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Implications of the UNCLOS Marine Scientific Research Regime for the Current Negotiations on Access and Benefit Sharing of Marine Genetic Resources in Areas Beyond National Jurisdiction

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ABSTRACT

Access to marine genetic resources (MGRs) in areas beyond national jurisdiction (ABNJ) and the sharing of benefits arising out of the utilization of these resources are among the most contentious at the UN Intergovernmental Conference on Marine Biodiversity of Areas Beyond National Jurisdiction. This article examines the applicability of the marine scientific research (MSR) regime of the UN Convention on the Law of the Sea (UNCLOS) to the access and benefit-sharing issues. It concludes that the MSR regime of UNCLOS provides the legal basis for setting up nonmonetary-benefit sharing obligations, including the dissemination of information, data, and research results concerning MGRs at the UN negotiations on marine biodiversity in the ABNJ.

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Introduction

The past decades have witnessed dramatic evolutions in science and technology, which enable humans to venture into the deep sea and discover the unknown biological world in areas beyond national jurisdiction (ABNJ). This ability presents opportunities to enhance knowledge and deliver benefits. However, there are also new challenges for governance, especially considering the possible environmental impacts of sampling activities, and the concerns with regard to the equitable utilization of marine genetic resources (MGRs).

In 2015, the UN General Assembly in Resolution 69/292 decided to develop an international legally binding instrument under the United Nations Convention on the Law of the Sea (UNCLOS)¹ on the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction (BBNJ).² In 2017, the General Assembly

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decided in Resolution 72/249 to convene an intergovernmental conference with a view to developing the instrument as soon as possible.³ The intergovernmental conference is to meet in four sessions.

Different proposals have been put forward by various stakeholders, among which the marine scientific research (MSR) regime of UNCLOS⁴ was tabled as a pragmatic approach to the issues concerning access to and benefit sharing of MGRs in the ABNJ.

The relevance of the UNCLOS MSR regime to the discussions of access and benefit sharing has been debated and analyzed.⁵ However, there is a paucity of literature focusing specifically on the interpretation of the relevant MSR provisions of UNCLOS and the implications of the MSR regime for the access and benefit-sharing issues in the current BBNJ negotiations. It is the aim of this article to fill this gap.

The main questions to be addressed include to what extent access to and utilization of MGRs can be categorized as MSR and what implications the UNCLOS MSR regime would have for the establishment of an access and benefit sharing arrangement for MGRs in the ABNJ. In answering these questions, the article first introduces the relevant MSR provisions of UNCLOS and sets out the regulatory scope of the regime. Then the article discusses the main features of the activities concerning the access to and utilization of MGRs in the ABNJ and the implications of the UNCLOS MSR regime for the current BBNJ discussions.

The MSR Regime of UNCLOS: Its Regulatory Scope

MSR on the High Seas and in the Area

MSR is expressly listed as one of the freedoms on the high seas that is to be exercised with due regard for other rights and interests.⁶ In the Area, all States and competent international organizations also have the right to conduct MSR, but all MSR activities within the Area are to be carried out “exclusively for peaceful purposes” and “for the benefit of mankind as a whole.”⁷ All MSR activities regardless of location are to be conducted in line with the general principles enumerated in Article 240 UNCLOS, which requires all MSR to

- (a) be conducted exclusively for peaceful purposes; (b) be conducted with appropriate scientific methods and means compatible with this Convention; (c) not unjustifiably interfere with other legitimate uses of the sea compatible with this Convention and shall be duly respected in the course of such uses; (d) be conducted in compliance with all relevant regulations adopted in conformity with this Convention including those for the protection and preservation of the marine environment.

Comparing the provisions on the regulation of MSR in the Area (Article 143) and the general principles of MSR (Article 240), one can note that, in the Area, the requirement that MSR is to be conducted “exclusively for peaceful purposes” is a repetition of the first general principle that applies to other ocean areas.⁸ However, the second requirement, that MSR in the Area is to be carried out “for the benefit of mankind as a whole,” is an additional obligation for States and competent international organizations that conduct MSR activities in the Area.

Paragraphs 2 and 3 of UNCLOS Article 143 detail the duties for the International Seabed Authority (ISA)⁹ and States Parties.¹⁰ The ISA’s role is to coordinate and

disseminate the results and analysis of MSR.¹¹ Under Paragraph 3, States Parties are obliged to promote international cooperation in MSR in the Area by means including participating in international programs and encouraging cooperation by personnel; ensuring MSR programs are developed through an international platform; and effectively disseminating the results of research and analysis when available.¹²

Similar obligations are provided for in Articles 242 and 244, which apply to MSR conducted at all maritime zones. Article 242 requires States and competent international organizations to promote international cooperation in MSR for peaceful purposes.¹³ Cooperation is to be achieved through the conclusion of bilateral and multilateral agreements in order to create favourable conditions for the conduct of MSR and to integrate the efforts of scientists.¹⁴ Article 244 concerns the obligations of States and competent international organizations 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,” and for this purpose, special attention is to be paid to assisting developing States.¹⁵

The different wordings of Article 143(3) and Articles 242 and 244 suggest that the obligations for researching States and international organizations in the Area are more concrete than those in Articles 242 and 244 that provide the duty to cooperate and to disseminate information on MSR. This, together with the additional obligation for MSR in the Area to be conducted “for the benefit of mankind as a whole” noted in the preceding, implies a special status for MSR activities in the Area. Considering the general context of Part XI of UNCLOS, one may note that such a special status of MSR is a result of the special status given by the drafters of UNCLOS to the Area. It has been submitted that the obligation of “for the benefit of mankind as a whole,” which appears in several provisions in Part XI, among others in Article 143 on MSR, is one of the means to give expression to the common heritage of mankind principle as embodied in Article 136 of UNCLOS.¹⁶

