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**Efforts of international institutions to protect marine genetic resources in areas
beyond national jurisdiction from biopiracy**

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Abstract:

In recent years, the regulation of marine genetic resources beyond national jurisdiction has become an urgent issue in international maritime law. Albeit their huge scientific potential and economic interest, these resources remain extremely susceptible to biopiracy and uneven use due to wide gaps in current legal regimes. In this article, international actions to counter these threats, based on mechanisms of fair benefit-sharing, biopiracy avoidance, and transfer of technologies, are scrutinized critically, while stressing the responsibility of the United Nations, its conventions, and other expert organizations. through analyzing both advances and limitations of these actions, based on the role of these organizations, achievements, and ongoing gaps, the article reaches the conclusion that, in the absence of an integrated and effective international legal framework, marine genetic resources will be open to exploitation by technologically advanced countries, thereby promoting international inequality and undermining the principles of sustainable development and the common heritage of mankind.

Keywords: Marine genetic resources; international institutions; international efforts; marine biodiversity; biopiracy; benefit-sharing.

1. Introduction:

The vast areas beyond national jurisdiction (ABNJ) account for 64% of the oceans and 47% of the Earth's surface and remain poorly characterized.¹ These areas were of little interest to scientists until the 1970s, when scientists began to find microbes and deep-sea creatures whose survival depends on chemosynthesis rather than photosynthesis.² This discovery has prompted many commercial companies entities that raced to secure access to these rich marine materials and valuable genetic resources to use them for pharmaceutical and industrial purposes.³

These enterprises, primarily based in the world's most industrialized countries,⁴ have not shared the benefits derived from marine genetic resources (MGRs) with less developed nations. Moreover, these nations have been excluded from the research necessary to utilize these resources,⁵ as such efforts require substantial financial investment, advanced ships and submarines, and sophisticated laboratory equipment—assets largely concentrated by developed countries. In contrast, poorer nations lack these capabilities,⁶ fueling debates over their ability to access these resources equitably.

With the growing acquisition of sophisticated equipment by bioprospecting institutions and companies in industrialized nations, in particular, biotechnology, and increased commercial interest in marine genetic products, biopiracy concerns have become heightened in Global South nations, particularly in regions beyond national jurisdiction (ABNJ) where legal systems leave these resources vulnerable to unauthorized use and exploitation.

The issue has thus assumed a North-South divide, where bioprospecting companies stand accused of abusing knowledge and technology to favor industrialized nations while neglecting technology transfer or fair benefit-sharing to developing nations. Alarm has also grown over sustainable resource use and the rights of future generation, as biopiracy activities persist.⁷

In response, acknowledging the threat of falling behind amid heightened trade and capacity disparities, developing nations have endeavored to provide solutions to this problem within various international institutions,⁸ These institutions, subsequently, have devoted considerable effort to protecting these resources and ensuring justice for the groups pursuing fair access.

One might initially assume that this paper assesses whether international institutions have done an effective job in responding to biopiracy issues of marine genetic resources (MGRs) in areas beyond national jurisdiction (ABNJ). However, the research problem statement examined is more nuanced than that. The difficulty in regulating these resources extends beyond issues of enforcement, covering gaps in fair benefit-sharing, technological imbalances, and the establishment of legal systems. Rooted in the North-South divide, these concerns underscore the need for institutional responses that are not only protective but also just—ensuring fair access to marine genetic resources and fostering sustainable international cooperation.

Therefore, this article examines the problem statement: to what degree have international institutions managed to create effective and equitable legal frameworks to safeguard marine genetic resources in ABNJ? Additionally, to what degree and in what ways have they tackled biopiracy, closed technological gaps, and facilitated fair benefit sharing from these resources?

The introductory part of this article defines the scope of analysis and clarifies key concepts, particularly "marine genetic resources". The first part of it discusses the role of the United Nations as the leading international institution, highlighting international agreements addressing issues related to these resources. The gaps within current legal mechanisms, technological transfer, and evaluating work to achieve equitable benefit-sharing are also outlined. The second part of this article reviews the work of other international specialized institutions, considering their successes and mistakes in turn. Finally, the article concludes that, although considerable steps were taken, international institutions must strengthen their efforts to secure the sustainable and equitable management of marine genetic resources for humanity as a whole.

2. Terminology and the Scope of the Analysis:

It is widely accepted in the legal community that no international treaty codified marine genetic resources (MGRs) until June 2023. However, this does not imply that maritime law and marine environmental protection experts have not attempted to define them. On the contrary, they have worked diligently to formulate a legal framework for MGRs, alongside experts in preserving aquatic biodiversity, fisheries development, and various branches of international law. The earliest indications for a clarification on the legal nature of the said resources emerged with the provisions in Article II of the

Convention on Biological Diversity (CBD) in 1992. It brought about new unusual terminology, such as describing "resources" as being "genetic material of actual or potential value," where "genetic material" is "any material of plant, animal, microbial, or other source containing functional units of heredity".⁹ Regardless, while the CBD established the definition for the term "genetic resources," it failed to specifically connect them with the maritime sphere, leaving ambiguity in this regard. This gap prompted further research into the legal nature of MGRs, ultimately leading towards negotiations for the development of an internationally legally binding instrument.

The negotiations started in 2004, culminating in the formation of an open-ended informal working group on issues related to biodiversity beyond national jurisdiction (BBNJ) through UN General Assembly resolution 59/24. When deliberating, experts outlined some of the features of the marine genetic resources in the high seas.¹⁰ However, a comprehensive legal framework for these resources has yet to be established, resulting in ambiguity and confusion surrounding the access and benefit-sharing (ABS) provisions of the Convention on Biological Diversity (CBD).

This prompted the adoption of the Nagoya Protocol in 2010 on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization, as an annex to the Convention on Biological Diversity. The Protocol attempted to fix some of the gaps in defining these genetic resources and offered a more complete definition.¹¹ According to the Global Genome Biodiversity Network, the Protocol, like its predecessor, still lacks detailed information about these substances.¹² It wasn't until the publication of the new Convention on the Law of the Sea concerning the conservation and sustainable use of marine biological diversity in areas beyond national jurisdiction (ABNJ), concluded in New York on June 19, 2023, that clarity finally existed. It included the phrase "any material of marine plant, animal, microbial, or other origin containing functional units of heredity of actual or potential value". It specifically covers derivatives of living organisms in ABNJ as well as digital sequence information on marine genetic resources. It clarifies further the "use of the marine genetic resources" and its relationship to "biotechnology" in Article 1, paragraph 3,¹³ It is very similar in definition to the CBD and its Nagoya Protocol.¹⁴

It is evident from this definition, too, that its regional application—for the term "areas beyond national jurisdiction" clearly applies in the case of the high seas and the international area of the seabed, since it logically denotes

particular maritime zones. These are parts of the ocean that no single nation has full control or responsibility over. That is, MGRs in ABNJ pertain to everybody and nobody in specific; they are an international common. Such shared ownership is enhanced in this new treaty by providing for the equitable and fair distribution of benefits accruing as a result of MGRs in ABNJ, along with the concomitant digital sequence information.¹⁵

3. Efforts of the United Nations:

Among the international bodies engaged in working toward the development of cooperation in the conservation of genetic resources in areas beyond national jurisdiction (ABNJ) against biopiracy, the United Nations has taken a pioneering role. Since its inception, the organization has sought to tackle crimes committed in jurisdictions extending beyond states while simultaneously advocating for the right to benefit from scientific research on genetic resources and fair distribution of benefits. These efforts will be discussed in detail in the following sections.

