodiversity. Hence, in this regard, one could argue that the conservation of MGRs can be identified as a CCH (to the same extent as the conservation of biodiversity is).[114] Although

[110] The United Nations Framework Convention on Climate Change (UNFCCC) (adopted 9 May 1992, entered into force 21 March 1994) 1771 UNTS 107 preamble, para 1 and preamble, para 3 CBD.
[111] Frederiech Soltau, 'Common Concern of Humankind', The Oxford Handbook of International Climate Change Law, Oxford University Press (2016), p. 203.
[112] However, the idea of a common concerns must not be confused with the CHM principle. Basler argues that the term 'common heritage' is in many ways equivalent to the term 'common concern', but the principles has their own distinct features, see Kemal Baslar, *supra* note 89, pp. 107-111.
[113] See the forthcoming article by Vito De Lucia, 'The Concept of Commons and Marine Genetic in Areas Beyond National Jurisdiction', in Maritime Safety and Security Law Journal, pp. 24, p. 1, on file with author. For more views of the public influence in certain areas of international law, see for instance also Jutta Brunnée, 'Common Areas, Common Heritage and Common Concern', The Oxford Handbook of International Environmental Law, Oxford University Press (2018).
[114] *Ibid.*, Vito De Lucia p. 15. Other authors reflecting upon whether MGRs may be considered as a common concern are Chelsea Bowling, Elizabeth Pierson and Stephanie Ratté, 'The Common Concern of Humankind: A Potential Framework for a New International Legally Binding Instrument on the Conservation and Sustainable Use of Marine Biological Diversity in the High Seas, pp. 15, p. 11, retrieved from http://www.un.org/depts/los/biodiversity/prepcom_files/BowlingPiersonandRatte_Common_Concern.pdf 28 August 2018.

the principle of CCH primarily has been focused in treaties governing areas within States' sovereignty, the concept of common concerns is not thusly limited. For instance, Shelton contends that '[c]ommon concerns are […] are not spatial, belonging to a specific area, but can occur within or outside sovereign territory.' This could imply that despite being subject to the spatial dimensions of either areas within national jurisdiction, or beyond, MGRs could independently be considered as a CCH. Based on these findings, one could state that the concept of global commons is, in fact, a living concept that is able to accommodate and adapt to other, more contemporary commons at the international level, such as MGRs (as a CCH). The next question is whether the concept of CCH can somehow be linked with the exploration and benefit sharing of MGRs.

3.2.1.3 A Link Between the CCH and ABS?

Within areas of national jurisdiction, there is a natural link between the CCH (as the conservation of biodiversity and genetic resources), and the equitable sharing of the benefits arising from genetic resources.[115] As an extension of this, one could question whether there also exists such links between the concepts of CCH and ABS of MGRs in ABNJ. There is no mention of the CCH within the LOSC, but the convention promotes 'the equitable and efficient utilization of [the] resources'[116] within the all parts of the oceans, and generally the conservation and sustainable use of the marine environment[117]. Furthermore, the UNGA have urged the need to strengthen 'the conservation and sustainable use of marine biological diversity'[118] in ABNJ, with MGRs as one of the four items within the BBNJ process.

Based on these notions, and despite the fact that the CCH mainly focuses upon conservation, one could possibly argue that the exploitation of MGRs from ABNJ, constitute common concerns.[119] Could then the utilization of MGRs, as being a common interest of all the world's States due to their location, be considered as a CCH because they bear vast potential benefits for all mankind?[120] Without touching into all the intricacies, one could arguably even refer to these resources as belonging to part of our common heritage when these resources are

[115] As the CCH and ABS are two of the key objectives of the CBD.
[116] Preamble, para 4 LOSC.
[117] See in particular Part XII of the LOSC.
[118] See e.g. UNGA A/RES/66/119 (30 June 2011), para 1(b).
[119] Angelica Bonfanti and Seline Trevisanut, 'TRIPS on the High Seas: Intellectual Property Rights on Marine Genetic Resources', 37 Brook. J. Int'I L (2011), p. 190.
[120] *Ibid.*, p. 197.

located in the global commons?[121] If this is the case, it should indeed be in the interest of the international community to take into consideration the realities and opportunities of all the world's States to equally participate in the efficient (and sustainable) utilization of the MGRs.

Reports from *inter alia* the 'United Nations First Integrated Marine Assessment on the Conservation and Sustainable use of Marine Biological Diversity of Areas Beyond National Jurisdiction' have revealed that there exist substantial gaps in the research capabilities of different States.[122] This uneven distribution refers to technological, scientific and economic capabilities, and the disparities are largest between developing 'south' States and the developed 'north' States.

First of all, developed States have more advantages by means of advanced private companies and research institutes. Depending on where the MGRs are accessed, the *in situ* biological collection, sampling and fieldworks are normally conducted by research vessels. These operations are often highly expensive and could cost as much as 25000 USD per day.[123] The majority of appropriate research vessels are divided among a few developed countries, which signals an uneven degree of access to MGRs. Furthermore, there are significant dissimilarities in the research skills, expertise and knowledge among the different States, which is necessary to conduct research upon marine biodiversity (particularly in remote deep seas), to undertake molecular screening and biodiversity assessments, and to analyse the data these genetic findings generate.[124] Accordingly, in all types of research (*in situ*, *ex situ*, and *in silico)*, there are capacity dissimilarities between the States. These limitations in capabilities restrict the ability of several States to fully participate in the research and discoveries of MGRs.

Recent studies have also discovered that a few so-called 'keystone actors' representing only a few developed States (USA, Germany and Japan) are deeply involved in the patenting of genetic sequences of MGRs.[125] The possibility to patent innovations from MGRs provides an

[121] However, the idea of a common heritage must not be confused with the CHM principle governing the Area. Basler argues that the term 'common heritage' is in many ways equivalent to the term 'common concern', and that the common concern is an operationalization of the principle of CHM when resources are located in areas within national jurisdiction, see generally Kemal Baslar, supra note 89, and in particular p. 107-111.
[122] Michael Banks, et al. *supra* note 36, pp. 14.
[123] Sophie Arnaud-Haond et al., *supra* note 47, p 454.
[124] Arianna Broggiato et al., *supra* note 9, p. 14-15.
[125] Robert Blasiak et al., 'Corporate control and global governance of marine genetic resources', Science Advances. 4, eaar5237 (2018), pp. 7. Other studies have also pointed out that over 90% of the patents, which includes marine genes, are registered within ten developed States, whereas the top three countries (Japan, USA and Germany) holds around 79% of the patents, see Marjo Vierros et al., 'Who Owns the Oceans? Policy Issues Surrounding Marine Genetic Resources', Association for the Sciences of Limnology and Oceanography (2016), pp. 8, p. 3.

opportunity to enjoy exclusivity of potential economic benefits arising from the utilization of MGRs. This could suggest that the private sector and research institutions in the developed States conduct most of the scientific research and utilization of MGRs and are thereby also granted most of (both monetary and non-monetary) the benefits.

What all of this is a clear signal of, is that there exist enormous imbalances in terms of access to, utilization of and the enjoyment of benefits arising from MGRs.[126] It also raises concerns of equity and justice within the landscape of the global commons. The apparent question in this regard is whether the commercial potential of these genetic resources should only belong to the discoverers[127], or should the benefits arising from MGRs be conserved and distributed among all nations on the basis that they are a common concern (or as being part of our common heritage)? Based on these findings, one could perhaps argue that within international law, the exploitation and utilization of MGRs in ABNJ, including the benefit-sharing of these, are linked to the perception of CCH. Accordingly, there is a certain link between the CCH and the ABS of MGRs in ABNJ, and it is thus possible to justify a regime of ABS in these ocean areas. As a common concern, one could contend that there is a 'general basis for the concerned community to act'[128], and thus a general obligation arising from international law to endeavour to avoid that inequity occurs. This would imply that there are certain collective ethical commitments for the international community concerned with the future governance of MGRs (regardless of what legal regime MGRs in the end are governed by).

3.2.2 ABS – Possible Tensions Between Science and Law

Although there is a general need for equity, and there is reason to believe that a regime of ABS could contribute to equity, ABS is a complex issue technically and ethically that may create tensions between science and law.[129] As scientists and researchers prefer unhindered access and wide opportunities for the utilization of genetic resources, regulations of ABS may pose severe limitations to these liberties. As the utilization of genetic resources might create numerous benefits (particularly monetary), many researchers are concerned with securing their share of any benefits through either patenting or other intellectual properties that ensure

[126] Kim Juniper, IUCN Information Papers for the Intersessional Workshop on Marine Genetic Resources 2-3 May 2013, United Nations General Assembly 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', International Union for Conservation of Nature (IUCN) Environmental Law Centre. Bonn, Germany, pp. 16.
[127] Marjo Vierros et al., *supra* note 125, p. 5.
[128] Dinah Shelton, 'Common Concern of Humanity', *Iustum Aequum Salutare*, 'V./1 (2009), p. 38.
[129] Bevis Fedder, *supra* note 45, p. 1.

the benefits. In this regard, there have been concerns that the adoption of an ABS regime in ABNJ could produce obstacles towards research and development.[130] The question then becomes to what extent a regime of ABS would restrict, or even hamper, scientific research and developments upon MGRs.

As the scientific community represents one of the key stakeholders in relation to MGRs, it is essential to 'not hinder, but rather promote'[131] the possibility to engage into further research and discoveries. Hence, placing too many restrictions upon bioprospecting could prevent the great potential research of this research. Future research and innovation will be crucial if we desire to fully benefit from marine genetic resources. For the industry, legal certainty is vital to investment, but also the potential of economic income. On the other hand, there is the crucial consideration of the interests of States with less developed skills and capacities to conduct research.[132] As ABS confronts these several conflicting interests, the negotiating States need to bear in mind the considerations to create a system that both balances equity and promote research and development. In order to satisfy the interests and predictability of the scientific community, their views should to the largest extent possible be taken into consideration when establishing such a regime. This is, in the writer's opinion, the only way to truly justify an ABS regime in ABNJ.