Another issue concerns the applicable scope of Article 143. Some hold the view that this article is only relevant to MSR within the Area where the mineral resources are the objects, since Article 133 of the Convention defines “resources” for the purposes of Part XI as mineral resources.¹⁷ However, the more convincing argument is that the definitions in Article 133 are not concerned with the applicable scope of the regime established for the Area.¹⁸

In addition, under Article 143, different terminologies are used. In paragraphs 1 and 3, the term MSR “in the Area” is used, whereas in paragraph 2, when establishing the rights and obligations of the ISA, the term used is MSR “concerning the Area and its resources.” This difference indicates that the scope of the general provision in paragraph 1 as well as of paragraph 3 is broader than that of paragraph 2,¹⁹ and this reflects the intention that no limit is to be attached on the objects of MSR activities (living or non-living resources) in these provisions.

Finally, Article 1 of the Convention defines the “Area” as “the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction.”²⁰ It has been submitted that the ordinary meanings of the terms “seabed,” “ocean floor,” and “subsoil” comprise both the living and nonliving resources that are found in those areas.²¹ In this

connection, the phrase “concerning the Area and its resources” would cover both living and nonliving resources. The result is that the provisions in Article 143 can be applied to research activities concerning MGRs in the Area.

Regulatory Scope of the UNCLOS MSR Regime

Since there is no definition given to the term “marine scientific research” in UNCLOS, in order to determine the scope of the UNCLOS MSR regime, one has to look at the regime and the Convention as a whole.²² Though Articles 246 and 56 are concerned with MSR activities undertaken in the exclusive economic zone (EEZ) and on the continental shelf, they are relevant since the purpose of MSR activities and UNCLOS’s division of different types of MSR may be inferred from the provisions.²³

Pure MSR Versus Applied MSR

Article 246 stipulates the rights of a coastal State over MSR in its EEZ and on its continental shelf. The article makes a distinction between MSR projects carried out “to increase scientific knowledge of the marine environment for the benefit of all mankind” and those projects falling within certain situations as prescribed in paragraph 5, including a research project that

- a) is of direct significance for the exploration and exploitation of natural resources, whether living or non-living; b) involves drilling into the continental shelf, the use of explosives or the introduction of harmful substances into the marine environment; c) involves the construction, operation or use of artificial islands, installations and structures referred to in articles 60 and 80; d) contains information communicated pursuant to article 248 regarding the nature and objectives of the project which is inaccurate or if the researching State or competent international organization has outstanding obligations to the coastal State from a prior research project.²⁴

Under the logic of this article, the term MSR is generic in its scope and covers activities that are “of direct significance for the exploration and exploitation of natural resources.”²⁵ The implications of this are elaborated upon in the following.

MSR Versus Exploration and Exploitation

The provisions in Article 246 need to be read in conjunction with paragraph 1 of Article 56. According to this article, in its EEZ, a coastal State has (a) sovereign rights for the purpose of exploring and exploiting, conserving, and managing the natural resources and with regard to other activities for the economic exploitation and exploration of the zone; and (b) jurisdiction with regard to marine scientific research.²⁶ Although there is some debate on whether “a difference in terms of quality” exists between sovereign rights and jurisdiction,²⁷ the different sets of substantive rules designated for exploration, exploitation (Articles 62–73, UNCLOS), and MSR (Articles 246–254, UNCLOS) in the EEZ of a coastal State clearly establish a distinction between these activities.

UNCLOS does not provide a definition of either exploration or exploitation. When interpreting these terms, reference can be made to the Regulations adopted by the ISA

with respect to prospecting and exploration of mineral resources in the Area.²⁸ Generally, “exploitation” is defined as the recovery for commercial purposes of [mineral resources] and the extraction of minerals therefrom, including the construction and operation of mining, processing and transportation systems, for the production and marketing of metals.²⁹ “Exploration” is defined as the searching for deposits of [mineral resources] with exclusive rights, the analysis of such deposits, the use and testing of recovery systems and equipment, processing facilities, and transportation systems, and the carrying out of studies of the environmental, technical, economic, commercial, and other appropriate factors that must be taken into account in exploitation.³⁰

In the Regulations, there is a common statement that

in accordance with the Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982 (‘the Agreement’), the provisions of the Agreement and Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982 shall be interpreted and applied together as a single instrument. These Regulations and references in these Regulations to the Convention are to be interpreted and applied accordingly.³¹

This statement makes explicit the inherently close relationship between the Regulations and the provisions of UNCLOS, and thus is of significance respecting the definitions in the preceding for the purposes of interpreting relevant terms contained in UNCLOS.

Although the definitions apply specifically to mineral resources, a number of principles implied in the definitions can be applied over a more general scope.³² It can be concluded that “exploitation” refers to the recovery of natural resources for commercial purposes and for the production and marketing of certain products, while “exploration” refers to research and analytical activities for the purposes of exploitation. This viewpoint is similar to that of Soons, according to whom the term “exploration” denotes data-collecting activities concerning natural resources, conducted specifically in view of the exploitation (economic utilization) of those natural resources.³³

Since MSR is distinct from exploitation and exploration, MSR activities do not include those conducted with the primary intention of commercial utilization of natural resources.

Conclusions

On the basis of the preceding analysis, it can be concluded that if a sampling activity is conducted purely for the purpose of commercial gain, the activity cannot be regarded as MSR. However, if a sampling activity is “of direct significance for the exploration and exploitation of natural resources” but is not aimed at the commercialization of such resources, it still qualifies as MSR.³⁴ This conclusion contributes to the evaluation below of the applicability of the UNCLOS MSR regime to the access to and utilization of MGRs in the ABNJ.