3.1. United Nations Convention on the Law of the Sea (UNCLOS):

The first major United Nations initiative in this regard is found in Part XII of the 1982 (UNCLOS).¹⁶ While not directly mentioning biopiracy, this section's provisions on the high seas and utilization of maritime resources apply indirectly. It emphasizes the protection and preservation of the marine environment and on those steps which may be taken in order to avert the open-ended exploitation of maritime genetic resources—a practice which in some contexts may be equated to piracy when it takes place in ABNJ.¹⁷ While not explicitly mentioning the words "marine genetic resources," the convention urges state parties to work together to preserve these resources in all their forms. This is especially crucial in areas not subject to a state's jurisdiction since no state has sovereignty here. UNCLOS also demands measures against piracy and ensuring maritime security as part of its general commitment toward good ocean governance.¹⁸

3.2. The Convention on Biological Diversity (CBD):

This Convention, adopted in 1992, is an important international convention on a global framework for the conservation and sustainable use of biodiversity, including marine genetic resources. Though it mainly focuses on terrestrial genetic resources, its general principles apply even to marine areas which lie beyond the jurisdiction of any single state. Its main objective is to

establish the foundations for the fair and equitable sharing of benefits obtained from genetic resources¹⁹ — a matter of special concern when dealing with marine genetic resources as their unregulated exploitation may give rise to biopiracy. While the Convention on Biological Diversity (CBD) does not make specific reference to biopiracy, it provides a framework for protecting marine resources by promoting international cooperation. Specifically, it calls for the establishment of marine protected areas to conserve biodiversity and ensure the sustainable use of genetic resources, in line with Articles 6 and 8 of the Convention.²⁰ These protected areas can serve as a mechanism to prevent the uncontrolled exploitation of marine resources. Nevertheless, with regard to biopiracy, the CBD still lacks effective protective measures since such crimes need to be addressed through enforcement of international maritime laws and strengthened regional cooperation.

3.3. The Nagoya Protocol:

Adopted in 2010, the Nagoya Protocol was introduced as a supplementary instrument to the Convention on Biological Diversity in response to growing concerns over the unauthorized and imbalanced exploitation of genetic resources found in the ocean and other marine ecosystems. Since this has become a concern for nations, it has established at its core the principle of Access and Benefit-Sharing (ABS), which governs the conditions upon which nations provide access to genetic resources, including marine genetic resources those found in the ocean. The protocol aims to ensure that the benefits derived from these resources are equitably distributed to the nations or communities providing them,²¹ while also preventing cases of biopiracy, such as the "Ziconotide" case that preceded its adoption.

Coming back to Article 6, paragraphs 1 and 2, of the Nagoya Protocol, it can be seen that the provision not only reinforces the ABS principle but also introduces in another important principle: prior informed consent (PIC). This principle mandates obtaining permission prior to accessing genetic resources, especially maritime resources, and ensuring this consent is obtained after informing the concerned party sufficiently about potential uses and applicable mechanisms for benefits. Prior informed consent is crucial in preventing biopiracy, as it ensures that the state or community providing genetic resources is aware of and agrees to their proposed research or commercial exploitation.²²

The question remains: Is raising community awareness of prior informed consent sufficient for its effective application to marine genetic resources in

areas beyond national jurisdiction? Article 10 of the Nagoya Protocol addresses this by stating that Parties “shall consider the need and modalities” for a “global multilateral benefit-sharing mechanism.” This mechanism ensures that benefits arising from the utilization of genetic resources and associated traditional knowledge—especially in transboundary cases or where prior informed consent cannot be obtained—are used to support biodiversity conservation and the sustainable use of its components globally.²³

Thus, the concept of resources and knowledge for which prior informed consent cannot be granted or obtained may reflect a compromise regarding the temporal scope of the protocol’s application. Ultimately, it could be used to refer to different situations beyond the aforementioned one, such as genetic resources in regions outside the national jurisdiction of states.²⁴ The argument is also supported by Article 11(1), which highlights the obligation of cooperation between states for effecting the protocol wherever the resource exists, including in its natural habitats outside the regional jurisdiction of any state.²⁵

3.4. The Agreement on Biodiversity Beyond National Jurisdiction (BBNJ):

This agreement was adopted in 2023 as the "United Nations Convention on the Law of the Sea on the Conservation and Sustainable Utilization of Marine Biological Diversity in Areas Beyond National Jurisdiction." It also goes by the official names of "Convention on the Protection of Biological Diversity of the High Seas"²⁶ or the "Marine Protected Areas Treaty" (MPA). It has been touted as a complement to previous agreements, filling the loopholes left unaddressed by them. Its core aim is the conservation and sustainable use of marine genetic resources in areas beyond national jurisdiction. In order to do so, it prescribes the kinds of marine resources that must be protected and establishes various provisions and mechanisms, which include the following:

Before discussing the mechanisms instituted by this agreement to preserve the genetic resources in the high seas, it is important to highlight the disparity in access and utilization of these resources between countries. Few countries possess the technology and laboratories to take full advantage of them,²⁷ a disparity that made it necessary to activate “The Mechanism of Access and Benefit-Sharing” of all types resulting from their use,²⁸ whether monetary or non-monetary benefits.²⁹ To further the objectives of this

agreement, this mechanism has led to the creation of several bodies one being the Committee on Access to Resources and Benefit-Sharing, and the other being the Special Fund established to finance capacity-building and implementation-assistance activities so that shared benefits from marine genetic resources contribute to the Convention's goal attainment.³⁰ By activating these mechanisms and instituting supporting institutions, the risk of biopiracy will be partially mitigated³¹ and apprehensions about their occurrence will be removed.

