



OPEN ACCESS

EDITED BY

Yen-Chiang Chang,
Dalian Maritime University, China

REVIEWED BY

Wei Wang,
Zhejiang University, China
Zakieh Taghizadeh,
Université de Fribourg, Switzerland

*CORRESPONDENCE

Xiuwei An
✉ xiuweianne@163.com

RECEIVED 02 July 2025

ACCEPTED 22 August 2025

PUBLISHED 04 September 2025

CITATION

Wang C, Zhao M, Wang D and An X (2025)
On the provisions regarding access to
and benefit-sharing of MGRs under the
BBNJ agreement: from the perspective
of the concept of a maritime
community with a shared future.
Front. Mar. Sci. 12:1658332.
doi: 10.3389/fmars.2025.1658332

COPYRIGHT

© 2025 Wang, Zhao, Wang and An. This is an
open-access article distributed under the terms
of the [Creative Commons Attribution License](#)
(CC BY). The use, distribution or reproduction
in other forums is permitted, provided the
original author(s) and the copyright owner(s)
are credited and that the original publication
in this journal is cited, in accordance with
accepted academic practice. No use,
distribution or reproduction is permitted
which does not comply with these terms.

On the provisions regarding access to and benefit-sharing of MGRs under the BBNJ agreement: from the perspective of the concept of a maritime community with a shared future

Chuanliang Wang^{1,2,3,4}, Mengjie Zhao⁵, Dexin Wang¹
and Xiuwei An^{6*}

¹School of Law, Shandong Normal University, Jinan, China, ²School of Law, Dalian Maritime University, Dalian, China, ³School of Law, Tsinghua University, Beijing, China, ⁴Marine Academy of Zhejiang Province, Hangzhou, China, ⁵School of Law, Nanjing Normal University, Nanjing, China, ⁶School of Marxism, Shandong Normal University, Jinan, China

The BBNJ Agreement represents a new development in the field of the law of the sea. In particular, the implementation of the provisions regarding access and benefit-sharing (hereinafter, ABS) of marine genetic resources (hereinafter, MGRs) under the BBNJ Agreement emerges as a pressing issue for contracting Parties. In the process of implementing the provisions, there arises a compelling need to reach a consensus and coordinate interests with the concept of a maritime community with a shared future (hereinafter, MCSF). The connotations of the concept of MCSF could be interpreted from three dimensions: community of maritime interests, community of maritime responsibilities and community of maritime developments. Furthermore, it also explores the practical significance of the concept of MCSF in the implementation of the provisions regarding ABS of MGRs, focusing on ownership disputes, access management, and benefit-sharing regime. As a responsible major power, China should take the concept of MCSF as a guide, providing Chinese solutions for the implementation of the provisions regarding the ABS of MGRs from both a macro-level of global marine governance and a micro-level of implementation.

KEYWORDS

the BBNJ agreement, marine genetic resources, access to and benefit-sharing, a maritime community with a shared future, implementation

1 Introduction

On June 19, 2023, 193 Member States of the United Nations adopted the third implementing agreement to the United Nations Convention on the Law of the Sea (hereinafter, UNCLOS), 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* (hereinafter, BBNJ Agreement)¹. Part II of the BBNJ Agreement outlines its core objective: the promotion of “fair and equitable sharing of benefits arising from activities with respect to MGRs beyond areas of national jurisdiction, and sustainable use of marine biodiversity beyond areas of national jurisdiction”², and to build a rational framework of ABS of MGRs on this basis. As it relates to the maritime strategy and maritime rights and interests of each State party, there were major differences among States during the negotiations on the specific provisions to be set up. Through varying degrees of compromise and concession, the BBNJ Agreement ultimately established new systems and rules concerning these disputes. At the Intergovernmental Conference, the Chinese delegation advocated the concepts of a Community with Shared Future for Mankind (hereinafter, CSFM) and a Maritime Community with a Shared Future (hereinafter, MCSF), and actively promoted the adoption of the Agreement.

The concept of MCSF serving as a fundamental stance and strategy for China’s participation in global ocean governance (Wang, 2023), provides a novel approach to effectively manage and harmonize the diverse interests and concerns of countries. It has played a role in generating the system during the formulation of the BBNJ Agreement and will continue to play a guiding role in the implementation of the provisions regarding ABS of MGRs. Based on this, this paper interprets the meaning of MCSF in the field of global ocean governance, and argues from the theoretical level its guiding role in the formulation and implementation of the provisions; second, it reviews the disputes over the setting up of the provisions regarding ABS of MGRs during the negotiation process of the Agreement, and analyses the role and significance of the concept of MCSF in the process of resolving these disputes. Finally, based on the theoretical foundation of the concept of MCSF, it discusses the implementation path of the provisions and China’s legal response to the provisions. It should be noted that the legal and normative influence of the concept of MCSF on the regime of ABS extends not only to the BBNJ Agreement but also to other treaty negotiation processes and international legal frameworks governing the conservation of marine biodiversity, such as the *Convention on Biological Diversity* and the *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, Nagoya Protocol).

2 Legal foundations: the connotations of the concept of MCSF

On April 23, 2019, President Xi Jinping formally proposed the concept of MCSF when he met with the heads of foreign delegations invited to attend the 70th anniversary of the founding of the Chinese People’s Liberation Army Navy (PLAN) in Qingdao (Zhu et al., 2024). As an innovative development and practice of the concept of CSFM, in the maritime domain, this concept provides legal foundations for the implementation of the provisions regarding ABS of MGRs.