Features of Activities concerning MGRs in the ABNJ

UNCLOS makes no explicit reference to genetic resources. Not surprisingly, the definition and scope of genetic resources are under debate in the current BBNJ negotiations.

For the purposes here, the term is taken to generally denote any material of plant, animal, microbial, or other origin containing functional units of heredity that is of actual or potential value, as defined in the Convention on Biological Diversity (CBD).³⁵

There are mainly two stages of activities related to MGRs: access and utilization.³⁶

Access to MGRs

Access to MGRs can take place at different places and in different forms, which mainly include *in situ* access, *ex situ* access, and *in silico* access.³⁷ *In situ* access refers to “access to/collection of samples of marine organisms (containing MGR) within their natural surroundings, such as ecosystems and habitats in the high seas or the Area”; *ex situ* access means “access to MGR outside of their natural habitats, which involves transfer of samples previously collected from ABNJ that have been analysed and kept in biorepositories”; and *in silico* access refers to “access to information, data and research results for *in silico* testing and the results therefrom.”³⁸

In situ access is primarily carried out by academic or government institutes with the objective of increasing humankind’s knowledge of the ocean and the natural resources therein.³⁹ MGRs may be used in a number of commercial and noncommercial applications once they have been removed from their *in situ* source.⁴⁰ In other words, once collected, the samples of MGRs can be preserved *ex situ* and *in silico* for future research with information of genetic materials digitalized and be freely/or partial freely accessed through databases.

Whether all these types of access will be within the regulatory scope of the new instrument remains a controversial issue.

Utilization of MGRs

The utilization of MGRs can be divided into either for commercial purposes or for non-commercial (scientific) purposes. The commercial utilization of MGRs can be further classified into two subcategories: the utilization of MGRs as commodities, such as fish, and the utilization of MGRs for other commercial purposes. It is apparent that collecting or using MGRs as a commercial commodity does not constitute MSR, and the difference between the two is, to a large degree, obvious in practice; therefore, the utilization of MGRs as a commercial commodity is not relevant for this article. The distinction between utilization for commercial purposes other than as commodities and utilization for scientific purposes is much more complex.

In order to understand this issue, experience can be borrowed from other relevant legal instruments, for example, 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 (hereinafter the Nagoya Protocol).⁴¹ The Nagoya Protocol defines “utilization of genetic resources” as “to conduct research and development on the genetic and/or biochemical composition of genetic resources.”⁴² Article 17 (“Monitoring the Utilization of Genetic Resources”) indicates that checkpoints

should be relevant to the utilization of genetic resources, or to the collection of relevant information at, *inter alia*, any stage of research, development, innovation, pre-commercialization or commercialization.⁴³

Under the logic of this provision, commercialization of genetic resources takes place only at the final stage of their utilization, following previous steps including research and development.

The division of different stages of the utilization of genetic resources enumerated in Article 17 Nagoya Protocol is consistent with a comment contained in the 2007 Report of the UN Secretary-General on Oceans and the Law of the Sea, which stated that “types of activities related to MGRs generally include scientific investigation of the oceans and their biological processes; research and development or bioprospecting and exploitation.”⁴⁴

The term “bioprospecting” is neither used nor defined in UNCLOS or any other international legal instruments, including CBD. A note prepared by the Secretariat of CBD defined bioprospecting as

the exploration of biodiversity for commercially valuable genetic and biochemical resources. It can be defined as the process of gathering information from the biosphere on the molecular composition of genetic resources for the development of new commercial products.⁴⁵

According to this definition, bioprospecting is, in a sense, equivalent to exploration, which aims specifically at the commercialization of the genetic resources. Nevertheless, several points need to be noted.

First, the ISA Regulations referenced in the preceding separate prospecting from exploration, with prospecting referring to the searching for deposits without any exclusive rights, while exploration refers to the search for deposits with exclusive rights.⁴⁶ According to the relevant provisions of UNCLOS, there is no time limit for the conduct of prospecting activities, whereas the time for exploration is limited to that

of sufficient duration to permit a thorough survey of the specific area, the design and construction of mining equipment for the area and the design and construction of small and medium-size processing plants for the purpose of testing mining and processing systems.⁴⁷

The differences suggest a separate focus for the two activities. Arguably, prospecting means the searching starting from scratch, which is also the case of bioprospecting, while exploration refers to a search on the basis of previously gathered data and information and/or confirmed hypothesis.

Second, although there is no guarantee of monetary benefits for any exploration activities, past experience indicates that the percentage of bioprospecting activities for MGRs that lead to commercial gains is very low.⁴⁸ MGRs collected *in situ* need to be isolated and cultured before they can be studied, and after study, interesting and unique genetic materials may eventually result in commercial biotechnological applications.⁴⁹ Until this point, the organism and its genetic material only have potential economic value, and such value can only be realized if there are subsequent financial investments, research, and marketing, which is seldom achieved in practice.⁵⁰

Third, the line between research and bioprospecting is arguably more blurred than the one between MSR and exploration. The potential different development stages of

genetic resources, from research to commercialization, are difficult to identify, “due to the discontinuous paths from the collection of samples in the field through to commercialization.”⁵¹ This difficulty is further complicated by the fact that genetic resources are usually collected and analyzed as part of scientific research projects, which often involve partnerships between public research institutes and biotechnology companies.⁵² It is becoming increasingly common for activities undertaken for scientific purposes, especially those related to biological and geological sampling, to have links to onshore commercial activities.⁵³ Considering the high costs in terms of financial and human resources of venturing into the marine environment, the consortia of different actors, such as government, academia, and industry, have been created to share expertise, risks, and expenses for such activities.⁵⁴ In this regard, one expedition of sampling has to serve multiple ends, in order to satisfy the needs of all the actors involved.