The second mechanism established by this treaty is the "Clearing-House Mechanism"³² which allows countries and organizations involved to access environmental and scientific information on marine genetic resources beyond national jurisdiction. This is made possible through an open central platform under the General Secretariat, serving as a central unit for exchanging information on the implementation of the agreement.³³ This mechanism promotes cooperation between countries by offering scientific and technical advice on protecting and sustainably conserving these essential resource.³⁴ Additionally, the mechanism operates based on a "monitoring and transparency" system, supported by periodic reports designed specifically to monitor countries' compliance with global regulations and guidelines on the protection of resources and prevention of biopiracy.³⁵

Another key measure involves the "Notification on activities related to marine genetic resources and digital sequence information from areas beyond national jurisdiction" which must be filed in the Clearing-House Mechanism at least six months prior to collection,³⁶ These aspects make the Clearing-House Mechanism act as a body responsible for ensuring that parties under benefit-sharing regulations and complements the first mechanism, and enforcing sanctions in case of non-compliance.

Among the other important committees set up by this treaty for conserving marine genetic resources, the "Implementation and Compliance Committee" is worth mentioning first. This committee makes easier the implementation and compliance with the Convention's rules at both systemic and individual levels in a non-punitive and transparent way. Another important and equally significant body is the "Capacity-Building and Transfer of Marine Technology Committee",³⁷ which has an active and advisory role in capacity development and the transfer of marine technology beyond national jurisdiction. The activities of this committee involve facilitating capacity needs assessment and evaluation, monitoring and reviewing the

implementation of this Convention's sections, and making recommendations and developing guidelines.³⁸ All of its activities aim to empower developing nations—particularly small island and coastal states—to engage in sustainable utilization and fair distribution of benefits from marine genetic resources.³⁹ This way helps stop one-sided use by making other international groups able to manage and get these resources and so improve world efforts in fighting biopiracy.

Under this agreement, the United Nations cooperates with relevant regulatory regimes as well as global and regional bodies and sectoral organizations to safeguard the marine genetic resources in ABNJ. At the same time, it facilitates the agreement's aims during decision-making and promotes international cooperation for marine scientific research and the transfer of relevant technology to ensure sustainability.⁴⁰

4. Efforts of other international bodies:

Notwithstanding the active role played by the United Nations in safeguarding marine genetic material in areas beyond national jurisdiction, some scholars see its intervention as limited to the passing of most of these agreements, which are nothing but legal frameworks bound by texts that do not translate into real action on the ground. This is with the exception of some minor efforts by certain committees and the early implementation indicators under its latest agreement for 2023 as previously indicated.⁴¹ Nevertheless, this little challenge does not diminish the importance of this international body and its committees; rather, it underscores the significance of other international bodies that complement the efforts of the United Nations. Whether UN-associated or maintaining some good cooperative relationship, they play a part in formulating policies and providing adequate countermeasures for the protection of the marine ecosystem from illegal use and biopiracy. Together, these international bodies form a network of coordinated efforts aimed at enhancing the sustainable protection of marine genetic resources in areas beyond national jurisdiction. Most significant among them are:

4.1. International Maritime Organization (IMO):

This body emerged from the remnants of the 1948 IMO Convention,⁴² which did not explicitly address the conservation of marine genetic material beyond national jurisdiction. Nevertheless, in establishing the mandate of the organization, this instrument authorizes the IMO "to promote and facilitate the

widespread adoption of the highest achievable standards in maritime safety, navigation efficiency, and the avoidance and limitation of marine pollution from ships." The IMO has used this provision to justify new initiatives in marine environmental issues that are not directly mandated by other conventions.⁴³

This organization also concluded the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter in 1972 and its 1996 Protocol.⁴⁴ Although neither of the two treaties specifically deals with the conservation and management of marine genetic resources directly, they do obligate the States Parties and the organization in particular to take all practicable measures to prevent to prevent pollution of the sea by dumping.⁴⁵ And by preventing ships from dumping, it clearly contributes indirectly to the conservation of marine genetic resources.

The London Convention establishes lists of wastes prohibited from being dumped and wastes requiring national authorization before being discharged into the marine ecosystem.⁴⁶ This organization has also embraced yet another international convention based on the prevention of shipborne pollution, 1973/1978 (MARPOL),⁴⁷ which addressed various issues, including standards for the disposal of extremely hazardous shipborne wastes in special areas at sea. These standards, particularly outlined in Annexes I, II, IV, and V, introduced a more enhanced level of protection than that of other maritime areas,⁴⁸ thus significantly leading to the conservation of marine biodiversity. In addition to this convention, the organization further incorporated another the 2001 Convention on the Control of Harmful Anti-Fouling Systems on Ships (AFS Convention),⁴⁹ aimed at hazardous anti-pollution shipborne systems used in maritime transport activities. Notably, it regulated the use of organotin compounds such as tributyltin (TBT), which are extremely devastating to marine genetic resources.⁵⁰

Hence, the IMO plays both a direct and indirect roles in conserving marine genetic resources. This is through specified tools aimed at conserving marine diversity, as well as more broader instruments aimed at conserving the marine environment as a whole.⁵¹ Moreover, although the IMO does not directly address the issue of biopiracy, it has been very instrumental in supporting international frameworks aimed at the prevention of unauthorized exploitation of marine genetic resource exploitation unauthorizedly, especially in areas beyond national jurisdiction. Thus, all its regulatory

regimes are geared towards ensuring these valuable marine resources are protected against their inherent risks and potential threats.

4.2. International Ocean Commission (IOC):

The Intergovernmental Oceanographic Commission (IOC/UNESCO) was established in 1960 within the framework of UNESCO. According to its Charter, the Commission's purpose is to support international and regional cooperation⁵² in ocean sciences to enhance the management of oceans, coasts, and marine resources, protect the marine environment, and promote sustainable development.⁵³ To achieve this, the IOC has dedicated its efforts to marine scientific research and the transfer of marine technology.

Recognizing that marine scientific research is a fundamental step toward accessing marine genetic resources from areas beyond national jurisdiction and deriving benefits from their use,⁵⁴ the IOC has established several programs to support these objectives. One such program is the International Oceanographic Data and Information Exchange Programme (IODE),⁵⁵ launched in 1961, which underscores the importance of free and open access to marine resource data for the global public good. In 2009, the IOC created a complementary system known as the Ocean Biodiversity Information System (OBIS), a collaborative network that ensures free access to information about deep-ocean marine life,⁵⁶ while providing high-quality biodiversity data, including species abundance, habitats, and genetic resources.⁵⁷ Through these two systems, the IOC significantly contributes to facilitating the equitable sharing of non-monetary benefits arising from marine genetic resources (MGRs) in areas beyond national jurisdiction while also advancing the transfer and dissemination of marine technology. However, its efforts are not limited to these systems alone. In 2014,⁵⁸ the IOC adopted a more comprehensive monitoring strategy known as the IOC Deep-Ocean Observing Strategy (DOOS), which serves multiple functions, including coordinating existing deep-ocean observing activities across disciplines to establish a sustained observation effort, integrating research institutions, intergovernmental organizations,⁵⁹ industry, regulatory bodies, and funding agencies to achieve deep-ocean societal objectives, and fostering observation activities to track biogeochemical systems, environmental dynamics, and biodiversity,⁶⁰ including marine genetic resources (MGRs), while safeguarding them against biopiracy.