3.3 What Legal Regime Applies MGRs in ABNJ?

The intention of this section is to shed light on some of the existing gaps and ambiguities in the current regimes regulating MGRs in ABNJ *lex lata*. The legal framework in this respect consists of the LOSC, the CBD and the Nagoya Protocol, with the LOSC as the main legal framework that establishes the overall norms and principles for all ocean-related activities. In accordance with article 311 and the *lex superior* rule in article 237 of the LOSC, in matters of environmental protection, other legal instruments must be implemented consistently and in coherence with the convention.[133] The CBD as the main convention regulating biological diversity, specifically acknowledges that implementation must be in coherence with the rights

[130] DOSI Deep-Sea Genetic Resources Working Group, Draft Discussion Paper, 'Deep-Sea Genetic Resources Beyond National Jurisdiction: How to Conserve Marine Life & Facilitate Scientific Research?' (20 February 2016), p. 1.
[131] Chair's overview of the third session of the Preparatory Committee, third Session of the PrepCom (27 March – 7 April 2017) Appendix 1, p. 5.
[132] Arianna Broggiato, *supra* note 34, p. 180.
[133] Arianna Broggiato, *supra* note 34, p. 179. s

and obligations arising from the LOSC in article 22(2), and its Nagoya Protocol regulate its relationship to the LOSC to the same extent in article 4(3).

3.3.1 Applicability of the LOSC

The LOSC is the natural starting point for examining how ABS of MGRs are regulated in ABNJ. Part of its object and purpose is to establish 'a legal order for the seas and oceans […] and to promote the peaceful uses of the seas and oceans, the equitable and efficient utilization of their resources, the conservation of their living resources, and the study, protection and preservation of the marine environment.'[134] The convention aims to fulfil its objectives by taking a zonal approach, and establishes distinct rights and obligations for States in each maritime zone. The LOSC regulates States' rights and duties in ABNJ throughout the different regimes of the freedoms of the high seas and the Area. MGRs as such are not mentioned in the LOSC. The main reason for this is because at the time the final version of the LOSC was negotiated, MGRs and their potential values were not an area of focus within international law. It was not until more than ten years after the ratification of the convention that genetic resources of marine areas caught significant commercial interest.[135] Despite not being directly referred to in the LOSC, the following section provide for an examination of potential regimes that could regulate MGRs in ABNJ.

3.3.1.1 The Freedom to Exploit the Living Marine Resources

The regime of the high seas is specified in Part VII of the LOSC, and its core feature is the several freedoms specified under article 87(1). This includes *inter alia* the freedom of navigation, overflight, installing submarine cables, construction of artificial islands, fishing and scientific research. The wording *inter alia* implies a non-exhaustive list of high seas freedoms, and thereby offers States other potential freedoms. One of these freedoms could be the exploitation of 'living marine resources', which is referred to in several parts of the LOSC, for instance in the preamble and in Part VII. MGRs could arguably qualify as such as they are extracted from living organisms of the marine environment. However, the regulations are mainly targeting high seas commercial fisheries in the scope of 'living marine resources', and the provisions are primarily focusing toward utilization and conservation. For instance, the regulations encourage States to set total allowable catch quotas based on maximum sustainable yields and to become members of regional fisheries management

[134] Preamble, para 4 LOSC.
[135] Arianna Broggiato, *supra* note 34, p. 179.

organisations/arrangements (RFMO/As), cf. articles 117-119.[136] As large-scale harvesting of MGRs is not likely, at least for the present time, the regime of high seas fisheries does not seem suitable to govern MGRs.[137]

Although MGRs was not included by the time the LOSC was concluded, a dynamic interpretation of the wording 'living marine resources' supports that the LOSC also encompasses such resources. Hence, part VII itself seems, by a literal interpretation of article 87 and a dynamic approach, to be applicable to MGRs. This provides States a freedom to utilize MGRs as a consequence of being a living marine resource. The key responsibility States have in accordance with the LOSC when utilizing living marine resources is the obligation to have 'due regard' for the interest of other States in accordance with article 87(2). States must also conform to obligations towards environmental protection, see e.g. the general obligation to protect and preserve the marine environment in article 192 and the following provisions in Part XII.[138]

One could in addition argue that States are obliged to set certain standards for and cooperate in the conservation and management of MGRs through article 117 and 118. The final obligations follow from the duty to exercise the freedoms in accordance with the conditions laid down in the LOSC, and to comply with general international law. It would be up to flag States to adopt further measures to regulate the activities set out in these areas.[139] Besides these obligations, Part VII does not regulate or limit access to genetic resources or demand that benefits arising from the utilization are to be shared. The preliminary anticipation would therefore be that within the high seas States enjoy more or less an unlimited freedom to exploit and further utilize MGRs (however, with the notion of due regard of other States). In other words: the high seas regime highly relies on self-regulation. The apparent question in this regard is whether this freedom would also encompass the seabed, which is governed by

[136] See also the United Nations Agreement for the Implementation of the Provisions 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 (Fish Stock Agreement) (adopted 4 August 1995, entered into force 11 December 2001) 2167 UNTS 88.
[137] Joanna Mossop, 'Marine Bioprospecting', The Oxford Handbook of the Law of the Sea, Oxford University Press (2015), p. 7.
[138] States would also have to accommodate duties arising from the general principles of international law, such as cooperation and acting in good faith among other States.
[139] Petra Drankier et al., 'Marine Genetic Resources in Areas Beyond National Jurisdiction: Access and Benefit Sharing', The International Journal of Marine and Coastal Law 27 (2012) p. 423.

the regime of the Area. The answer to this question depends on the applicability of the regime of CHM to MGRs.

3.3.1.2 Applicability of the CHM Regime in the Area

Article 136 of the LOSC states that the 'Area and its resources are the common heritage of mankind'. Resources are further defined in article 133 to mean 'mineral resources.' The provision is thus primarily targeting non-living resources in its definition, such as polymetallic nodules and cobalt rich minerals. As Part XI of the LOSC does not refer to living resources, which are organic by nature, into its definition of 'resources', a literal interpretation suggest that the regime of the Area is not applicable to MGRs.

However, another way to interpret article 136 is by a presumption that the CHM regime is not only applicable to the mineral resources in the Area, but to the Area itself.[140] Support of this interpretation can be found in the preamble of the LOSC stating that 'the area of the seabed and ocean floor and the subsoil thereof, beyond the limits of national jurisdiction, as well as its resources, are the common heritage of mankind.' The Area consist of the 'seabed', 'ocean floor' and the 'subsoil', and although these terms are not defined in the LOSC, an ordinary interpretation implies that both living and non-living resources make up natural components of these areas.[141] By taking this rather contextual approach, the result would be that it is not only the mineral resources that are covered by the CHM, but the entire deep seabed constituting the 'Area', including MGRs.

Still, one cannot underestimate the clear and unmistakable definition of 'resources' in article 133, which defines them, for the purposes of Part XI, to solely include 'all solid, liquid or gaseous mineral resources *in situ* in the Area'. Furthermore, the fact that the entire system of Part XI is targeting mineral resources, including the later amendments to this part, also underscores the argument that the living resources are not included within the scope of Part XI. Hence, this supports the literal interpretation that the CHM, as set out in Part XI, is restricted to mineral resources. Consequently, the contextual and literal interpretation presents us with two different solutions.

[140] Petra Drankier et al., *supra* note 139, p. 401-402, Natalie Y. Morris-Sharma, 'Marine Genetic Resources in Areas Beyond National Jurisdiction: Issues with, in and outside of UNCLOS', Max Planc Yearbook of United Nations Law Online, Volume 20, Chapter 3, Koninklijke Brill NV, Leiden (2017), p. 79.
[141] *Ibid.*, Petra Drankier et al., p. 402.

It could be useful to look into the negotiation history behind Part XI to find support for the legal interpretation.[142] One prominent question that has been brought to light is whether the States would have taken the same approach if the knowledge and awareness of the potential values of MGRs were known at the time the LOSC was drafted.[143] It has been suggested that the negotiating States would have considered MGRs as being part of the Area if they had such information.[144] However, when the convention was drafted, the focus was solely upon exploitation of the mineral resources, and although there could have been an intention to include living resources, this was not done.[145]

As a means of interpretation, one could also investigate the successive practice by the parties of the LOSC with regard to bioprospecting activities of MGRs in the Area.[146] This practice is, however, difficult to trace as most of the utilization of genetic resources have taken place in areas within the States jurisdiction.[147] Still, as illustrated above, MGRs are also captured in the deep seabed, and the potential for exploitation in these ocean areas is remarkable. However, the main factor limiting information of the actual utilization is that only a few States and corporations have been involved with deep-sea bioprospecting, as illustrated above. Based on this it is hard to draw the conclusion that there exists a practice of applying the CHM regime on the bioprospecting activities upon MGRs. What has been done, however, is a continuous objection by the G77 to the 'first come-first served' bioprospecting practice, and a persistent claim that the deep-sea MGRs fall under the CHM regime.[148] While their claim cannot substantiate the inclusion of MGRs under the CHM regime, however, what these States have achieved by taking this approach is at least to prevent the creation of a practice that might lead to an '…agreement of the parties regarding its interpretation.'[149]; i.e. prevent practice from uniformly considering the regime of freedom as applicable.

[142] Dire Tladi, 'Genetic Resources, Benefit Sharing and the Law of the Sea: The Need for Clarity' 13 Journal of International Maritime Law (2007), p. 183. See article 32 of the VCLT.
[143] Fernanda Millicay, 'A Legal Regime for the Biodiversity of the Area', 11 Law, Science and Ocean Management 739 (2007), p. 811.
[144] Natalie Y. Morris-Sharma, *supra* note 140, p. 81.
[145] Fernanda Millicay, *supra* note 143, p. 739.
[146] Article 31 (3)(b) VCLT.
[147] Sophie Arnaud-Haond et al., *supra* note 47, p. 452.
[148] See *inter alia* the Statement on behalf of the Group of the Group of 77 and China at 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 (31 May 2011), retrieved from http://www.g77.org/statement/getstatement.php?id=110531 19 June 2018.
[149] Article 31 (3)(a) VCLT.