Implications of Relevant UNCLOS MSR Provisions for the Current BBNJ Negotiations

Applicability of the UNCLOS MSR Regime to the Activities Concerning MGRs in the ABNJ

Some scholars hold the view that the UNCLOS MSR regime cannot be applied to activities concerning MGRs, mainly for the reason that MSR in UNCLOS is understood only to apply to noncommercial purposes, whereas access to and utilization of MGRs may have a commercial intent.⁵⁵

However, as discussed in the preceding, some MSR projects can be of relevance to resource exploitation and commercial gains, even if the activity does not amount to exploration.⁵⁶ MSR has been used to provide insights for the discovery, exploration, and exploitation of resources for centuries.⁵⁷ This type of MSR that is directly relevant for commercial applications (or “of direct significance for the exploration and exploitation of natural resources” under UNCLOS Article 246(5)(a)) is generally regarded as applied MSR. The UN Secretary-General Report on the Oceans and the Law of the Sea has commented that

In the absence of a formal definition, it has been suggested that marine scientific research under UNCLOS encompasses both the study of the marine environment and its resources with a view to increasing humankind’s knowledge (so-called “pure” or “fundamental” research), and research for the subsequent exploitation of resources (so-called “applied” research).⁵⁸

Besides, even MSR that is conducted for the purpose of enhancing humankind’s knowledge of the marine environment can contribute to economic gains.⁵⁹ One example is the research that led to the discovery of manganese nodules, which turn out to be economically valuable.⁶⁰

The decisive factor to differentiate MSR from other activities is to determine what is the main purpose for conducting the sampling activity. If an activity is driven mainly by a view to increase knowledge about the marine environment and it is only at a later stage that some commercially valuable information is found, the sampling activity is to be categorized as MSR. On the other hand, if the primary intent of an activity is commercial gain, even if during the process some information that adds to the

sum of scientific knowledge of the oceans is revealed, the sampling activity should be considered as exploration.

Nevertheless, the line between MSR and other activities, or more specifically exploration, is not clear-cut. In both situations mentioned above, the nature of the activities may change at a later stage. MSR can lead to exploration, and at the same time exploration can result in MSR. What matters from a practical perspective is the primary intent to carry out the activity in the first place. The turning point (from MSR to exploration or vice versa) is too complex to be clearly determined.

It is suggested that until the intent of an activity changes to the level of being easily noticeable—for example, MSR leads to actual commercial gains or exploration leads to scientific findings—the classification of the research activity involving sampling remains the same.

In the context of the current global discussions, it is better, or more feasible at least, to classify activities concerning access to and utilization of MGRs in the ABNJ, which are carried out primarily with a view to better understanding the marine environment and the unique biodiversity therein, as MSR, to which the UNCLOS MSR regime applies, until the actual commercialization is realised from the utilization of the MGRs.

Application of the UNCLOS MSR Regime to Different Types of Access Activities Concerning MGRs

During the BBNJ negotiations, various approaches have been raised concerning access to MGRs.

In Situ Access

Based on the MSR regime on the high seas and in the Area, *in situ* access to MGRs that is not exclusively for commercial purposes can be carried out without notification or consent. However, this does not mean that under the UNCLOS MSR regime there are no obligations respecting the access to MGRs in the ABNJ.

First, as stipulated by UNCLOS, all MSR is to be conducted in accordance with the general principles outlined in Article 240. These principles, *inter alia*, require all the MSR to be conducted with appropriate means and methods and in compliance with all relevant regulations, including those for the protection and preservation of the marine environment. Accordingly, sampling activities concerning MGRs are to be carried out consistent with environmental protection obligations and this can include new environmental protection obligations adopted in the new BBNJ instrument.

An option would be to establish standards and criteria to encourage responsible sampling activities. This could take the form, for example, of a code of conduct. Some non-governmental initiatives to ensure responsible research among the scientific community have already been adopted. Examples include the “InterRidge Statement of Commitment to Responsible Research Practices at Deep-Sea Hydrothermal Vents”⁶¹ and the “Code of Conduct for Marine Scientific Research Vessels” proposed by the Marine Board of the European Science Foundation and adopted at the International Research Ship Operators’ Meeting (ISOM).⁶²

Second, according to paragraph 1 of UNCLOS Article 244, States and competent international organizations are under an obligation to make public and disseminate “through appropriate channels information on proposed major programmes and their objectives.” It has been commented that “major programmes” seems to refer to all MSR programs that involve the conducting of research activities in areas that are not under the jurisdiction of the researching State and/or that “are of more than purely local interest.”⁶³ As such, all *in situ* access to MGRs in the ABNJ can (or could) be regarded as “major programmes.” In compliance with this provision, States or competent international organizations that carry out activities involving *in situ* access to MGRs (not for commodities) would be obliged to disseminate information on the proposed activities and their objectives “through appropriate channels.” These channels could be decided during the current negotiations.

Third, in accordance with relevant provisions of UNCLOS Article 143, *in situ* access to MGRs by States Parties in the Area is to be carried out pursuant to several procedural obligations. For example, States Parties are to participate in international program, encourage cooperation, and ensure that sampling programs are developed through the ISA or other international organizations for the benefit of developing States and technologically less developed States.⁶⁴ These requirements can be considered as the detailing of the “for the benefit of mankind as a whole” obligation, and need to be taken into consideration when negotiating the substantive rules concerning *in situ* access to MGRs in the Area.

Ex Situ Access

Ex situ access mainly concerns the access to MGRs samples that have already been collected. UNCLOS does not contain any obligations on the researching State that conducts MSR activities in the ABNJ to share samples with other States or international organizations. Access to *ex situ* MGRs samples is or may be subject to the consent of the researching State or international organization that has collected the samples.