4.3. International Seabed Authority (ISA):

The International Seabed Authority (ISA) has been mandated by the 1982 United Nations Convention on the Law of the Sea and the 1994 Agreement relating to the implementation of Part XI of UNCLOS to organize and control all mineral resource-related activities in the Area for the benefit of humankind as a whole. It also has a mandate to ensure the effective protection of the marine environment against harm resulting from deep-seabed activities.⁶¹ The ISA, being the custodian of the seabed and its mineral wealth, plays a central part in ensuring the implementation of the objectives of the 2023 Convention on the Conservation and Sustainable Use of Marine Biological Diversity Beyond Areas of National Jurisdiction (BBNJ).⁶²

The 2023 Agreement reiterates the necessity to harmonize its provisions with those of UNCLOS to reinforce the mandates of the ISA to manage marine scientific research and the transfer of marine technology within the Area.⁶³ Moreover, it obliges other parties and relevant international bodies to cooperate with the ISA in submitting proposals for area-based management tools, including measures aimed at the conservation and sustainable use of marine genetic resources (MGRs).⁶⁴

Amid these measures, in the last few years, the International Seabed Authority (ISA) has issued exploration licenses only for mineral resources occurring on and under the seabed of the high seas to a number of sponsoring states and their contractors. This clearly excludes genetic resources. If either one of those plans comes to fruition, then the ISA would have a provision to share all benefits that arise in a fair manner while also ensuring the protection of this marine environment for the benefit of humankind, including future generations—a commitment that remains central to its mandate. In this way, therefore, it contributes indirectly toward fighting biopiracy.⁶⁵

4.4. International Commission for the Protection of the Marine Environment (CIESM):

CIESM was established in 1908 and officially instituted in 1919 by Prince Albert I of Monaco to organize marine studies and exploration in the Mediterranean and Black Seas. It represents the most significant regional initiative for advancing research to protect crucial marine resources, including marine genetic resources in the Mediterranean. Despite its regional character notwithstanding,⁶⁶ CIESM uses a scientific-legal approach with universal relevance in the preservation of marine genetic resources.

It embraces a wide range of marine disciplines, tapping a huge pool of human resources. On this basis, CIESM publishes authoritative, objective reports concerning the status and trends in Mediterranean marine systems, along with accurate recommendations on priorities for action, research, and development in a panoply of sensitive issues that affect the entire Mediterranean Basin. These guidelines, contained in CIESM's Charter on Access and Benefit-Sharing (ABS) resulting from the use of marine genetic resources (MGRs), were formulated in 2014 to complement the Nagoya Protocol.⁶⁷

The CIESM Charter fosters scientific knowledge-sharing by means of coordinated data management, traceability, conservation of nature, and environmental responsibility.⁶⁸ The Charter, formulated after extensive consultation with scientists and legal practitioners, is designed to provide nine ethical principles for mutual use by all stakeholders from collectors to end-users. It underscores core values such as the fair and equitable benefit-sharing of these resources, along with transparency and reciprocal data sharing.

This Charter applies to all parties engaged in the collection and use of marine genetic resources in the Mediterranean for research, commercial, or industrial purposes. It reflects the commitment of the Mediterranean area to preserve access to knowledge for all people and to prevent any form of abuse upon the global commons of the oceans-in particular, biopiracy.⁶⁹ Furthermore, this CIESM Charter transcends biological approaches and extends beyond the strict delimitations of the Mediterranean-Black Sea region insofar as it is applicable to large scientific initiatives concerning oceanographic campaigns in the world's oceans.⁷⁰

4.5. International Union for Conservation of Nature and Natural Resources (IUCN):

Established in 1948, IUCN became the world's largest, most diverse environmental network utilizing over 1,400 member organizations' expertise, resources, and influence, along with that of 17,000 experts from 160 countries.⁷¹ The organization has contributed significantly to solving major challenges related to the conservation of marine genetic resources beyond national jurisdiction, providing knowledge resources, organizing expert workshops, and providing technical support as part of the BBNJ process.⁷² This endeavor resulted in a global accord, after comments had been made on a draft revised supplementary text to the United Nations Convention on the

Law of the Sea concerning the conservation and sustainable use of marine biological diversity beyond national jurisdiction (ABNJ) (A/CONF.232/2022/5) dated 8 August 2022.⁷³

It highlights transparency and consultation in the management of activities impacting biodiversity in areas beyond national jurisdiction (ABNJ) such as marine genetic resources (MGRs) as key. It warns that conducting assessments outside the scope of the agreement risks entrenching the problem this tool seeks to address. This is why IUCN advocates for common, high standards for environmental assessments to offset this threat and urges the use of Strategic Environmental Assessments (SEAs) to create shared knowledge and to formulate cross-sectoral plans balancing conservation with uses by people in ABNJ.⁷⁴

The organization also emphasizes the growing recognition that equity is key to harvesting the value from marine genetic resources (MGRs) by pointing to the need for equitable benefit-sharing and articulating this into enforceable terms. It also emphasizes the importance of traditional knowledge, capacity building, and technology transfer in order to propel sustainable use and conservation in areas beyond national jurisdiction (ABNJ). Moreover, the IUCN further names effective financial assistance as a key driver. The requirement for a holistic, fair, and adaptable funding scheme is evident. The IUCN proposes building institutions like a Standing Committee on Finance and having reliable diversified sources of funding. It emphasizes how the cost of inaction far outstrips investment to build this kind of infrastructure, placing financial stability as the foundation for effective action in ABNJ.⁷⁵

In the context of global efforts to address biopiracy and promote the sustainable use of marine genetic resources beyond national jurisdiction, the IUCN has had a crucial contribution through its synergy with the Food and Agriculture Organization (FAO), Secretariat of the Convention on Biological Diversity (CBD), and other global organizations. This synergy has greatly enhanced global efforts to prevent unauthorized exploitation of these resources. This was stressed in particular during the twenty-fourth SBSTTA meeting, where it highlighted stringent measures to safeguard marine biodiversity against biopiracy while ensuring its use remains sustainable.⁷⁶

The meeting underscored the need for synergy and collaboration with relevant regional and international organizations and initiatives. These initiatives are catalogued in the recommendations of the SBSTTA's twenty-

fourth meeting (CBD/SBSTTA/24/12), in particular Recommendation 9/24, titled «Marine and Coastal Biodiversity Conservation and Sustainable Use". Through this recommendation, the IUCN and its partners stressed the importance of applying ecosystem-based approaches, and the precautionary principle to safeguard genetic resources, integrating the best available science. They also demand enhanced collaboration with regional and international organizations to stop biopiracy, especially in the areas beyond national jurisdiction. Moreover, the recommendation highlighted the importance of open talks with main players, like Indigenous peoples and local communities, to address unauthorized exploitation and to create fair-sharing mechanisms for benefits obtained from marine genetic resources.⁷⁷

5. Conclusion:

In conclusion, marine genetic resources beyond national jurisdiction form the common heritage of mankind and an inestimable source of technological and scientific ingenuity. Their conservation is not only an ethical obligation but an international responsibility that calls for coordinated action by international agencies. As the principal architect of global governance, the United Nations offers an integrative framework for actions, while the specialized agencies are tasked with the responsibility of finding innovative solutions for improving protection and ensuring the proper use of such priceless resources.