What can be determined based on this assessment, is that Part VII appears to represent the current state of law with regard to the legal regime applicable to MGRs in the water column, and this appears to be consistent with the current bioprospecting practice.[150] Whether the CHM applies to the deep-sea living resources is not a clear-cut, as there are compelling arguments *pro* and *contra* to whether the CHM principle applies *lex lata*.[151] However, based on the diverging views in the political forums between the States on which legal regime is (most) applicable to MGRs in ABNJ, it is hard to believe that this disagreement can be resolved solely by the interpretation of the convention text itself.

3.3.1.3 Applicability of the Regime of Marine Scientific Research

An additional regime that potentially could regulate States' right to access and utilize MGRs is the regulations of marine scientific research (MSR), outlined in Part XIII of the LOSC. MSR is one of the freedoms of the high seas,[152] and States are allowed to undertake scientific research in the Area in coherence with Part XI.[153] According to article 238, 'All States' and 'competent international organizations' are entitled to conduct MSR in in compliance with the conditions laid down in the convention. Furthermore, as MSR is a freedom of the high seas, there is generally a notion of due regard, as stated in article 87(2)[154]. This freedom must be conducted only 'for peaceful purposes' and comply with the general principles prescribed by article 240. In order to determine whether this high sea freedom is applicable, it must be decided whether bioprospecting qualifies as 'marine scientific research', and thereby falls within the scope of part XIII.

There is a lack of a legal definition of 'marine scientific research' within the LOSC or any other convention. A natural interpretation of the term 'scientific research' could imply a systematic study and examination of any source or material, by use of accepted scientific procedures and methods.[155] The term 'marine' further states that the specific research conducted must be directly related to the oceans, and that MSR is a subcategory of 'scientific research'. One definition that has been suggested and applied by legal scholars is 'any form of

[150] See e.g. Petra Drankier et al, *supra* note 139.
[151] For a further review of the discussion of applicability of the CHM regime, see e.g. Tullio Scovazzi, *supra* note 100, Petra Drankier et al, *supra* note 139. See also an extensive analysis by Konrad J. Marciniak, *supra* note 96.
[152] Article 87 (1)(f) LOSC.
[153] See in particular articles 256 and 257 LOSC, relevant to ABNJ.
[154] and this freedom must be conducted with due regard to general requirements from international law.
[155] See definitions of 'scientific' and 'research' at Oxford living dictionaries, retrieved from https://en.oxforddictionaries.com/definition/scientific and https://en.oxforddictionaries.com/definition/research 9 August 2018.

scientific investigation, fundamental or applied, concerned with the marine environment, i.e. that has the marine environment as its object'.[156] This definition suggests the inclusion of a variety of activities, with the research and discoveries related to the oceans as the overall purpose with the activity. It also implies that one must not necessarily distinguish between the pure and applied forms of research.

Examining the convention's object and purpose in relation to MSR could help determine the closer content of MSR. The provisions in Part XIII, including article 143 applicable to the Area, appear to mainly address the pure or basic types of scientific research, which has the intention of e.g. to increase knowledge of and understand the marine environment for the benefit of all mankind.[157] MSR shall also be conducted for peaceful purposes on the high seas in accordance with article 240(a). This could indicate that the object and purpose of the LOSC is to include the types of research that does not benefit self-interest, but mankind as a whole, as a public interest. However, a reference to both applied and pure research can be traced within the articles 246 and 252, which regulates when consent of the coastal State is needed to conduct research in the EEZ or on the continental shelf.[158] According to article 246(5)(a) the States are able to withhold their consent if MSR 'is of direct significance for the exploration and exploitation of natural resources, whether living or non-living'. In this respect, the LOSC appears to distinguish between research that are considered beneficial for all humankind and the type of research mainly targeting utilization of resources to benefit single States or entities. Hence, reading the provisions of Part XIII together, a contextual interpretation suggests the inclusion of both pure and applied research within the regime of MSR within the LOSC.[159]

With an investigation of the preparatory works behind Part XIII of the LOSC,[160] there appears to have been attempts to enclose a definition of MSR, but no such definition was ultimately adopted due to difficulties in deciding whether to distinguish between pure or applied research.[161] Another reason is that States were in the opinion that the term would be

[156] Patricia Birnie, 'Law of the Sea and Ocean Resources: Implications for Marine Scientific Research' 10 International Journal of Marine and Coastal Law (1995), p. 242, see also this definition applied by Tim Stephens and Donald R. Rothwell in 'Marine Scientific Research', The Oxford Handbook of the Law of the Sea, Oxford University Press (2015), p. 2.
[157] Article 246(3) LOSC.
[158] Natalie Y. Morris-Sharma, *supra* note 140, p. 91.
[159] Tullio Scovazzi, *supra* note 100, p. 18.
[160] Article 32 VCLT.
[161] Myron Nordquist, United Nations Convention on the Law of the Sea, 1982: A Commentary. Articles 192 to 278, vol. IV (Martinus Nijhoff, Dordrecht, 1991), pp. 434–450.

sufficiently defined through a systematic interpretation of the articles in Part XIII.[162] It could perhaps also be argued that it could have been the intention of the States to leave MSR undefined in the LOSC, in order to not restrict the activities combined with it. As illustrated by this review, it appears to there is no clear answer in international law on the question of whether MSR encompasses both pure and applied scientific research. What appears to be clear, however, is that pure research is included in the scope of MSR, and it all hinges on whether the LOSC regulates scientific research that is commercially oriented or not. As interpreting the provisions of the LOSC is not sufficient to arrive at a clear solution, it might be helpful to turn towards an analysis of the nature of bioprospecting.

There is a debate about the content of bioprospecting, and no universally established definition can be found in this regard either.[163] This activity has, however, been referred to by the UN Secretary-General as 'the search for biological compounds of actual or potential value to various applications, in particular commercial applications'.[164] This seem to be a plausible interpretation, as by looking at the nature of bioprospecting, this activity might involve both sampling and extraction of genetic material, which could potentially lead all the way to commercializing of products. Hence, bioprospecting might comprise elements of both pure and applied forms of MSR, and it could be difficult to place it within one of the categories. This long chain of activities might also contain different researchers from both the private and public sector, e.g. universities or research institutions, and sometimes major cooperative research projects across numerous research institutions, creating a mix of both pure and applied research.[165] Thus, the distinction between the different forms of research is not necessarily straightforward. Nevertheless, even if only pure research were to be considered as MSR, one can determine that at least elements of bioprospecting overlaps with the MSR regime.

Different forms of research do not only occur in relation to bioprospecting activities. Other areas within scientific research may also serve other purposes. For example, commercial researchers in the field of fisheries targeting the migratory patterns and nature of fish stocks may also be of interest for climate researchers who attempt to understand impacts of climate change in relation to marine species in the oceans. Hence, both pure and applied research

[162] Tim Stephens and Donald Rothwell, *supra* note 156, p. 3.
[163] David Leary et al., *supra* note 43, p. 184.
[164] United Nations Secretary-General, 'Oceans and the Law of the Sea: Report of the Secretary-General' (A/62/66, United Nations, 2007), at para. 105.
[165] David Leary et al., *supra* note 43, p. 184.

appears to be conducted within several areas of MSR. The reality is that the pure forms of research often form the basis to conduct the more commercially oriented forms of research.[166] In terms of bioprospecting, it is likely that it contains both, and that its content can only be decided upon case by case. However, if one were to determine that bioprospecting, as a combination of pure and applied research is included within the scope of MSR, the next question is how bioprospecting interacts with the existing obligations of MSR in the LOSC. One distinct feature with MSR is that activities undertaken in accordance with the regime of MSR 'shall not constitute the legal basis for any claim to any part of the marine environment or its resources'.[167] What may be interpreted by this provision is that MSR cannot at any level be used as a legal basis for any claim, which is also consistent with the promotion of peaceful uses of the seas.[168] Bioprospecting companies are often interested in securing their inventions through intellectual property rights (IPRs).[169] The concrete act of patenting could by an ordinary interpretation be understood as containing elements of sovereignty. Thus, if a bioprospecting company intend to make e.g. the 'resources' themselves subject to patents, they might be proceeding in conflict with these provisions.[170] On the other hand it could be argued that there is no claim of sovereignty as the protection of patent rights is only valid for certain time.

Considering bioprospecting under the regime of the Area also brings up another question. A key provision regulating MSR in the Area is article 143, stating that marine scientific research in the Area shall be conducted for the 'benefit of mankind as a whole'. The interpretation of these wordings implies that for the purpose of the Area, any research conducted in this maritime zone must be conducted for the benefit of mankind as a whole. This would have the implication that MSR does not include single researchers profiting on their own benefits with the research. Nevertheless, this argument goes both directions, as many (although commercially motivated) discoveries are in fact driven on the basis of creating and developing drugs advancing the entire humanity. However, a notion with regard to MSR in the Area (in light of the issue above of whether both living and non-living resources are included in Part XI) is that the provisions do not distinguish between the types

[166] Tim Stephens and Donald Rothwell, *supra* note 156, p. 2.
[167] Article 241 LOSC.
[168] Article 240(a) LOSC.
[169] For instance, 'products and processes can be patented according to article 27(1) of the TRIPS agreement. See a further review in Ane Jørem and Morten W. Tvedt, 'Bioprospecting in the High Seas: Existing Rights and Obligations in View of a Legal Regime for Marine Areas beyond National Jurisdiction', The International Journal of Marine and Coastal Law (2014), p. 332. (pp. 321-343).
[170] Petra Drankier et al., *supra* note 139, p. 397.

of 'resources' subject to research.[171] This calls for an inclusion of genetic resources within the scope of Part XI with regard to MSR.[172]

A third problem is that the regime of MSR is promoting transparency among the scientific community. For instance, States and the competent international organisations are obliged to publish and disseminate knowledge resulting from MSR and promote the flow of scientific data and information.[173] This requirement could create challenges for researchers and commercial entities seeking to hold information about their inventions confidential, at least before establishing patents. However, the wordings 'States and competent international organisation […] shall […] make available by publication and dissemination' could imply that States are only responsible for adapting legislations that encourages the publication of information and knowledge, as they are arguably not able to keep track of all the research going on in their countries.[174] Hence, this argument could also go both directions.
After an examination of the applicability of the MSR regime, we are left with several uncertainties. The preliminary conclusion is that the regime of MSR provides a potential, but currently incomplete regime to govern MGRs exploited through bioprospecting activities.