It is arguable that the UNCLOS MSR regime covers not only sampling and data collection activities in the marine environment, but also the subsequent research and analysis of the samples and data retrieved in laboratories.⁶⁵ Therefore, the freedom enjoyed by States and competent international organizations to conduct MSR in the ABNJ, as discussed in the preceding, also applies to *ex situ* access to MGRs for research purposes. However, common sense suggests that this kind of freedom concerning *ex situ* access is only applicable where there is a continuous link between users. To be more specific, this freedom can only be exercised among the researching States or organizations that collect and share relevant samples in the marine environment.

In Silico Access

With respect to *in silico* access, which refers to access to information, data, and research results concerning MGRs, paragraph 2 of UNCLOS Article 244 may be relevant:

States, both individually and in cooperation with other States and with competent international organizations, shall actively promote the flow of scientific data and information and the transfer of knowledge resulting from marine scientific research,

especially to developing States, as well as the strengthening of the autonomous marine scientific research capabilities of developing States.

This provision implies that researching States are under an obligation to share with other States, especially developing States, scientific data, information, and research results concerning MSR. This arguably makes the *in silico* access to MGRs by other States or international organizations a freedom in the context of the UNCLOS MSR regime. Since this article applies to all MSR, it covers data, information, and research results concerning MGRs in the ABNJ.

This might raise concerns respecting possible intellectual property rights. This concern warrants attention, since respecting the rights and interests of intellectual property holders is a crucial element in securing investment in MGR-related industries. It has been suggested that there be an embargo period for the researching States or organizations to keep information and data private, for instance, to secure confidentiality before the publication of the results of the research or the grant of a patent.⁶⁶ However, the entitlement to an embargo period could be conditional, for example, on the researching States or international organizations paying certain fees to a to-be-established organization that deals with MGRs in the ABNJ. This would provide a good balance between facilitating MSR on the one hand and the safeguarding of intellectual property interests on the other.

It is worth noting that the freedom of *in silico* access to MGRs, which is premised on the interpretation of Article 244(2) UNCLOS, and the legal status of the activities concerned—whether they are MSR or not—are separate issues. *In silico* access to MGRs is more likely to be conducted for commercial purposes as compared to *in situ* access. In this respect, it remains a controversial issue whether the subsequent utilization of the MGRs accessed *in silico* can be regarded as MSR in the context of UNCLOS.

Implications of the UNCLOS MSR Regime for Benefit-Sharing Arrangement Concerning MGRs

The sharing of benefits arising from the utilization of MGRs in the ABNJ is a controversial topic. The following section focuses on the UNCLOS MSR regime with a view to analyzing benefit-sharing alternatives.

The most controversial issues concerning benefit sharing include whether an obligation of benefit sharing should be included in the new instrument, and if the answer is yes, what kind(s) of benefit-sharing obligations should be included, monetary and/or nonmonetary.

As noted above, it is only at the final stage (commercialization) that the utilization of MGRs can lead to monetary benefits. Among all the development stages identified for MGRs in the Nagoya Protocol,⁶⁷ the line between commercialization (the final stage of utilization of genetic resources) and other development stages is relatively easier to draw, since commercialization normally involves the production and marketing of certain products or the application of intellectual property rights, which can be known to the public. Before commercialization, since no commercial gains are generated from the utilization of MGRs, there would be no sharing of monetary benefits. Since commercialization is in a sense equivalent to “exploitation” in the context of UNCLOS and thus is

not to be considered as MSR, the UNCLOS MSR regime does not apply. In this respect, the UNCLOS MSR regime does not provide any direction regarding establishing monetary benefits-sharing obligations in the new BBNJ instrument.

Although the MSR regime of UNCLOS is not relevant in considering monetary benefit sharing issues, it is worth noting the following.

Since very few sampling activities lead to commercial gains, establishing monetary obligations tied to sampling is likely to reduce the incentive to innovate and is not conducive to the overall development of scientific research and the increase of knowledge about the oceans. Besides, as a result of researchers' unwillingness to share monetary benefits, they might find ways to avoid such obligations, and in a worse scenario, might leave their activities unregulated and hence cause adverse effects to the marine environment.

The drawbacks just described could be overcome to a certain extent by opting for forms of nonmonetary benefits sharing.⁶⁸ Article 244 of UNCLOS, which is concerned with the obligation of the researching States to share with others, especially developing States, information, data, and research results of MSR, is relevant. As is opined by some scholars, public availability and free exchange add to the sum of human scientific knowledge on a particular subject, and therefore, they can be presumed to benefit humankind.⁶⁹

In this connection, it is suggested that a clearinghouse mechanism (CHM) be established for MGRs in the ABNJ, where information of sampling activities, data of MGRs, and research results would be shared in the international community. This arrangement has several advantages.

First, it could serve as a means to share the benefits arising out of the utilization of MGRs in the ABNJ, in accordance with Article 244 of UNCLOS.

Second, the establishment of a CHM would be beneficial for the conservation of BBNJ and the preservation of the marine environment, since the sharing of such information, data, and research results can avoid duplicated visits to an ABNJ and repeated collecting of genetic resources. This is significant, especially when considered over a longer time span, as investigative and sampling activities have been identified as one of the causes of environmental degradation and reduction in biodiversity.

Third, this kind of nonmonetary benefit sharing has the potential to reduce the research and technological gaps between different States. Compared with *in situ* access to MGRs, *in silico* access, which is made possible by this form of nonmonetary benefit sharing, is much more affordable and accessible for technologically less developed States. This kind of arrangement is also conducive to the "strengthening of the autonomous marine scientific research capabilities" of developing States,⁷⁰ and can be linked to another component of the new BBNJ instrument—capacity building. It can be hoped that, in the future, this arrangement can contribute to a more equitable situation.