This convergence of international law and advanced science points to the dynamic nature of global challenges and the urgent need for robust, collaborative mechanisms. With growing threats and illegal exploitation, the preservation of marine genetic resources has now become an imperative of international cooperation. Establishing effective legal and regulatory frameworks is essential to combating biopiracy and ensuring a sustainable future based on the principles of transparency and fairness. It guarantees that all mankind derives benefits from the deep-sea treasures while upholding a shared responsibility for the planet.

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² The microfauna and bacteria of the deep seabed are called ‘extremophiles’ or ‘hyperthermophiles’, as they live in conditions of darkness, extremely high temperatures and pressure, which has made them resistant to heat and pressure. See: *Report of the BBNJ Workshop of the Centre for International Law (Preparing for the PrepCom), Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction*, National University of Singapore, February 2016, p. 10. Available at: <https://cil.nus.edu.sg/wp-content/uploads/2015/10/CIL-report-of-BBNJ-workshop-21-March-2016-final-2.pdf> (accessed 17 August 2025).

³ Marine genetic resources (MGRs) have been used in a myriad of applications from industrial process to drugs, cosmetics, and other products. For instance, compounds isolated from the shallow-water sponge *Tectitethya crypta* were instrumental in the development of a drug for leukemia and then in the 1980s an antiretroviral drug called AZT (azidothymidine). Just like that, peptides from venom of *Conus magus* snail have been developed into a synthetic compound Prialt (ziconitide) for chronic intractable pain. Antifreeze proteins derived from cold-water fish and other life forms find application in recrystallization inhibition ice cream making keeping texture smooth all along the frozen life of the product. And an enzyme extracted from a microbe in the Mid-Atlantic Ridge is currently used in the development of biofuels. See: M. VIERROS – C.A. SUTTLE – H. HARDEN-DAVIES – G. BURTON, *Who Owns the Ocean? Policy Issues Surrounding Marine Genetic Resources*, *Association for the Sciences of Limnology and Oceanography (ASLO), Limnology and Oceanography Bulletin*, vol. 25, Issue. 2, May 2016, p. 29. Available at: <https://doi.org/10.1002/lob.10108> (accessed 18 August 2025).

⁴ R. BLASIAK et al., op.cit, p. 5.

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⁸ Among those countries that raised this issue, we remember the message of the Group of 77 and China in the United Nations Open-ended Informal Working Group meeting held May 2011 which explained a growing crisis in governance on marine biological diversity beyond areas of national jurisdiction. In a statement that resonated with the principles of international equity and justice, they condemned exclusive exploitation of genetic resources by a few privileged; they also expressed the economic and social implications at a global level. Their intervention unitedly made it loud and clear through Minister Diego Limeres of Argentina that such practices are blatantly inconsistent with legal principles at the international level. They brought to attention the United Nations Convention on the Law of the Sea (UNCLOS) which has this mandate enshrined in it that The Area and its resources are the common heritage of mankind to be explored and utilized for the benefit of all. See: THE GROUP OF 77, *Statement on behalf of The Group of 77 and China by minister Diego Limeres, deputy permanent representative of the permanent mission of Argentina to the*

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⁹ *Convention on Biological Diversity*, Art. 2, Rio de Janeiro, 5 June 1992, p. 3. Available at: https://treaties.un.org/doc/Treaties/1992/06/19920605%2008-44%20PM/Ch_XXVII_08p.pdf (accessed 22 August 2025).

¹⁰ C. CHIAROLLA, *The Work of the World Intellectual Property Organization (WIPO) and Its Possible Relevance for Global Ocean Governance*, in D.J. ATTARD – M. FITZMAURICE (eds.), *Comprehensive Study on Effective and Sustainable Global Ocean Governance: UN Specialized Agencies and Global Ocean Governance*, IMO/IMLI Research Report to the Nippon Foundation, 2016, pp. 8-9. Available at: <https://ssrn.com/abstract=3002489> (accessed 25 August 2025).

¹¹ *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*, Arts. 1–2, Nagoya, 18–29 October 2010, p. 7. Available at: https://treaties.un.org/doc/source/docs/UNEP_CBD_COP_DEC_X_1-E.pdf (accessed 25 August 2025).

¹² GLOBAL GENOME BIODIVERSITY NETWORK, *Letter to Dr. Cristiana Paşca Palmer Regarding the Exclusion of Sequence Information Accessed from Public Databases from Coverage under the Nagoya Protocol*, 7 September 2017. Available at: <https://www.cbd.int/abs/DSI-views/GGBN-DSI.pdf> (accessed 25 August 2025).

¹³ *Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ)*, Art. 1, paras. 3-8, New York, 19 June 2023, pp. 3-4. Available at: https://treaties.un.org/doc/Treaties/2023/06/20230620%2004-28%20PM/Ch_XXI_10.pdf. (accessed 26 August 2025).

¹⁴ INTERNATIONAL UNION FOR CONSERVATION OF NATURE (IUCN), *The High Seas Biodiversity Treaty: An Introduction to the Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction*, November 2023, Switzerland, p. 17. Available at: <https://www.iucn.org/sites/default/files/2024-01/iucn-bbnj-treaty-policy-brief.pdf>. (accessed 26 August 2025).

¹⁵ *Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ)*, Art. 9, para. A, *op.cit.*, p. 6.

¹⁶ The 1982 United Nations Convention on the Law of the Sea (UNCLOS) is an international agreement that has evolved to cover essentially everything related to the legal use and conservation of marine resources. It was adopted on December 10, 1982, and went into effect on November 16, 1994. Since it covers almost every aspect of maritime law, it is nicknamed the 'Constitution for the Oceans,' in which it included a provision to protect marine resources against their illegal use—piracy. See: UNITED NATIONS, *United Nations Convention on the Law of the Sea*, 1982. Available at: https://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf. (accessed 01 September 2025).

¹⁷ UNITED NATIONS (UN), *Part XII of the UNCLOS 1982: Protection and Preservation of the Marine Environment*. Available at: https://www.un.org/depts/los/convention_agreements/texts/unclos/part12.htm. (accessed 02 September 2025).

¹⁸ UN, *Part XII, Art. 100 of the UNCLOS 1982: Duty to Cooperate in the Suppression of Piracy*.