3.3.2 Applicability of the CBD and the Nagoya Protocol

As already mentioned above, the CBD and its Nagoya Protocol can be considered as the main instruments regulating genetic resources. The legal instruments also contain a system of ABS of both terrestrial and marine genetic resources. As one of its three main pillars, the CBD aims at creating 'fair and equitable sharing of the benefits arising out of the utilization of genetic resources', in addition to 'appropriate access to genetic resources.'[175] This convention seems, at first sight, applicable to MGRs in ABNJ.
However, the major shortcoming is found in the jurisdictional scope of application in article 4(a) of the CBD. As it is limited to 'components of biological diversity' within national jurisdiction, it is mainly applicable to MGRs found within States territorial seas, EEZs or continental shelves, and not to MGRs in ABNJ.[176] Nevertheless, the convention is applicable to 'processes and activities, regardless of where their effects occur'. This must be carried out under the jurisdiction or control of a State party. A natural interpretation implies that MGRs

[171] See articles 143(1) and 143(3) LOSC.
[172] Thomas Greiber (2011), *supra* note 33, p. 14.
[173] Article 244 (1) and (2) LOSC.
[174] Ane Jørem and Morten W. Tvedt, supra note 169, p. 333.
[175] Article 1 CBD.
[176] Petra Drankier et al., *supra* note 139, p. 409.

might be subject to the activities conducted in ABNJ under the CBD. This could arguably include bioprospecting activities or processes within MSR, as long as these are performed under the control or jurisdiction of a State that is member of the CBD.

Article 15 of the CBD introduces the concept of ABS of genetic resources, and the provision aims to maintain the rights and obligations of users and providers. Based on the entire system of the CBD, this convention might arguably have limited applicability to MGRs in ABNJ. Although the scope in article 4 of the CBD and article 3 of the Nagoya Protocol does not deny applicability to 'processes and activities' in ABNJ, it appears from the articles 15.1, 15.4, 15.5 of the CBD and Articles 5 and 6 of the Nagoya Protocol that ABS of genetic resources is mainly built upon bilateral approaches, which can be seen by the references to e.g. prior informed consent and mutually agreed terms, and the sovereignty of States over their natural resources.[177] Another factor underscoring the absence of regulating MGRs in ABNJ is the lack of practice towards States adopting legislation in accordance with article 4 (a) upon their bioprospecting activities beyond national jurisdiction.[178] One could ask whether this implementation gap is made by choice in order to not prevent investments in bioprospecting, which requires large public investments.[179]

Article 10 of the Nagoya Protocol states that the 'Parties shall consider the need for and modalities of a global multilateral benefit-sharing mechanism to address the fair and equitable sharing of benefits derived from the utilisation of genetic resources […] for which it is not possible to grant or obtain prior informed consent.' The wording 'not possible to grant or obtain prior informed consent' implies that the provision could be applicable to areas beyond national jurisdiction. Hence, the article opens up the possibility for the parties of the CBD and the Protocol to construct a multilateral benefit sharing mechanism for genetic resources located beyond domestic areas. However, taking into consideration that the objective of the protocol, enshrined in its preamble, points towards 'the sovereign rights of the States over their natural resources and according to the provisions of the Convention', and the fact that article 3 in the protocol limits its scope to genetic resources to article 15 of the CBD, it is

[177] Arianna Broggiato et al., *supra* note 34, p. 179.
[178] Arianna Broggiato 'Marine Genetic Resources Beyond National Jurisdiction – Coordination and Harmonisation of Governance Regimes' Environmental Policy and Law, 41/1 (2011), p. 38. Salvatore Arico and Charlotte Salpin, 'Bioprospecting of Genetic Resources in the Deep Seabed: Scientific, Legal and Policy Aspects', United Nations University, Institute of Advanced Studies (UNU-IAS) Report, p. 38.
[179] Arianna Broggiato, *supra* note 178, p. 36.

problematic to state that the protocol applies outside the frames of the CBD, which is mainly concentrated towards areas within national jurisdiction.[180]

Based on this review, it is clear that these regimes mainly regulate MGRs within national jurisdiction. Although there are certain links to their applicability to ABNJ, the regulations within the CBD and Nagoya Protocol have left the States with uncertainties towards the legal status of MGRs in ABNJ.

4 The Potential Scope of the Implementing Agreement

Having established some of the scientific, legal, and ethical concerns related to MGRs in ABNJ, this chapter moves on to elaborate on the future and potential scope of the ILBI. The normative basis set out by the future instrument will be an important guiding factor for the scope of application, interpretation and further compliance by the international and scientific community. In order to examine this possible normative basis, the chapter examines selected, but central aspects within the scope of the new implementing agreement. Firstly, the chapter examines what overarching legal principle could govern MGRs. Secondly, the chapter investigates how an ABS regime could be developed by drawing upon lessons from other ABS modalities and regimes. Finally, the chapter examines key issues in relation to the legal definition and material scope of MGRs.

4.1 Determining the Legal Principles – Prospects and Challenges

The first step in deciding the normative basis of the new implementing agreement, is to determine what legal principles should govern MGRs in ABNJ. As presented above, it has been decided that the new implementing agreement shall be created under the auspices and framework of the LOSC, including the MGRs in ABNJ.[181] Such an outcome is natural as this convention establishes the 'legal order of the seas and oceans'[182], and should, at least in theory, be capable of regulating all maritime activities and matters related to the oceans. However, as illustrated in the following section, the negotiators of the new ILBI face certain constraints in their subject to choose a legal regime for MGRs, as any ABS regime for MGRs must be implemented in coherence with existing obligations arising from the LOSC.

[180] Bevis Fedder, *supra* note 45, p. 51.
[181] See e.g. UNGA A/RES/69/292 (19 June 2015).
[182] Preamble, para 4 LOSC.

4.1.1 A Freedom of the High Seas or a CHM?

A question that is left unanswered is whether the ILBI, with regard to MGRs, will apply to both the Area and the high seas, or only to the Area.[183] This refers to the question of whether the high seas or CHM regime applies to MGRs, and this question has been left unanswered for over a decade. The BBNJ Working Group has faced this 'ideological divide' regarding the legal status of MGRs in the Area since they first met in 2006, and it turned out to be one of the dominant issues during the successive meetings.[184] The PrepCom was also unable to find the answers to this principled issue, and it remains unsettled when the States are about to meet decide upon the substantive questions of the ILBI in the intergovernmental conference in September 2018.

If the geographical scope of MGRs would cover the entire ABNJ, one option is to apply both legal regimes according to their respective maritime zones. As for the genetic resources floating in the water column beyond national jurisdiction, the freedom of the high seas would continue to prevail, and the CHM regime govern the MGRs found in the Area. Such solution does, however, actualise certain question regarding the very nature of MGRs. They are migratory of nature as they are capable of moving both vertically and horizontally.[185] Thus, they can both travel between areas beyond and within national jurisdiction, and between the deep seabed and the water column. Hence, it would be necessary to make a distinction as to which part of the ABNJ the different MGRs belongs to – the seabed or the superjacent water.[186]

The guidance for doing such geographical delineations could perhaps be found in an extensive interpretation and definition of the term 'seabed', 'ocean floor' and 'subsoil', against the 'water column', which is currently left undefined within the LOSC. These terms could be defined and implemented within the forthcoming agreement, based on guidance for legal interpretations in the VCLT. Some important questions appear in this regard: What components constitute the 'seabed'? Does this only include the hard or solid components, such as benthos, or are water, natural gasses and liquid, which are constantly interacting with the seabed, also included in the scope of the 'seabed'? One question refers to 'hydrothermal

[183] See the ABNJ defined in section 2.2.1.
[184] See for instance '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' *supra* note 101, p. 5, para 15.
[185] Arianna Broggiato et al., *supra* note 34, p. 179.
[186] A geographical delineation would also need to be made between coastal States extended continental shelves and the water column, and between the extended continental shelves and the Area. Many extended continental shelves have yet to be delineated and concluded, in particular within the Arctic Ocean.

vents' containing water and gasses flowing into to the water column. Would the water flowing from the vents belong to the seabed or the water column?[187] Another question refers to how to delineate so-called 'brine pools', pools on the deep ocean floor with an identifiable surface and shoreline.[188] Questions also appear in terms of living marine resources (being interesting for bioprospecting due to their genetic material), such as certain species living parts of or their entire life at the seabed.[189] Should these belong to the regime of the deep seabed or the water column? Could a solution be to consider certain species that live parts of or their entire lives in physical contact with the seabed in ABNJ as part of the regime of 'sedentary species', by analogies?[190] The LOSC is familiar with living marine resources being capable of migrating or straddling between maritime zones.[191] It is, however, evident that MGRs challenge the existing rules as they are exploited for their genetic properties rather than in which maritime zone they are found, or which life cycle they find themselves at.[192] Hence, making all of these delineations would not be a straightforward task, and it would require significant scientific expertise and guidance. The apparent question with regard to MGRs is thus whether a two-traced approach is justifiable given their complex and diverse nature.