Last, the establishment of a CHM, which makes easily available information, data, and research results, can foster future MSR and spur innovation, and thus creates a positive circle for MSR concerning MGRs.

Conclusions

The relevant provisions on MSR of UNCLOS imply that the decisive factor for determining whether an activity is or is not MSR is the main purpose of conducting the

activity. If commercial gain is the primary intent, the activity is not to be regarded as MSR. If the activity serves multiple purposes, among which increasing scientific knowledge is the main intent, the possible discovery of commercially valuable information at a later stage does not change the character of the activity as MSR. The inherent linkage between MSR and exploration and, more particularly, the features of the activities concerning MGRs in the ABNJ make the establishment of objective criteria to categorize different development stages of MGRs into MSR or exploration an extremely difficult task. Facing this dilemma, and also taking into consideration the required compatibility of the new instrument with UNCLOS as a whole, and the common ground shown during the negotiations to facilitate MSR in the ABNJ, it is suggested that activities concerning the (*in situ*) access to and utilization of MGRs in the ABNJ qualify as MSR, to which the UNCLOS MSR regime applies, until commercialization from the utilization of the resources is realized.

By applying the UNCLOS MSR regime to the BBNJ negotiations, several implications could be drawn for the establishment of access and benefit sharing arrangements concerning MGRs in the ABNJ. In terms of access to MGRs, all States and competent international organizations should enjoy the right to freely access *in situ* and *in silico* MGRs derived from the ABNJ subject to certain obligations, notwithstanding that some interrelated issues may arise, for example, with regard to intellectual property interests, which could be solved by allowing for an embargo period; *ex situ* access could be subject to the consent of the researching States or organizations that have collected relevant samples from *in situ* sources.

As regards benefit sharing, the UNCLOS MSR regime provides a legal basis for establishing nonmonetary benefit-sharing obligations. It is suggested that a clearing-house mechanism be established as a means of nonmonetary benefit sharing and as an effective way to conserve BBNJ and preserve the marine environment in the ABNJ, to reduce the gaps between developed States and developing States, and to foster research.

Notes

1. U.N. Convention on the Law of the Sea, 1833 *U.N.T.S.* 397.
2. Resolution adopted by the General Assembly on 19 June 2015, UN Doc. A/RES/69/292.
3. Resolution adopted by the General Assembly on 24 December 2017, UN Doc. A/RES/72/249, para. 1.
4. UNCLOS, *supra* note 1, Part XIII.
5. See, in particular, Arianna Broggiato et al., “Mare Geneticum: Balancing Governance of Marine Genetic Resources in International Waters,” *International Journal of Marine and Coastal Law* 33, no. 1 (2018); Gaute Voigt-Hanssen, “Current ‘Light’ and ‘Heavy’ Options for Benefit-sharing in the Context of the United Nations Convention on the Law of the Sea,” *International Journal of Marine and Coastal Law*, no. 33 (2018); Natalie Y. Morris-Sharma, “Marine Genetic Resources in Areas beyond National Jurisdiction: Issues with, in and outside of UNCLOS,” *Max Planck Yearbook of United Nations Law Online* 20, no. 1 (2017); Glen Wright, Julien Rochette, and Thomas Greiber, “Sustainable Development of the Oceans: Closing the Gaps in the International Legal Framework,” in *Legal Aspects of Sustainable Development*, edited by Volker Mauerhofer (Springer, 2016); 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); Ane Jørem and Morten Walløe Tvedt, “Bioprospecting

in the High Seas: Existing Rights and Obligations in View of a New Legal Regime for Marine Areas Beyond National Jurisdiction,” *International Journal of Marine and Coastal Law* 29, no. 2 (2014); Arianna Broggiato, “Exchange of Information on Research Programs Regarding Marine Biodiversity in Areas beyond National Jurisdiction,” *IUCN Information Papers for the Intersessional Workshop on Marine Genetic Resources*, 2013; Arianna Broggiato, “Global and Regional Regimes on Genetic Resources, Experiences and Best Practices,” *IUCN Information Papers for the Intersessional Workshop on Marine Genetic Resources*, 2013; Charlotte Salpin and Valentina Germani, “Patenting of Research Results Related to Genetic Resources from Areas beyond National Jurisdiction: The Crossroads of the Law of the Sea and Intellectual Property Law,” *Review of European Community & International Environmental Law* 16, no. 1 (2007).