¹⁹ *Convention on Biological Diversity*, Art. 15, *op. cit.*, pp. 5-6.

²⁰ *Ibid.*, Arts. 6 and 8, pp. 9-10.

²¹ M. BUCK – C. HAMILTON, Access and Benefit-Sharing: The Protocol on Marine Genetic Resources, in *Ocean Development & International Law*, Vol. 42, No. 1, 2011, pp. 23-38.

²² *Nagoya Protocol*, Art. 6, paras. 1-2, *op. cit.*, p. 9.

²³ *Ibid.*, Art. 10, p. 10.

²⁴ A. FODELLA, *Recent Developments on Access and Benefit Sharing Relating to Genetic Resources (ABS) in International Law*, Università degli Studi di Trento, Trento, 2014, p. 19. Available at: <https://www.biodiritto.org/content/download/2110/20580/file/Fodella.pdf>. (accessed 06 September 2025).

²⁵ Art. 11 of the Nagoya Protocol establishes a duty to cooperate, with a view to implementing the Protocol, “In instances where the same genetic resources are found in situ within the territory of more than one Party, those Parties shall endeavour to cooperate, as appropriate, with the involvement of indigenous and local communities concerned, where applicable, with a view to implementing this Protocol”. See: *Nagoya Protocol*, Art. 11, para. 1, *op. cit.*, p. 11.

²⁶ IUCN, *op. cit.*, p. 4.

²⁷ *Ibid.*, p. 9.

²⁸ The Conference of the Parties to the Convention on Biological Diversity shall review and evaluate the provisions of monetary benefit-sharing every two years, with the first review scheduled no later than 5 years after the entry into force of the agreement. After that, the Conference of the Parties may, taking into account recommendations by the access and benefit-sharing committee, decide on other modalities for the future. This may include changing the type of payments - for example milestone payments or payments of percentage of the revenue from sales of products are listed as options. These future modalities may also change which State Parties will have to share monetary benefits. See: *Ibid.*, p. 10.

²⁹ What is meant here is that the access and benefit-sharing mechanism includes the sharing of monetary and non-monetary benefits derived from the use of marine genetic resources, the benefits of which usually come from research, innovation and commercial applications such as pharmaceuticals, biotechnology and aquaculture.

³⁰ This is quite different from the Nagoya Protocol benefits under CBD, where monetary benefits are shared bilaterally with mutually agreed terms but not necessarily applied towards advancement of the objectives of the CBD. See: IUCN, *op. cit.*, see footnote 11.

³¹ R. WYNBERG, *Biopiracy: Crying Wolf or a Lever for Equity and Conservation?*, in *Research Policy*, Vol. 52, No. 2, March 2023, Article 104674, p. 1. Available: <https://doi.org/10.1016/j.respol.2022.104674> (accessed 08 September 2025).

³² *Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ)*, Art. 11, para. 3, *op. cit.*, p. 8.

³³ IUCN, *op. cit.*, p. 29.

³⁴ *Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ)*, Art. 51, *op. cit.*, p. 46.

³⁵ Parties shall periodically submit to the access and benefit-sharing committee reports on their implementation of the provisions in this Part on activities with respect to marine genetic resources and digital sequence information on marine genetic resources of areas beyond national jurisdiction and the sharing of benefits therefrom, in accordance with this Part. See: *Ibid.*, Art. 16, para. 2, p. 15.

³⁶ *Ibid.*, Art. 12, para. 2, p. 9.

³⁷ *Ibid.*, Arts. 44-45, para. 2, pp. 40-41.

³⁸ IUCN, *op. cit.*, pp. 29-30.

³⁹ *Ibid.*, Art. 42, para. 4, p. 39.

⁴⁰ *Ibid.*, Art. 8, p. 6.

⁴¹ Among the committees it has created and previously mentioned are: "The Mechanism of Access and Benefit-Sharing", "the Special Fund" that finances capacity-building and implementation assistance activities, in addition to the "Implementation and Compliance Committee", and "The Capacity-Building and Transfer Marine Technology Committee".

⁴² Convention on the Inter-Governmental Maritime Consultative Organization (adopted 6 March 1948, entered into force 17 March 1958) ATS 1958 No 5. See: UN, *Convention on the Inter-Governmental Maritime Consultative Organization*, adopted 6 March 1948, entered into force 17 March 1958, in United Nations Treaty Series, Vol. 289, Nos. 4214–4226, New York, 1958, p. 3. Available at: <https://treaties.un.org/doc/Publication/UNTS/Volume%20289/v289.pdf> (accessed 12 September 2025).

⁴³ A. CHIRCOP, *The Role of the IMO in Protecting Marine Biodiversity*, in N. BOILLET – B. QUEFFELEC (eds.), *Le transport maritime et la protection de la biodiversité*, Éditions Pedone, Paris, 2021, p. 3.

⁴⁴ *London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*, adopted 13 November 1972, entered into force 30 August 1975, in *United Nations Treaty Series*, Vol. 1046, No. 15749, New York, 1977, p. 138. available at: <https://treaties.un.org/doc/publication/unts/volume%201046/volume-1046-i-15749-english.pdf> (accessed 13 September 2025).

Also: *London Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*, adopted 7 November 1996, entered into force 24 March 2006, Can. TS 2006.

⁴⁵ Dumping is defined broadly to include marine disposal from vessels, aircraft, platforms and structures and including their disposal, abandonment or toppling, as the case may be. The definition also includes storage of wastes or other matter in the seabed and subsoil. See: *Ibid.*, Art. 2, para. 1, Subpara. (a), p. 140.

⁴⁶ A. CHIRCOP, *op. cit.*, p. 4.

⁴⁷ *International Convention for the Prevention of Pollution from Ships*, adopted 2 November 1973, 1340 UNTS 184, as amended by the *Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships*, adopted 17 February 1978, entered into force 2 October 1983, 1340 UNTS 61, in United Nations Treaty Series, Vol. 1340, No. 22484, New York, 1992, p. 61. Available at: <https://treaties.un.org/doc/Publication/UNTS/Volume%201340/v1340.pdf> (accessed 14 September 2025).

⁴⁸ A Special Area is a "sea area where, for recognized technical reasons in relation to its oceanographical and ecological conditions and to the particular character of its traffic, the adoption of special mandatory methods for the prevention of pollution by oil, noxious liquid substances, sewage, or garbage, as applicable is required". Under the Convention, these Special Areas have been provided with a higher level of protection than other areas of the sea. See: INTERNATIONAL MARITIME ORGANIZATION (IMO), *2013 Guidelines for the Designation of Special Areas under MARPOL*, Resolution A.1087(28), adopted 4 December 2013, London, 21 February 2014, para. 1, p. 2. Available at: [https://www.wcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/AssemblyDocuments/A.1087\(28\).pdf](https://www.wcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/AssemblyDocuments/A.1087(28).pdf) (accessed 14 September 2025).