Another option is to create a uniform legal regime for MGRs in ABNJ. Taking into consideration that MGRs are already a part of the regime of the high seas with regard to the water column[193], the likely outcome in this situation, appear to be that the freedom of the high seas would establish the legal basis for the entire ABNJ. This is mainly because the applicability of the CHM to the deep-sea genetic resources is somewhat uncertain.[194] This is why the debate within the BBNJ negotiations mainly centres around whether the CHM or the freedom of the high seas' regime is applicable to the deep-sea genetic resources. This is arguably also because the MGRs situated within the deep sea-bed of the oceans have exposed particular interesting novel properties and have caught significant interest for bioprospecting

[187] Petra Drankier et al., *supra* note 139, p. 406. See also Alex G. Oude Elferink, 'The Regime of the Area: Delineating the Scope of Application of the Common Heritage Principle and Freedom of the High Seas', The International Journal of Marine and Coastal Law, Vol 22, No 1 (2007), pp. 143-176.
[188] *Ibid.*, Alex G. Oude Elferink, p. 148. Due to the amount of salt in the water, these pools contain higher density than the adjacent water in the ocean.
[189] In terms of living marine resources, or biological resources, it would be necessary to decide upon the relationship to MGRs both geographically and materially. The material relationship is discussed further down in section 4.3.3.
[190] Article 77(4) LOSC.
[191] See for instance straddling fish stocks and highly migratory species being dealt with in article 63 and 64 of the LOSC (and particularly within the Fish Stock Agreement).
[192] Natalie Y. Sharma-Morris, *supra* note 140, p. 86.
[193] See authors confirming this in e.g. Petra Drankier et al., *supra* note 139, p. 407.
[194] Although, this is a matter of political consensus in the end.

entities.[195] There are considerations calling for the creation of a single regime for MGRs: First and foremost, the negotiators would avoid confronting several of the difficult delineations mentioned above. Second, scientific entities conducting bioprospecting in both the water column and the seabed would arguably prefer a uniform regime, by way of a freedom to exploit the MGRs. However, with regard to an ABS policy, the legal regimes establish the opposite basis: The freedom of the high seas regime represents the status quo where existing practices for marine bioprospecting continues rather unchanged, with no specific requirements of benefit sharing[196]. On the other hand, the CHM regime, stipulates equity between developing and developed States and sets out extensive benefit-sharing arrangements.[197] Hence, the crucial difference in the maritime zones set out by the LOSC will in any case have fundamental importance for an ABS regime.[198]

4.1.1.1 A Pragmatic Solution for the Regulation of MGRs?

Another option the negotiating States could depend on is the more 'pragmatic approach whereby progress in the negotiations does not depend on the determination of the legal status of [MGRs] in [ABNJ]'[199]. The EU suggested this, and the core of their argument is that determining the legal status of MGRs is not a requirement for addressing relevant provisions concerning a possible ABS regime in the ILBI. By taking such approach, ABS is used in the negotiations to try to find a middle way among the different views and would be developed as a *sui generis* regime. Indeed, it can be agreed upon that ABS solutions can be discussed separately from the legal principles governing such a regime.

Nevertheless, a solution where the negotiators designates an ABS regime with no reference to or coordination with the overarching legal principles set out by the LOSC itself is questionable, both from a legal and a political point of view.[200] Even though the CBD and the Nagoya Protocol establishes a unique system for ABS, it is coordinated with the regulations set out by the LOSC, which would also prevail in the case of conflict.[201] With the ILBI being

[195] See information about this in chapter 2 above.
[196] Through a freedom of exploiting the living resources on the high seas stipulated through article 87 of the LOSC.
[197] See *inter alia* articles 140(2), 142(2) and 143(3)(c) LOSC. One notion to be made is that article 140(2) requires that the resources are subject to 'the equitable sharing of financial and other economic benefits', implying that both monetary and non-monetary benefit sharing is a premise.
[198] Petra Drankier et al., *supra* note 139, p. 417.
[199] Written submission of the EU and its member States, 'Marine genetic resources, including questions on the sharing of benefits', 22 February 2017.
[200] Natalie Y. Morris-Sharma have also expressed concerns for such approach, see *supra* note 140, p. 84.
[201] See article 4(3) Nagoya Protocol.

subject to the structure of the LOSC, the inherent zonal approach in the convention sets the outer frames of what fundamental principles that might govern the implementing agreement.[202] One must thus ask the important question of whether it is possible to create an ABS regime without determining the legal status of the MGRs. If, however, the negotiators are able to find a pragmatic solution that would not be conflicting with the obligations arising from international law, such approach would be highly welcomed. The positive aspect of employing a tactic like this, is that it provides for flexibility and creativity in the designation of a regime to govern the MGRs, especially if ABS is the main focus of it.

Leary has expressed his concerns that the fundamental divide in the States' views towards the legal regimes applicable, can never be bridged, as neither side will be able to convince the other with their perception of the correct interpretation of law.[203] Whether this statement is true or not will depend on the negotiations in the following years to come. The minimum hopeful outcome, which also seems likely, is that the States succeed to arrive at a compromise solution, in the arrangement of a package deal. Such compromise was made by the adoption of the LOSC, and there is reason to believe that it can be achieved in the negotiations of the new ILBI as well.

4.1.2 Could the Regime of MSR be a Reliable Pathway?

An alternative solution States could take advantage of is to regulate the future governance of MGRs within the already existing regime for MSR in the LOSC. These regulations may in addition provide a bridge across the issues surrounding the two maritime zones in ABNJ.[204] The MSR regime could be a desirable option as it would prevent the States from having to choose between the freedom of the high seas and the CHM regime for the genetic resources located in the Area. One particular feature making this regime attractive, is the presence of several non-monetary benefit-sharing obligations[205], which are presented further down. Other considerations calling for such solution are; first of all, that the LOSC itself strongly encourages its State parties to promote MSR;[206] second, there are important provisions on capacity building and technology transfer related to the MSR regime that would be given full

[202] Unless amending the LOSC itself, which does not seem to be a reliable solution.
[203] David Leary, 'Moving the Marine Genetic Resources Debate Forward: Some Reflections', 27 Int'l J. Marine & Coastal Law (2012), p. 440.
[204] Natalie Y. Sharma, *supra* note 140, p. 90.
[205] See e.g. articles 242-244 LOSC.
[206] See *inter alia* the preamble, section 3 of Part XIII, and article 239 LOSC.

effect[207]; finally, MSR in itself also serves as a major benefit not solely for the mankind, but also for our planet, providing e.g. environmental, social, health and economic benefits.[208] Thus, by incorporating bioprospecting into this regime, it could turn out to be a progressive development towards such a promotion.

However, as illustrated above, there are many issues that appear when asking whether bioprospecting can be subsumed under the MSR regime, and several uncertainties will have to be sorted out. The main problem seems to be the continuously lack of legal definitions of both MSR and bioprospecting, as no uniform interpretations of these terms exists between either States or commentators. Another set of issues are the potential conflicts with obligations arising from IPRs.[209] One particular question appears with regard to the potential different treatment of MSR in the Area, which must be conducted for the benefit of mankind as a whole.[210] The implications of this provision is not completely clear, but it could imply that the LOSC itself would require that benefits from all MSR activities in the Area must be shared with the entire mankind, while there are not the same requirements in the water column. This could bring up several of the same questions as have been raised with regard to delimiting the deep-sea genetic resources and those found in the water column. Bearing these questions and concerns in mind, the negotiators have several alternatives for how to create and implement a regime to govern MGRs in ABNJ based on the provisions of MSR.

One option is to create a definition of MSR in the implementing agreement that includes bioprospecting within its scope. This could, for instance, be done through an agreed interpretation of the MSR provisions in the LOSC to clarify the relationship between the two types of marine research.[211] The negotiators would also have to decide upon whether the reinforced scope and definitions of MSR would apply to both the water column and the seabed. A definition of MSR could then be adopted to encompass both fundamental and commercial oriented research. However, this solution could risk opening up discussions of the content of the LOSC itself.[212] One may rise questions regarding the likelihood of the

[207] See e.g. Part XIV.
[208] Arianna Broggiato et al., *supra* note 9, p. 11. See also DOSI Deep-Sea Genetic Resources Working Group, *supra* note 130, p. 1. MSR is particularly important with regard to the future ILBI as a means to gather data and monitor potential impacts on human activities in the deep sea.
[209] See generally about this debate, Ane Jørem and Morten W. Tvedt, *supra* note 169, Petra Prankier et al. *supra* note 139, Angelica Bonfanti and Seline Trevisanut *supra* note 119.
[210] According to article 140, MSR in the Area must be conducted in conformity with Part XI and 'for the benefit of mankind as a whole', and benefits derived from activities in the Area shall be shared equitably.
[211] Petra Drankier et al., *supra* note 139, p. 424.
[212] *Ibid.*

negotiating States being able to agree upon this contentious issue, as they were not able to do so when the convention was negotiated. However, if the negotiators are able to agree upon bioprospecting being included within the definition of MSR, it could have implications for the manner of which States and bioprospecting companies are able to execute their activities.[213] For instance, activities related to patenting of MGRs could arguably be prohibited in the Area.[214] One way to solve this could be to agree that certain provisions in Part XIII (or Part XI for that matter) are not applicable with regard to the implementing agreement. However, a concern is that we would end up with a fragmented system of MSR, which in the end would be counterproductive to the object and purpose of MSR.[215]

Another option is to differentiate between the stages of conducting research upon MGRs in its pure form, and when the activity turns out to be commercially oriented. In terms of MGRs, this could be done by way of a temporal dimension between when genetic material is accessed and used for the purpose of fundamental research, and when the genetic material is further utilized for its properties and novelty to research and development of commercial products. This would have the consequence that the provisions regarding MSR would apply fully in terms of pure research, and additional requirements would need to be created for the commercial research. Some scholars have referred to the intention of the researcher[216], or distinguish between public and private funded research as the main impetus for delineating between the different forms of research. However, such distinctions could be challenging for several reasons. For instance, how would the intention of the researchers be regulated if there is a legal person doing the research?[217] Must the intention of the research be clarified before accessing the resources, or could it be determined at a later stage?[218] Another difficulty is that research projects are to a larger extent being funded by both private and public investors (and particularly by industrial partners), creating a mixture of basic and commercial research.[219]

[213] See for instance Joanna Mossop, *supra* note 137, p. 6.
[214] Article 137(1) LOSC.
[215] In this regard, particular concerns are given with regard to amendments or exceptions that potentially could be conflicting with article 311(6).
[216] See for instance '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', UN Doc UNEP/CBD/SBSTTA/8/INF/3/Rev.1 (22 February 2003), at para. 39.
[217] Ane Jørem and Morten W. Tvedt, *supra* note 169, p. 331.
[218] *Ibid.*
[219] David Leary et al., *supra* note 43, p. 184. This distinction becomes even blurrier the further within the chain of research and discovery the research process find itself at.

However, if such distinction is desirable, it would require certain prerequisites that ensure equal treatment, predictability and traceability for the scientific community.