6. UNCLOS, *supra* note 1, Article 87(1).
7. *Ibid.*, Article 143(1).
8. A similar provision is contained in UNCLOS Article 301, *supra* note 1, which requires states parties, in exercising their rights and performing their duties under the Convention, to “refrain from any threat or use of force against the territorial integrity or political independence of any State.” This provision is applicable to all uses of the oceans.
9. The International Seabed Authority (ISA) is an autonomous international organization established under UNCLOS and the 1994 Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea, 1836 *U.N.T.S.* 3. The ISA is the organization through which states parties to the Convention, in accordance with the regime for the seabed and ocean floor and subsoil thereof beyond the limits of national jurisdiction (the Area) established in UNCLOS, *supra* note 1, and the 1994 Agreement, are to organize and control activities in the Area, particularly with a view to administering the resources of the Area. For more information, see the ISA website, www.isa.org.jm/authority.
10. Different wording in UNCLOS, *supra* note 1, Article 143, refers to the duties for the ISA (the Authority may carry out marine scientific research *concerning* the Area and its resources) and states parties (may carry out marine scientific research *in* the Area). The implications of the different wording are elaborated upon in the following.
11. UNCLOS, *supra* note 1, Article 143(2).
12. *Ibid.*, Article 143(3).
13. *Ibid.*, Article 242(1),(2).
14. *Ibid.*, Article 243.
15. *Ibid.*, Article 244.
16. See 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,” *International Journal of Marine and Coastal Law* 22, no. 1 (2007): 156.
17. UNCLOS, *supra* note 1, Article 133.
18. 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,” 152–153. Oude Elferink further noted that the drafting history of the Convention showed no indication to exclude living resources from the applicable scope of Part XI.
19. Alfred H. A. Soons, *Marine Scientific Research and the Law of the Sea* (Kluwer Law and Taxation Publishers, 1982), 227.
20. UNCLOS, *supra* note 1, Article 1(1)(1).
21. 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,” 150. Oude Elferink further noted that this observation is “explicitly confirmed by the reference to ‘the natural resources of the Area’ in Article 145(b) of the Convention.”
22. Vienna Convention on the Law of Treaties, 1155 *U.N.T.S.* 332, Article 31(1).
23. See Tullio Scovazzi, “Is the UN Convention on the Law of the Sea the Legal Framework for All Activities in the Sea? The Case of Bioprospecting,” in *Law, Technology and Science for Oceans in Globalisation: IUU Fishing, Oil Pollution, Bioprospecting, Outer Continental Shelf*, Davor Vidas (ed.) (Brill, 2010), 312.

24. UNCLOS, *supra* note 1, Article 246(5).
25. See Lucius Caflisch and Jacques Piccard, “The Legal Regime of Marine Scientific Research and the Third United Nations Conference on the Law of the Sea,” *Ocean Development and International Law* 4 (1977): 849–853.
26. UNCLOS, *supra* note 1, Article 56(1).
27. See Alexander Proelss, ed. *United Nations Convention on the Law of the Sea: A Commentary* (C.H. Beck; Hart; Nomos, 2017), 429; E. D. Brown, “The Exclusive Economic Zone: Criteria and Machinery for the Resolution of International Conflicts between Different Users of the EEZ,” *Maritime Policy and Management* 4, no. 6 (1977): 333–334.
28. These include Regulations on Prospecting and Exploration for Polymetallic Sulphides in the Area; Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area; and Regulations on Prospecting and Exploration for Cobalt-rich Ferromanganese Crusts in the Area. The regulations are available on the ISA website at www.isa.org.jm.
29. Regulations on Prospecting for Polymetallic Sulphides in the Area; Regulations on Prospecting for Polymetallic Nodules in the Area; and Regulations on Prospecting for Cobalt-rich Ferromanganese Crusts in the Area, *supra* note 28, para. 3(a), in Part I.
30. Regulations on Prospecting for Polymetallic Sulphides in the Area; Regulations on Prospecting for Polymetallic Nodules in the Area; and Regulations on Prospecting for Cobalt-rich Ferromanganese Crusts in the Area, *supra* note 28, para. 3(b), in Part I.
31. Regulations on Prospecting for Polymetallic Sulphides in the Area; Regulations on Prospecting for Polymetallic Nodules in the Area; and Regulations on Prospecting for Cobalt-rich Ferromanganese Crusts in the Area, *supra* note 28, para. 2, in Part I.
32. See “Report of the Secretary-General on Oceans and the Law of the Sea,” UN Doc. A/59/62, 4 March 2004, para. 262.
33. Alfred H. A. Soons, *supra* note 19, 125, 170–171.
34. *Ibid.*, 125.
 With respect to the meaning of the phrase “of direct significance for the exploration and exploitation,” the UN/DOALOS, “Marine Scientific Research: A Revised Guide to the Implementation of the Relevant Provisions of the United Nations Convention on the Law of the Sea” (New York: United Nations, 2010), para. 30, observed that “such research projects may generally be considered to be those which can reasonably be expected to produce results enabling resources to be located, assessed and monitored with respect to their status and availability for commercial exploitation.” This observation is in line with Soons, *supra* note 19, 171. Florian H. T. Wegelein, *Marine Scientific Research: The Operation and Status of Research Vessels and Other Platforms in International Law* (Martinus Nijhoff Publishers/Brill Academic Publishing, 2005), 297.
35. Convention on Biological Diversity, 1760 U.N.T.S. 79.
36. Arianna Broggiato et al., “Mare Geneticum: Balancing Governance of Marine Genetic Resources in International Waters,” *supra* note 5, 22.
37. Evanson Chege Kamau, “Access-Related Issues,” *IUCN Information Papers for the Intersessional Workshop on Marine Genetic Resources*, 2013, 23.
38. *Ibid.*
39. Kim Juniper, “Technological, Environmental, Social and Economic Aspects,” *IUCN Information Papers for the Intersessional Workshop on Marine Genetic Resources*, 2013, 18.
40. Lyle Glowka, “The Deepest of Ironies: Genetic Resources, Marine Scientific Research, and the Area,” *Ocean Yearbook Online* 12, no. 1 (1996): 169.
41. 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 in 29 October 2010, available at www.cbd.int/abs.
42. *Ibid.*, Article 2(c).
43. *Ibid.*, Article 17(1)(a)(iv).
44. “Report of the Secretary-General on Oceans and the Law of the Sea,” UN Doc. A/62/66, 12 March 2007, para. 145.