⁴⁹ INTERNATIONAL MARITIME ORGANIZATION (IMO), *International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS Convention)*, adopted 5 October 2001, entered into force 17 September 2008, Can. TS 2010 No. 15. Available at: <https://www.imo.org/en/About/Conventions/Pages/International-Convention-on-the->

Control-of-Harmful-Anti-fouling-Systems-on-Ships-(AFS).aspx (accessed 15 September 2025).

⁵⁰ Tributyltin (TBT): is a toxic organotin compound that belongs to the group of Persistent Organic Pollutants (POPs) and it is documented to cause severe sexual disorders development in aquatic fauna. See: K.R.V. BANDARA – S.D.M. CHINTHAKA – S.G. YASAWARDENE – P.M. MANAGE, *Modified, Optimized Method of Determination of Tributyltin (TBT) Contamination in Coastal Water, Sediment and Biota in Sri Lanka*, in *Marine Pollution Bulletin*, Vol. 166, May 2021, Elsevier, London. Available at: <https://doi.org/10.1016/j.marpolbul.2021.112202> (accessed 15 September 2025).

⁵¹ A. CHIRCOP, *op. cit.*, p. 19.

⁵² The Commission has strengthened its regional scientific cooperation through regional bodies and the Global Ocean Observing System, creating several regional sub-commissions, committees, project and programme offices and training centres of IOC, including: Africa and Adjacent Island States (IOCAFRICA); Caribbean and Adjacent Regions (IOCARIBE); Western Pacific (IOCWESTPAC); Central Indian Ocean (IOCINDIO); and Black Sea (BSRC). See: H. HARDEN-DAVIES, *Marine Science and Technology Transfer: Can the Intergovernmental Oceanographic Commission Advance Governance of Biodiversity beyond National Jurisdiction?*, in *Marine Policy*, Vol. 74, December 2016, pp. 260-267. Available at: <https://ro.uow.edu.au/lhapapers/2659> (accessed 20 September 2025).

⁵³ IOC was established by Resolution 2.31 adopted by the General Conference of UNESCO at its 11th session (Nov-Dec 1960) and in conformity with the recommendation of the Intergovernmental Conference on Oceanographic Research held at Copenhagen, in July 1960. see: UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION (UNESCO), *Conférence générale, 11e session, Paris, 1960*, Résolution 2.31 (11 C/Resolutions, CPG.61/VI.11), Doc. [1155], pp. 36-37. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000114583> (accessed 20 September 2025).

Also: INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (IOC), *Ocean Science for Sustainable Development*. Available at: <https://www.ioc.unesco.org/en> (accessed 20 September 2025).

⁵⁴ H. HARDEN-DAVIES, *op. cit.*, p. 2.

⁵⁵ The International Oceanographic Data and Information Exchange (IODE) of the Intergovernmental Oceanographic Commission (IOC) of UNESCO was established in 1961. Its purpose is to enhance marine research, exploitation and development, by facilitating the exchange of oceanographic data and information between participating Member States, and by meeting the needs of users for data and information products. The IODE programme coordinates a global network of more than 100 National Oceanographic Data Centres (NODCs), Associate Data Units (ADUs) and Associate Information Units (AIUs). These centres manage and make available millions of ocean observations that contribute to ocean data products and services developed and used by other IOC programmes, supporting a wide range of applications for the ocean community and society in general. See: UNESCO/IOC PROJECT OFFICE FOR IODE, *About IODE (Our History, the Community and Our Partners)*, Oostende, Belgium, 2025. Available at: <https://iode.org/about/> (accessed 22 September 2025).

⁵⁶ COMMISSION OCÉANOGRAPHIQUE INTERGOUVERNEMENTALE, *Ocean Biodiversity Information System (OBIS): Sound Scientific Ocean Management and Conservation Starts with Comprehensive Biodiversity and Biogeographic Data*, IOC/BRO/2021/2, Belgium, January 2021, p. 4. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000375489> (accessed 28 September 2025).

⁵⁷ OBIS currently records a total of 1.5 million marine species in marine areas beyond national jurisdiction. See: OCEAN BIODIVERSITY INFORMATION SYSTEM (OBIS),

ABNJ Statistics, 2025. Available at: <https://www.obis.org/area/1> (accessed 23 September 2025)

⁵⁸ DOOS is a network of networks working within the realm of the deep ocean (> 200m). and DOOS defines “deep ocean «as the area below the main thermocline (>2,000 m), with additional attention to shallower processes and mechanisms that are poorly sampled below the photic zone (>200 m) that influence the deeper depths. See: DEEP OCEAN OBSERVING STRATEGY (DOOS), *Our Deep Ocean Observing Strategy (Our Community)*, 2025. Available at: <https://www.deepoceanobserving.org/> (accessed 23 September 2025)

⁵⁹ Ocean monitoring is carried out through DOOS's Policy Liaison Team, which connects the contacts, voices, and messaging of multiple deep-ocean networks and organizations in reaching international policy makers through DOOS. This coordination helps alleviate the burden on the international community by addressing risks to various marine resources, particularly limited genetic resources vulnerable to biopiracy. See: L.A. LEVIN – L. CIMOLI – K. GJERDE – H. HARDEN-DAVIES – P. HEIMBACH – D. LA SCALA-GRUENEWALD – M. PACHIADAKI – H.R. PILLAR – L.M. SMITH – K. STOCKS – J.E. STOPA – D.J. WRIGHT, *Designing, Generating, and Translating Deep-Ocean Observations for and with International Policy Makers*, in *Journal of Marine Science*, Vol. 79, No. 7, 11 August 2022, p. 3. Available at: <https://doi.org/10.1093/icesjms/fsac143> (accessed 24 September 2025)

⁶⁰ L.M. SMITH – L. CIMOLI – D. LA SCALA-GRUENEWALD – M. PACHIADAKI – B. PHILLIPS – H. PILLAR – J.E. STOPA – S. BAUMANN-PICKERING – S.E. BEAULIEU – K.L.C. BELL – H. HARDEN-DAVIES – K.M. GJERDE – P. HEIMBACH – B. HOWE – F. JANSSEN – L.A. LEVIN – H.A. RUHL – A. SOULE – K. STOCKS – M.F. VARDARO – D.J. WRIGHT, *The Deep Ocean Observing Strategy: Addressing Global Challenges in the Deep Sea Through Collaboration*, in *Marine Technology Society Journal*, Vol. 56, No. 3, May–June 2022, pp. 51-52. Available at: <https://doi.org/10.4031/MTSJ.56.3.11>. (accessed 24 September 2025)

⁶¹ The Area and its resources are the common heritage of humankind. The Area covers around 54 per cent of the total area of the world's oceans. See: INTERNATIONAL SEABED AUTHORITY (ISA), *About ISA*, 2025. Available at: <https://www.isa.org.jm/about-isa> (accessed 24 September 2025)

⁶² *Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ)*, Art. 2, *op. cit.*, p. 4.