A final alternative is to separate between the different ways to approach the genetic resources. Most of the MGRs that are accessed *in situ*, are studied by researchers conducting research with pure intentions. The change from pure to commercialised research could be occurring at a later stage, or in another format, as the utilization of resources often materialises from *ex situ* or *in silico* research.[220] Hence, one could distinguish between the regulation of access and the regulation of utilization of MGRs. This could be done by simply treating the *in-situ* access to MGRs within the already existing regime of MSR, and the *ex situ* and *in silico* utilization of MGRs within a *sui generis* regime created for bioprospecting. One could, however, question the practicability of this solution with regards to future developments and potential changes within the traditional research technologies.[221] Hence, in order to develop such approach, it would require that the scientific community are actively included in the creation and development-process of such arrangement, as they have the best prerequisites to suggest the functional and reliable solutions. Nevertheless, taking this approach would be consistent with the provisions of MSR being applicable to the living resources located *in situ* in the Area.[222] Furthermore, making a differentiation between access to and utilization of MGRs could also constitute a natural link to a suggestion offered by Broggiato and others[223], where it has been recommended to regulate the closer ABS of MGRs through a similar differentiation. A closer review of their proposal is given further down in section 4.2.

4.1.2.1 Relevant Benefit-Sharing Mechanisms within the MSR Regime

Part XIII contains several provisions with requirements of non-monetary benefit sharing, and some of these are already mentioned above. These rules are, to a certain extent, given effect in practice, and could provide as a useful tool to increase research capabilities and advancements in science among States.[224] Article 244(1) of the LOSC obliges States to 'make available by publication and dissemination through appropriate channels information on proposed major programmes and their objectives as well as knowledge resulting from marine scientific research.' Similarly, article 244(2) also promotes 'the flow of scientific data and information

[220] Arianna Broggiato et al., *supra* note 9, p. 17 and 22 and Marjo Vierros et al., *supra* note 125, p. 6.
[221] Besides, *ex situ* and *in silico* access are not necessarily always commercial oriented, which could make the distinction between access and utilization more difficult.
[222] See article 133 and 143. That is, if Part XI is considered to encompass MSR in the Area upon living marine resources.
[223] Arianna Broggiato et al., *supra* note 9, pp. 3-33.
[224] Arianna Broggiato, *supra* note 34, p. 180.

and transfer of knowledge' achieved from MSR. This include that the States are obliged to conduct their scientific work in a transparent fashion. Facilitating and promoting that 'knowledge, data and biological samples' are widely accessible, is crucial to ensure advancements in research in general and would benefit the entire humanity.[225]
A way to ensure openness within the scientific community is by facilitating application and availability of databases, biobanks and collections of e.g. genomes, sequences and other novel properties of MGRs.[226] For instance, the InterRidge Code of Conduct for Responsible Practices at Deep-Sea Hydrothermal Vents[227] highly promotes public sharing of information, data and knowledge related to marine research, and has *inter alia* established open databases and national ridge programs.[228]

Another important provision in Part XIII is that 'States and competent international organisations shall '[…] promote international co-operation in marine scientific research for peaceful purposes.'[229] Article 143 also prescribe a specific obligation to cooperate towards MSR in the Area. Taking deep-sea MSR as an example, pioneers in facilitating international cooperation within deep-sea research, are the International Network for Scientific Investigation of Deep-Sea Ecosystems (INDEEP) and the Ocean Stewardship Initiative (DOSI)[230], and these and other units can be used as a source of information, assistance and expertise. Part of the commitments of international cooperation is also to produce research best practices[231] within the scientific community, which establishes a natural link to capacity building. An example of such tool is the Consortium of European Taxonomic Facilities' (CETAF) Code of Conduct & Best Practices on ABS[232] (which applies to areas within national jurisdiction). Cooperation could also consist of facilitating entrance to deep-sea

[225] As enshrined in article 143. With regard to research programmes, it would be important to be aware of future projects, both for potential investors and for researchers considering starting a research and would not want to waste effort on research projects that has already been conducted.
[226] However, there would need to be certain procedures to avoid that innovations are being enclosed.
[227] InterRidge's Code of Conduct on responsible behaviour at hydrothermal vents, retrieved from http://www.interridge.org/node/16908 20 August 2018.
[228] Arianna Broggiato et al., *supra* note 34, p. 180.
[229] Article 242(1) LOSC. See also article 243 in this regard.
[230] International Network for Scientific Investigation of Deep-Sea Ecosystems (INDEEP), retrieved from http://www.indeep-project.org 22 August 2018 and Ocean Stewardship Initiative (DOSI), retrieved from http://dosi-project.org 22 August 2018.
[231] For instance, "Best practices" according to article 8 of the EU Regulation 511/2014 are procedures, tools or mechanisms, developed and monitored by associations of users or other interested parties, which – when effectively implemented – help users of genetic resources to comply with the obligations of the EU ABS Regulation.
[232] Consortium of European Taxonomic Facilities (CETAF), 'Code of Conduct & Best Practices: Exploring and Documenting Diversity in Nature', retrieved from https://cetaf.org/sites/default/files/final_cetaf_abs_coc021015_0.pdf 22 August 2018.

infrastructure and to allocate the significant expenses in accessing the deep sea in ABNJ between the different stakeholders involved.[233] Transfer of marine technology is another crucial element to support enhanced participation and strengthened research capacity of the developing States.[234]

After a review of some of the provisions of Part XIII and Part XIV of the LOSC, it is evident that there are already several benefit-sharing mechanisms provisions inherently vested, and operational, within the regime of MSR in the LOSC. These could form a natural platform to develop further mechanisms and regimes specifically designed and modified to the bioprospecting industry. However, further implementing principles would be vital to provide the complete guidance and operationalization of an ABS regime.

4.2 Establishing a Potential ABS Regime

If the negotiators are determined to employ an ABS policy (regardless of which overarching legal principles chosen by the negotiating States in the end), it would be necessary to establish a regime, or system, specifically addressing ABS. Several legal instruments provide for ABS regimes, and many of these specifically regulate genetic resources. As revealed above, the CBD and its Nagoya Protocol are the main legal instrument providing the domestic governance over genetic resources. In addition to these, the FAO Treaty constitute an important source for inspiration.[235] The intention of this section is to draw inspiration from some of the existing and potential ABS modalities and regimes, and based on these identify the following; first, minimum requirements for a fair ABS regime; second, certain institutional aspects of such regime; finally, the type of benefit to be shared.

One point of departure could be to develop a 'global multilateral benefit-sharing mechanism' similarly to what is described in article 10 of the Nagoya Protocol.[236] The core characteristic of such a multilateral system is that the benefits derived from genetic resources found in ABNJ are to be shared on a multilateral basis (between all States). This implies that where

[233] DOSI Deep-Sea Genetic Resources Working Group, *supra* note 130, p. 1
[234] See Part XIV. Many of the principles in the regime of MSR is also enshrined in the Sustainable Development Goal 14, target 8.
[235] Another important legal instrument with regard to ABS, is the Pandemic Influenza Preparedness (PIP) Framework, created under the direction of the World Health Organization (WHO) in 2011. Although this legal framework is not further discussed in this thesis, it could contain several relevant mechanisms for the ILBI.
[236] In addition to the Nagoya Protocol, article 15(7) of the CBD indirectly refers to a multilateral benefit sharing approach, by way of the financial mechanism set out by the convention, see Thomas Greiber et al., *supra* note 70, p. 127. In addition, Part IV of the FAO Treaty also establishes a multilateral system for the sharing of benefits arising from plant genetic resources, which could be used as a source for inspiration.

terms are negotiated on a case-by-case within national jurisdiction, access is guaranteed upon certain pre-determined conditions in a multilateral regime.[237] A further way to operationalise such regime could be to employ a so-called open access (OA) principle, as is being encouraged by Broggiato and others.[238] Such an approach favours that access to genetic resources is facilitated, but qualified on the basis that the States agree to publish and discharge samples, information and raw data related to the genetic resources. This means that there are certain benefit-sharing requirements for being granted access to the resources.

The key element within the OA is that *in situ* access to MGRs is based on notification, which is provided through the electronic system 'Obligatory Prior Electronic Notification' (OPEN),[239] rather than authorisation[240]. Hence, the multilateral benefit sharing system is built upon transparency and could facilitate the establishment of open databases for storage and sharing of information. Raw data and information could, for instance, be stored by using so-called 'clearing house mechanisms', that is, mechanisms for global information-sharing[241], and could be made available and shared as so-called 'common pools of resources'[242]. Simplified smart-solution systems could provide as an effective mechanism, for instance from so-called 'Blockchain Technology'.[243] A technology developed to assist and improve the ABS systems, e.g. by lowering the transaction costs, and increasing the legal certainty in the ABS transactions.[244] An advantage with blockchains is that they also provide for a strong traceability system and could hence would safeguard the necessary security for all the users within the supply chain of developing new commercial products from MGRs.[245]

The OA principle would also accommodate eventual IPR's by allowing States to pay certain fees to a 'biodiversity contribution fund', in return for an 'embargo period' that allow the

[237] This is because a bilateral approach would not be possible to obtain within a regime for benefit sharing between multiple States.
[238] Arianna Broggiato et al., *supra* note 9. See particularly p. 3.
[239] *Ibid.*, p. 8.
[240] Authorisation is a requirement within several ABS systems within national jurisdiction See for instance the requirements of consent within the MSR regime in article 246, and requirements of prior informed consent within the ABS regime of the CBD.
[241] As e.g. prescribed by article 17 of the FAO Treaty.
[242] Which is practiced in article 12(3)(d) of the FAO Treaty. However, one could question whether it is relevant to list the relevant MGRs in the same manner as the FAO Treaty does.
[243] ABS Canada, 'Blockchain Technology and Access and Benefit Sharing', retrieved from http://www.abs-canada.org/food-for-thought/blockchain-technology-and-access-and-benefit-sharing/ 25 August 2018.
[244] Systems and solutions like blockchain could accommodate potential challenges with future advancements in science and gene technology, particularly with regard to new generations digital sequence data and information, which is discussed further down in section 4.3.3.
[245] These systems could also provide for systems of origins in relation to patent requirements.

researcher to keep the intended information confidential for a longer period.[246] Furthermore, the OPEN would provide as a notification scheme to operate the monitoring and tracking of the original location of where marine organisms are being sampled, which is important to ensure when the specific benefit sharing obligations are triggered.[247] However, an ABS regime should to the largest extent possible be created with the aim of functionality and practicability and seek to avoid bureaucratic burdens that potentially could hamper MSR, lead to circumvention of regulations, or even breach of obligations.[248] An ABS system should also promote to increase the capability of the research between the States. This could be done by a combination of actively facilitating capacity-building, partnership-building, and information and technology transfer. For instance, capacity-building proposals could be training programs that directly target the lowering of inequalities between the world's research States.[249]

There are numerous ways in which an ABS regime could be implemented into the ILBI, and this is by no means any detailed proposal of how this could be done. Based on this review, four objectives are recognised as being particularly important when establishing an ABS regime: First, an ABS regime should be based on openness and transparency; second, an ABS should not hamper scientific research; third, the regime should ensure monitoring and compliance; finally, it should make arrangements that take into consideration the special needs and interests of developing States. Bearing in mind these elements into a future ABS regime for MGRs, they could perhaps contribute to establish the necessary balance of all the interests at stake. Namely the interests of the research community in the continued research that may benefit all mankind, and the interests of those less developed research States that does not share the prerequisites of the more developed. Hence, these are, in the opinion of the writer, some of the crucial elements that should exist within an ABS regime, in order to achieve the overarching goal of a fair and equitable system for access to and sharing of benefits derived from MGRs.