45. “Progress Report on the Implementation of the Programmes of Work on the Biological Diversity of Inland Water Ecosystems, Marine and Coastal Biological Diversity, and Forest Biological Diversity (DECISIONS IV/4, IV/5, IV/7),” Doc. UNEP/CBD/COP/5/INF/7, 20 April 2000, para. 6.
46. Regulations on Prospecting for Polymetallic Sulphides in the Area; Regulations on Prospecting for Polymetallic Nodules in the Area; and Regulations on Prospecting for Cobalt-rich Ferromanganese Crusts in the Area, *supra* note 28, para. 3, in Part I.
47. UNCLOS, *supra* note 1, Annex III “Basic Conditions of Prospecting, Exploration and Exploitation,” Article 17(2)(b).
48. Arianna Broggiato et al., “Mare Geneticum: Balancing Governance of Marine Genetic Resources in International Waters,” *supra* note 5, 23.
49. Lyle Glowka, *supra* note 40, 169; Graham Shimmield, “Extent and Types of Research, Uses and Applications,” *IUCN Information Papers for the Intersessional Workshop on Marine Genetic Resources*, 2013; Kim Juniper, “Technological, Environmental, Social and Economic Aspects,” 18; Arianna Broggiato et al., “Mare Geneticum: Balancing Governance of Marine Genetic Resources in International Waters,” *supra* note 5, 17.
50. Lyle Glowka, *supra* note 40, 169; Graham Shimmield, “Extent and Types of Research, Uses and Applications.”
51. Thomas Greiber, “Meaning and Scope,” *IUCN Information Papers for the Intersessional Workshop on Marine Genetic Resources*, 2013, 3.
52. “Report of the Secretary-General on Oceans and the Law of the Sea,” UN Doc. A/62/66, 12 March 2007, para. 145.
53. “Report of the Secretary-General on Oceans and the Law of the Sea,” UN Doc. A/59/62, 4 March 2004, para. 260.
54. See Lyle Glowka, *supra* note 40, 173; Florian H. T. Wegelein, *supra* note 34, 21.
55. See Thomas Greiber, “Access and Benefit Sharing in Relation to Marine Genetic Resources from Areas Beyond National Jurisdiction: A Possible Way Forward,” *Bonn: IUCN.(BfN-Skripten, no. 301)* (2011): 15; Salvatore Arico and Charlotte Salpin, “Bioprospecting of Genetic Resources in the Deep Seabed: Scientific, Legal and Policy Aspects,” (2005), 33. This view was also shared by the CBD Secretariat, which in its report on “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,” Doc. UNEP/CBD/SBSTTA/8/INF/3/Rev.1, 22 February 2003, para. 47, stated that “in the absence of a formal definition, marine scientific research could be defined as an activity that involves collection and analysis of information, data or samples aimed at increasing mankind’s knowledge of the environment, and is not undertaken with the intent of economic gain.”
56. Craig H. Allen, “Protecting the Oceanic Gardens of Eden: International Law Issues in Deep-Sea Vent Resource Conservation and Management,” *Georgetown International Environmental Law Review* 13(2001): 646.
57. Montserrat Gorina-Ysern, “Principles of International Law of the Sea Governing Coastal State Access to Marine Scientific Research Results” (University of New South Wales, 1995), 66–67.
58. “Report of the Secretary-General on Oceans and the Law of the Sea,” UN Doc. A/62/66, 12 March 2007, para. 203.
59. Myron H. Nordquist et al., eds., *United Nations Convention on the Law of the Sea, 1982: A Commentary (Vol. IV)* (Dordrecht: Martinus Nijhoff Publishers, 1991), 433; Herman T. Franssen, “Developing Country Views of Sea Law and Marine Science,” in *Freedom of Oceanic Research: A Study Conducted by the Center for Marine Affairs of the Scripps Institute of Oceanography University of California, San Diego*, Warren S. Wooster, ed. (New York: Crane, Russak & Company, 1973), 158; Lucius Cafilisch and Jacques Piccard, “The Legal Regime of Marine Scientific Research and the Third United Nations Conference on the Law of the Sea,” 850; and Tim Stephens and Donald Rothwell, “Marine Scientific

- Research,” in *Oxford Handbook of the Law of the Sea*, Donald Rothwell et al. eds. (Oxford University Press, 2015), 560.
60. Joanna Mossop, *The Continental Shelf Beyond 200 Nautical Miles: Rights and Responsibilities* (Oxford University Press, 2016), 159.
 61. “InterRidge Statement of Commitment to Responsible Research Practices at Deep-Sea Hydrothermal Vents,” available at www.interridge.org/IRStatement, last accessed 23 September 2018.
 62. “Code of Conduct for Marine Scientific Research Vessels,” 2007, available at www.irso.info/wp-content/uploads/International_RV_Code_final.pdf, last accessed 23 September 2018.
 63. Alfred H. A. Soons, *supra* note 19, 243; Alexander Proelss, *supra* note 27, 1461.
 64. UNCLOS, *supra* note 1, Article 143(3).
 65. This conclusion could be inferred from several provisions on MSR in UNCLOS, especially Article 243, which creates the obligation for researching states and competent international organizations “to create favourable conditions for the conduct of marine scientific research *in the marine environment*” [emphasis added]. The phrase “in the marine environment” is not included in other general provisions concerning MSR, thus indicating that not all the MSR is conducted in the marine environment.
 66. Arianna Broggiato et al., “Mare Geneticum: Balancing Governance of Marine Genetic Resources in International Waters,” *supra* note 5, 8.
 67. Nagoya Protocol, *supra* note 41, Article 17(1)(a)(iv).
 68. See Morten Walløe Tvedt and Ane E. Jørem, “Bioprospecting In the High Seas: Regulatory Options for Benefit Sharing,” *Journal of World Intellectual Property* 16, no. 3–4 (2013): 154.
 69. Alfred H. A. Soons, *supra* note 19, 242–243; Lyle Glowka, *supra* note 40, 172.
 70. UNCLOS, *supra* note 1, Article 244(2).