⁶³ Article. 8 (paragraph 3) of the Convention on the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction (BBNJ), specifically states that the promotion of international cooperation in marine scientific research and the development and transfer of marine technology shall be consistent with UNCLOS. Accordingly, the role and mandate of the International Seabed Authority in this area is enhanced under Articles 143, 144, 256, 273 and 274 of UNCLOS, allowing the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction. See: INTERNATIONAL SEABED AUTHORITY (ISA), *ISA's Contribution to the Conservation and Sustainable Use of Marine Biodiversity Beyond National Jurisdictions*, Policy Brief 06/2024, pp. 1-2. available at: <https://www.isa.org.jm/wp-content/uploads/2024/11/BBNJ-policy-brief.pdf> (accessed 25 September 2025); and *Agreement under the BBNJ*, Art. 8, para. 3, *op. cit.*, p. 6.

⁶⁴ *Ibid.*, Art. 19, paras. 2 and 4/e, p. 17.

⁶⁵ Despite granting such licenses, – the ISA has expressed numerous concerns regarding the fairness of benefit-sharing, the impact of mining on the legitimate uses of the sea, and the annual release of atmospheric carbon, which eventually becomes trapped in ocean sediments over the long term. in addition to the impact of deep-sea mining on biodiversity

which may affect the carbon pump that absorbs CO₂ daily in the short term, which raises concerns about intergenerational equity in benefiting from genetic resources. See: R. PARMENTIER, *Marine Protection and the High Seas Treaty: A 'Big Deal'*, Elcano Royal Institute – Global Presence, 17 March 2023. Available at: <https://www.realinstitutoelcano.org/en/commentaries/marine-protection-and-the-high-seas-treaty-a-big-deal/> (accessed 26 September 2025)

⁶⁶ FLANDERS MARINE INSTITUTE (VLIZ), *Marine Biotechnology in Mediterranean Sea Basin*, based on information compiled by the European Marine Board as part of the CSA Marine Biotech Project (2011–2013), August 2019. Available at: https://coastalwiki.org/wiki/Marine_Biotechnology_in_Mediterranean_Sea_basin? (accessed 26 September 2025)

⁶⁷ M. BARBIER – A. REITZ – K. PABORTSAVA – A.-C. WÖLFL – T. HAHN – F. WHORISKEY, *Ethical Recommendations for Ocean Observation*, in *Advances in Geosciences*, Vol. 45, Katlenburg-Lindau, Germany, 2018, p. 345. Available at: <https://doi.org/10.5194/adgeo-45-343-2018> (accessed 26 September 2025).

⁶⁸ M. BARBIER et al., *Ibid.*, p. 345.

⁶⁹ F. BRIAND – F. GLOECKNER – T. JACOBS, *Research Benefits for Whom?*, CIESM Scientific Committee on Marine Microbiology and Biotechnology, in *CIESM – The Mediterranean Science Commission*, Charter on Access and Benefit-Sharing for Blue Biotechnology Development and Against Biopiracy, Press Release, 23 June 2014. Available at: https://www.microb3.eu/sites/default/files/media_material/press_release/CIESM_Charter_Press%20release_23june_MicroB3.pdf

And <http://www.ciesm.org/forums/index.php?post/2013/03/14/CIESM-Charter-on-ABS> (accessed 27 September 2025).

⁷⁰ M. BARBIER et al., *op. cit.*, p. 346.

⁷¹ These include States and government agencies at the national and subnational levels, NGOs large and small, indigenous peoples' organisations, scientific and academic institutions and business associations. This diversity and expertise makes IUCN the global authority on the status of the natural world and the measures needed to safeguard it. See: IUCN, *About IUCN*, 2025. Available at: <https://iucn.org/about-iucn>. (accessed 27 September 2025)

⁷² IUCN, *Story: BBNJ Agreement for Ocean Conservation*, 12 June 2024. Available at: <https://iucn.org/story/202406/bbnj-agreement-ocean-conservation> (accessed 28 September 2025)

⁷³ This comment was prepared by:

- IUCN World Commission on Environmental Law - Ocean Specialist Group;
- IUCN World Commission on Protected Areas - High Seas Specialist Group;
- Ocean team, IUCN Centre for Conservation Action, International Union for Conservation of Nature. See: IUCN, *Commentary on the Further Revised Draft Text of an Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (A/CONF.232/2022/5)*, IUCN World Commission on Environmental Law – Ocean Specialist Group; IUCN World Commission on Protected Areas – High Seas Specialist Group; Ocean Team, IUCN Centre for Conservation Action, 8 August 2022. Available at: <https://iucn.org/sites/default/files/2022-08/igc5-iucn-commentary-on-bbnj-further-revised-draft.pdf> (accessed 28 September 2025)

⁷⁴ IUCN, *IUCN Closing Statement to UN IGC4 on Biodiversity Beyond National Jurisdiction Agreement*, New York, 18 March 2022. Available at <https://iucn.org/news/marine-and-polar/202203/iucn-closing-statement-un-igc4-biodiversity-beyond-national-jurisdiction-agreement> (accessed 28 September 2025)

⁷⁵ *Ibid.*

⁷⁶ Among the international organizations that contributed through statements delivered by their observers, either orally or via submissions made available on the meeting's webpage, in collaboration with the Subsidiary Body on Scientific, Technical, and Technological Advice (SBSTTA) at its twenty-fourth session (CBD/SBSTTA/24/12), particularly within Recommendation 9/24, are: The United Nations Environment Programme (UNEP) and the World Health Organization (WHO), ICLEI and the International Indigenous Forum on Biodiversity, Future Earth, the International Union for Conservation of Nature (IUCN), The Nature Conservancy, and the Wildlife Conservation Society (WCS). See: UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP), *Convention on Biological Diversity (CBD), Report of the Deliberations of SBSTTA (CBD/SBSTTA/24/12)*, Annex: Outcomes of SBSTTA at Its Twenty-Fourth Meeting on the Conservation and Sustainable Use of Marine and Coastal Biodiversity under Agenda Item 6, Geneva, Switzerland, 23 March 2022, pp. 100 - 137. Available at: <https://www.cbd.int/doc/c/403d/780c/318cb218f16e939fddf1076b/sbstta-24-12-en.pdf> (accessed 29 September 2025)

⁷⁷ The outcomes of these deliberations, while constrained by the challenges posed by the COVID-19 pandemic, highlighted the urgency of coordinated efforts to enhance biodiversity conservation in areas beyond national jurisdiction, particularly in advancing the post-2020. See: *Ibid*, pp. 100 - 101.