[246] *Ibid.*, p. 3 and 8.
[247] Tracking systems could also provide helpful if there would be a distinction between genetic resources caught from the water column or the seabed. Tracking and monitoring would for all cases be important for knowing whether genetic resources are sampled from ABNJ or areas within.
[248] Bureaucracy and unreasonable transaction costs have been some of the problems with e.g. the multilateral system of ABS within the FAO Treaty.
[249] Such programs could be inspired by the FAO Treaty's 'Training and Capacity Development Programme', see Food and Agriculture Organization of the United Nations, International Treaty on Plant Genetic Resources for Food and Agriculture. Retrieved from http://www.fao.org/plant-treaty/training/training-and-capacity-development-programme/en/ August 2018.

In order to make the multilateral system for ABS to be organized properly, it could also be necessary to establish an international organization, authority, or even several institutions, to govern and manage such a regime. Such an institution, or institutions, could function as an independent organ, and be designated to systemize, monitor and enforce the multilateral benefit sharing regime.[250] For instance, in line with applying an OA approach, an institution could be responsible for the *ex situ* (and arguably also *in silico)* collections of MGRs and their sequences.[251] Such body could for instance be inspired by other modalities that have operated, such as the ISA, or even divide itself into a regional structure with several institutions and arrangements.[252] There are multiple ways in which such institution, body or organ could be adopted, but in the writer's opinion this should form part of the future governance of MGRs.

A contentious issue is whether the implementing agreement should include monetary or non-monetary benefits (or both) arising from the use of MGRs.[253] In this regard, it could be useful to draw lessons from other regimes and instruments that have provided for benefit-sharing arrangements, and particularly reflect upon the legislation that were not successful or provided effective benefit-sharing solutions.[254] Important emphasis should also be placed on the particular needs and interests by developing States with the objective of building blocks in research capabilities.

In line with the OA principle that is presented above, a condition for being able to fully access the resources is that the user accepts certain conditions laid down in the OPEN, namely obligations to share non-monetary and monetary benefits that actualizes from the utilization of MGRs.[255] Hence, and in accordance with what has been presented in the section above, the main emphasis could be placed on the sharing of non-monetary benefits, as a means of research-sharing. Besides, the benefits mentioned above (which mainly refers to public sharing and dissemination of information, cooperation and capacity building, partnership-building, and best scientific practices), could also include the transfer of 'know-how',

[250] For other scholars recommending adopting institutions, see Arianna Broggiato, supra note 9 and Petra Drankier et al., *supra* note 139, p. 385.
[251] *Ibid*., Petra Drankier et al., p. 433.
[252] In this regard, lessons could be drawn from regional fisheries management organizations/arrangements or other relevant regional structures.
[253] See summary of the third session of the [PrepCom] (27 March – 7 April 2017), Earth Negotiations Bulletin, Vol 25, No. 129, p. 3-4 and the Chair's non-paper, *supra* note 28, p. 28. Most States seem to agree upon the necessity of sharing of non-monetary benefits, but the core of disagreement appear to be whether there should be sharing of monetary benefits.
[254] For instance, with the FAO Treaty some of the problems have been the lack of adequate funds for benefit-sharing, and too much emphasis on voluntarily benefit-sharing, see Petra Drankier et al., *supra* note 139, p. 384.
[255] Arianna Broggiato et al., *supra* note 9, p. 8.

increase the quantity/quality upon scientific publications, building infrastructure development as a means of capacity building, and place more emphasis on conservation of biodiversity as a transgenerational benefit.[256] With regard to monetary benefit-sharing, these could be directly focused around the commercialisation of MGRs. Obligation of payment could be connected to the activation of IRPs in the form of exclusivity providing the user with extended embargo periods. Or one could operate with milestone payments, payments to sharing funds, or operate with a maximum share of monetary benefits, with less or no requirements for developing States.

4.3 Prominent Questions in Relation to Definitions of MGRs

4.3.1 The Use of Legal Definitions in the Forthcoming ILBI

As revealed throughout the thesis, numerous legal terms are not defined within international law, and this have contributed to legal uncertainty for the future legal instrument to be established in ABNJ. This includes *inter alia* MGRs, MSR and bioprospecting. One could ask the question of why the negotiators of the new ILBI should strive to adopt uniform legal definitions. The intention of legal definitions is, or should at least be, to create predictability and unambiguity, to avoid uncertainty with regard to rights and obligations, and to create an equal practice with regard to the closer content of a specific norm. It is thus evident that the absence of a definition may be a source of conflict. On the other hand, a very precise legal definition may have the outcome that they exclude certain aspects that was intended to be included at a later stage.[257] Hence, it is not without risk legal definitions are adopted. In the end, the use of and content of legal definitions are, and continue to be, a contentious issue. It all boils down to a question of predictability versus flexibility. The question of how vigorously definitions should be used within the ILBI in general will not be answered in this thesis. However, in the opinion of the writer, it is with no doubt valuable to create legal definitions within the forthcoming implementing agreement in relation to MGRs.

4.3.2 A Future Legal Definition of MGRs?

As far as MGRs are concerned, an accurate legal definition is crucial in order to ensure transparency in relation to when MGRs in ABNJ can be accessed, on what terms the

[256] Carlos M. Correa, 'Access to and Benefit Sharing of Marine Genetic Resources Beyond National Jurisdiction: Developing a new Legally Binding Instrument', South Centre, Research Paper 79 (2017), p. 15.
[257] Which arguably could have been the case with the exclusion of living marine resources from the scope of article 133

resources might be available for utilization, and when a unit is obliged to share benefits arising out of utilization. The legal definitions in the CBD could be implemented and adjusted to the necessary extent.[258] As these definitions have been subject to debates within the international scientific community, the future scope and definitions of MGRs should be considered carefully. Since the nature of MGRs is highly scientific and technical[259], it is crucial that the legal definitions are adapted to the activities and uses by the scientific community. A potential definition of MGRs will also depend on the legal principles that in the end are chosen to govern them. For instance, should MGRs be defined differently if they are belonging to the regimes of the high seas or the CHM?[260] Should the agreement address the relationship between genetic resources and biological resources used as a commodity? Another question is whether derivatives and digital sequence information of MGRs should be included in the scope of the ILBI. These and several other questions are placed on the agenda in the BBNJ negotiations. The relationship to digital sequence information and biological resources are dealt with in the following.

4.3.3 The Relationship to Digital Sequence Information

The Ad Hoc Technical Expert Group on Digital Sequence Information on Genetic Resources has recently carried out a 'fact-finding and scoping study' of the digital sequence information (DSI) of genetic resources in relation to the CBD and the Nagoya Protocol.[261] In their report it was mentioned that the scientific community practice both different uses of DSI, and different ways to describe it. The different terminologies have varied from e.g. 'digital sequence information', 'resources *in silico'*, 'genetic sequence data' etc.[262] In this regard, the term 'digital sequence information' is preferred and defined as the *in-silico* storage of genetic sequences. It may include 'genetic material found in nature, that is designed, mutated, or degenerated, or that is purely hypothetical'.[263] DSI has expanded into 'nearly every branch of life sciences and modern biology today'[264], permitting innovative, cheaper and faster ways to analyse and study genetic resources.

[258] This is also emphasized in the Chair's non-paper, *supra* note 28, p. 5.
[259] Jacqueline J. Espenilla, *supra* note 58, p. 4.
[260] Petra Drankier et al., *supra* note 139, p. 433.
[261] The Ad Hoc Technical Expert Group on Digital Sequence Information on Genetic Resources, *supra* note 77.
[262] *Ibid.*, p. 19-22.
[263] *Ibid.*, p 8.
[264] *Ibid.*, p. 22.

As a consequence of DSI, genetic resources are no longer limited to an organic source.[265] Researchers can access genomes from every environment on earth with minimum effort; As of today, the National Center for Biotechnology Information (NCBI) lists a staggering 152,200 genomes from the prokaryotic domains[266], freely accessible to anyone with access to the Internet. Considering some companies' ambitions to sequence the genomes of every organism on earth[267], DSI will have wide implications for most research disciplines working within biology. For example, future marine bioprospecting may consist principally of computer searches in genomic databases with millions of genomes, instead of the tedious collection, sorting and examining of organisms on cruises, which is the current mode of operation.

The report from the expert group disclosed that there are rapid developments related to the use of DSI on genetic resources and referred to the importance of addressing this matter within the frames of the CBD.[268] The emerging challenges combined with the use of DSI related to genetic resources could perhaps provide an opportunity for the BBNJ negotiators to jointly with the CBD fora work towards a common approach to address DSI. In the opinion of the writer, the important relationship between MGRs and DSI should not be disregarded in the new ILBI as it is obvious that DSI could have severe implications for ABS with regard to the future regulation of MGRs.[269]

4.3.4 Relationship to Biological Resources

One prominent question refers to the relationship between MGRs and biological resources, being harvested for their values as food and commodities.[270] Marine biological resources could include every harvestable living marine organism, such as fish, sedentary species and marine mammals. The link between biological and genetic resources is generated by the fact

[265] However, the report revealed that physical samples from field collections still represent a significant amount of the work related to DSI, see p. 32-36.
[266] National Center for Biotechnology Information. Retrieved from https://www.ncbi.nlm.nih.gov/genome/browse/#!/overview/ 9 August 2018.
[267] Elisabeth Pennisi, 'Biologists propose to sequence the DNA of all life on earth', Science, doi:10.1126/science.aal0824, 24 February 2017. Retrieved from http://www.sciencemag.org/news/2017/02/biologists-propose-sequence-dna-all-life-earth 9 August 2018.
[268] The CBD is already in the process of addressing issues surrounding DSI, but at this point, no legally binding rules regarding obligations of ABS from the use of DSI has been adopted. See further details of the process initiated by the CBD at their official homepage 'Convention on biological Diversity' (go to Nagoya Protocol, access and benefit sharing, key issues, Digital Sequence Information on genetic resources). Retrieved from https://www.cbd.int/abs/dsi-gr.shtml 26 August 2018.
[269] If issues are left unaddressed, it could potentially increase the risks for digital theft or piracy as well.
[270] Chair's overview of the second session of the Preparatory Committee, second session of the PrepCom (26 August – 9 September 2016), Appendix 1, p. 4.

that genetic material from biological resources qualifies as genetic resources and are thus often a target of bioprospectors. If, for instance, fish is included in the scope of MGRs in ABNJ, it could be necessary to separate the fish that has significance for its genetic properties from the fish solely used as a commodity. In this regard, it has been suggested to apply a 'scientifically informed threshold' for the harvesting of fisheries resources, whereas the fish harvested beyond a specific amount would be considered as a commodity.[271] Whether this solution is reliable or not, it provides a possible prevention of a potential tension between different regimes regulating different matters. In the opinion of the writer, such an approach should be taken and also actively used in the scope to avoid future uncertainty.

5 Conclusion

The intention of this thesis was to analyse what conditions must be met in order to achieve a fair and equitable ABS regime for MGRs originating from ABNJ. On the basis of the analyses throughout the thesis, four key conditions may be identified:

Normative conditions: Part of this thesis was devoted to illustrating the fundamental need for equity in the development of the future framework for MGRs in ABNJ. Based on the fact that there have been, and still are, disagreements between the negotiating States on the content and the need to create an ABS regime, it may be useful for them to seek a common normative rationale, or minimum requirements, for establishing such a system. If certain collective ethical values form the basis for constructing an ABS regime, it may be less problematic to agree upon the remaining points in the implementation agreement regarding MGRs. One of the hypotheses that emerged in this thesis, has been whether the principle behind the CCH might be considered as such normative rationale to justify the establishment of an ABS regime. The main attractiveness of pursuing this principle, or concept, is that it could establish certain normative linkages between the conservation of biodiversity (and MGRs) and the responsibilities of States to take actions for the highly needed enhancement of equity in the world's research nations (by pursuing the fair and equitable sharing of benefits from MGRs). However, this is just one of several possible approaches, as other principles, norms or concepts, just as well could legitimize ABS.

Legal conditions: The negotiating States also disagree upon what legal regimes regulates MGRs *lex lata* and the regulation of them *lex ferenda*. As illustrated throughout the thesis, the

[271] Chair's overview of the third session of the Preparatory Committee, Appendix 1, p. 5.

future legal regime should not 'undermine existing relevant instruments and frameworks' and not affect 'the legal status of the parties to the convention'.[272] Hence, the implementing agreement should be created and implemented in coherence with existing rules of international law, and in particular within the LOSC itself. One of the main questions before the States have been whether the freedom of the high seas or the CHM should regulate the MGRs in ABNJ, or whether both could apply according to their respective spatial areas. It has also been suggested pragmatic solutions, which could provide certain advantages as long as they may accommodate obligations from international law. [273] In this thesis it has been argued for considering the regime of MSR as a potential legal basis to govern MGRs. The main emphasis for preferring this regime is that it could accommodate the obligations arising from the LOSC, and most importantly, enable benefit- and research sharing from both basic and commercial research. In sum, it is evident that, regardless of what regime is being chosen or designated by the negotiators in the end, it has major implications for a potential ABS regulatory framework.

Balancing conditions: There are several interests at stake that must be balanced in order to achieve the objective of fair and equitable ABS. This include a range of considerations, such as the need to not hinder but promote scientific research and the future development of drugs and other products that in the end could benefit all mankind. These considerations must be reflected against the profound asymmetries between States in terms of capacities to participate in the utilization and development of MGRs in ABNJ. Furthermore, in determining the material scope and definitions of MGRs, a weighting of various considerations must also be made. Among these are the demand for predictability for the research community in knowing when a certain activity or use of MGRs trigger ABS obligations, and the need for flexibility with regard to the potential inclusion of future research methods of MGRs, (for instance, artificial intelligence and other innovative uses of MGRs[274]). Additionally, the negotiating States must also seek to strike reasonable balances in the regulation of access to MGRs, and whether to include monetary or non-monetary benefits, or a combination. In the end, all of

[272] UNGA A/Res 72/249 (24 December 2017), para. 10

[273] It is conceivable to think of hybrid solutions if there is a choice between the CHM and the high seas. For instance, if the CHM regime is favoured, the developed States could advocate for exceptions from the non-appropriation requirement in the Area. However, one could question whether it is possible to make exceptions from the rule in article 137 due to article 311(6).

[274] For instance, protein engineering allows scientists to partially or completely reproduce molecules artificially, see for example 'PEDS' (protein engineering design & selection), Oxford Academic, retrieved from https://academic.oup.com/peds/article-abstract/1/1/7/1490024 30 August 2018. One could ask whether such fields of science should be included in the scope of MGRs for future beings.

these important delineations must be properly balanced, while at the same time considering the specific features and peculiarities of MGRs.[275]

Political conditions: The last condition refers to the political consensus that must be exist in order to agree upon an ABS regime for MGRs in ABNJ. In order to achieve the overarching object of fair and equitable governance of MGRs in ABNJ, it may involve that the negotiators must be willing to make certain sacrifices. For instance, if the high seas regime in the end is chosen to stipulate the legal basis to regulate MGRs in the entire ABNJ, the developed States should be willing to compromise the less developed with certain benefit-sharing arrangements that may weight up the loss of departing from the CHM regime.[276] However, one major test of whether this condition actually can be met, is the amount of States that in the end up ratifying the implementing agreement. Considering the fact that the Fish Stock Agreement have only 89 States parties, there have been concerns that the non-members undermines the effective implementation and compliance of the agreement.[277]

A complicating element is that the ILBI need to be adopted as a package deal, i.e. the four agenda items must be agreed upon 'together and as a whole'[278], which complicates the negotiations further in several ways. This means that there must, or should at least, be certain level of coordination between the agendas of area-based management tools, including marine protected areas, MGRs (and the questions of benefit sharing), environmental impact assessments, and capacity-building and marine technology transfer[279]. Although the thesis has only dealt with one of these topics, the overall aim towards conservation and sustainable naturally forms an umbrella for all the issues. Hence, ABS of MGRs cannot be regarded independently from the overarching objectives of conservation and sustainable use of marine biodiversity in ABNJ. In this regard, as the conservation of biodiversity in ABNJ are a CCH[280], it is the writer's opinion that the further content, or at least parts of it, potentially could establish the overarching guiding principles of the entire implementing agreement. This could be an approach that would ensure the holistic and uniform regime that in the end is desired. Furthermore, the regime of MSR, including the active inclusion and participation of

[275] Natalie Y. Morris-Sharma, *supra* note 140, p.1.
[276] However, such ABS arrangements would have to be developed consistently with the principle of freedom of the high seas.
[277] See generally Ronald Barston, 'The Law of the Sea and Regional Fisheries Organisations', The International Journal of Marine and Coastal Law, Vol 14, No 3, Kluwer Law International (1999), pp. 333-352.
[278] UNGA A/RES 69/292, para 2 (19 June 2015).
[279] *Ibid.*
[280] Chelsea Bowling, Elisabeth Pierson and Stephanie Ratté, *supra* note 114, p. 11.

the research community, could contribute to and become a strength in building the bridges between science, policy makers and law.

This thesis has dealt with some of the central aspects of the scope MGRs within the future ILBI. However, central issues that are not dealt with, at least not in depth, are the relationship to IPRs, questions of enforcement and compliance, how to address the potential non-members of the agreement, questions of the further distribution of the benefits (e.g. how would the benefits be distributed among the States?), and how institutional benefit-arrangements may be funded. These and several other issues would need to be studied and reflected upon by the negotiators of the future legal instrument.

The final outcome of the negotiations remains uncertain and considering that developing global multilateral agreements involves complex and time-consuming procedures, one cannot expect to find the answers yet for some time. It remains to be seen whether the intricate challenges combined with creating new agreements at the international levels, and particularly crosscutting overarching multilateral agreements, can be achieved. One concern is that some of the developing States may not depend on an urgent change of the law governing MGRs in ABNJ, as they could continue their bioprospecting activities in ABNJ with no requirements of ABS. Another concern is that the States may not agree upon which legal principle(s) that in the end will govern MGRs in ABNJ, and that the negotiation process could be delayed, or even deadlocked[281]. However, considering the facts that the States have been able to agree upon two implementing agreements in the aftermath of the LOSC, and that the substantive negotiations will take place in the present future, there is indeed reason for optimism. One hopeful outcome is that the negotiators successfully are able to include key stakeholders, such as the scientific community and the least developed research States, into the designation, decision-making and development of the future ILBI.

[281] Petra Drankier et al., *supra* note 139, p. 424. If this would be the case, then it could be necessary to look for alternatives. For instance, the States could agree to disagree, similarly to how article IV of the Antarctic Treaty have been shaped. See the Antarctic Treaty (adopted 1 December 1959, entered into force 23 June 1961) 402 UNTS 71. For a further discussion about this, see David Leary, *supra* note 203.

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