The elements the concept of MCSF in the context of the international law of the sea specifically refer to the association of the members of the community through joint cooperation in the maritime sphere, on the premise of respecting each other’s political and economic development, and on the basis of a consensus of action and a sense of belonging arising from common maritime interests (Xu and Tan, 2023). Specifically, The core essence of the concept of MCSF is based on the background of the integration of interests and mutual dependence of the international community, jointly enhancing marine welfare, and safeguarding the “community of maritime interests” (hereinafter, CMI) that has essentially formed among countries. The consensus for action on the concept of MCSF, embodied in the building of a “community of maritime responsibilities” (hereinafter, CMR) with shared responsibility on the basis of safeguarding common interests. And the ultimate goal of the concept of MCSF is to promote global ocean governance through the continuous adaptation of the interests of all Parties and based on a sense of shared responsibility, in order to jointly promote the prosperity and sustainable development of the oceans and seas, that is to promote the eventual formation of a “community of maritime developments” (hereinafter, CMD) by the international community.

2.1 Community of maritime interests

The oceans are a flowing whole, harboring a wealth of resources including marine mineral, chemical, biological and power resources, which are the natural material basis that carries the common interests of humanity (Chang, 2020). At present, the international community’s utilization of marine resources, especially MGRs as emerging resources, has expanded beyond areas of national jurisdiction (hereinafter, ABNJ). However, the long-standing idea of “freedom of the high seas” (FOS), States have traditionally held the notion that ocean resources are inexhaustible and infinite, leading them to prioritize resource exploitation and utilization over the preservation of sustainable development.

It is the limited and scarce nature of resources that has led to fierce competition among countries for the distribution of resources, thus intensifying conflicts of interest among countries.

1 A/CONF.232/2023/4, 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, available at <https://documents-dds-ny.un.org/doc/UNDOC/LTD/N23/177/28/PDF/N2317728.pdf?OpenElement>.

2 See the BBNJ Agreement, Article 9 (a).

Based on the principle of sovereign equality, each country tries to maximize its rights over common resources to counter the rights of others, which inevitably results in a stalemate of rights and leads to no one benefiting. On this basis, States have begun to change their views on the sustainable use of marine resources, giving rise to a logic of governance based on “Community Interests” for the management of marine resources beyond the limits of national jurisdiction (Bai, 2023).

In the field of international law of the sea, the *United Nations Convention on the Law of the Sea* (hereinafter, UNCLOS) states in its preamble that “Conscious that the problems of ocean space are closely interrelated and need to be considered as a whole”. This coincides with the core essence of the concept of MCSF, which seeks to express the pursuit of one’s interests while taking into account the legitimate concerns of others and guides states to consider the rights and interests of other states while being self-interested in implementing activities of areas beyond national jurisdiction. In the establishment of the BBNJ Agreement, the concept of MCSF has played a certain guiding role (Wang, 2023) and the Agreement on the acquisition and exploitation of MGRs adheres to the implementation objective of fair and equitable sharing of the benefits arising from the activities of the MGRs and the promotion of the conservation and sustainable use of the BBNJ, and focuses on realizing a balance between the pursuit of self-interest by countries in the development and exploitation of the MGRs, and the maritime rights and interests of other countries, as well as the common interests of mankind as a whole. It is important to strike a balance between the interests of each country in the exploitation of MGRs and the rights and interests of other countries and the common interests of mankind.

2.2 Community of maritime responsibilities

The concept of “community” was first introduced by the French Enlightenment thinker Rousseau in his book *Du Contrat Social*, where he argued that “each of us places himself and all his powers together under the supreme guidance of the convention, and we accept each member of the community as an integral part of the whole”. The German sociologist Ferdinand Tönnies argued that “the community emerges naturally, as the common understanding of all its members”. However, the “community” at the level of the international law of the sea is different from the philosophical and sociological ones mentioned above, in that the former places greater emphasis on the preservation of the common maritime interests of international members based on their interdependence, and thus pays greater attention to the creation of common maritime responsibilities.

Due to the lack of effective management institutions and protection mechanisms, the uncontrolled exploitation of BBNJ by various countries has not only caused environmental problems such as ecological damage but also led to the practical problem of benefit sharing. Against the background of this increasingly serious problem, the oceans and the future of mankind are inextricably linked, and all countries have the responsibility to undertake the corresponding obligations for the protection and sustainable

utilization of marine resources. On this basis, all countries are not only the CMI with common interests but also CMR with shared responsibilities.

The concept of CSFM advocates that all countries should “coexist in terms of interests, share rights and responsibilities” in their interactions with the international community (Xue, 2021), conforms to the development trend of modern international society and is an important concept of international law. The concept of MCSF advocates the establishment of a sense of community responsibility and the pursuit of the value of shared responsibility, which is precisely the expression of CMR at the theoretical level. In the concrete field of practice, the CMR has been gradually integrated into the normative documents formulated by the international community to participate in ocean governance and serves as a corresponding theoretical guide to urge States to share responsibility for the oceans within the framework of UNCLOS. Such as in the preamble of the BBNJ Agreement, the CMR is expressed as “States are responsible for the fulfillment of their international obligations concerning the protection and preservation of the marine environment and may be liable by international law” and “Desiring to act as stewards of the ocean in areas beyond national jurisdiction on behalf of present and future generations”, etc.

2.3 Community of maritime developments

The ultimate goal of the concept of MCSF is to ensure the sustainable development of the marine ecosystems of all countries, thereby promoting the common development of the oceans and seas of all countries, that is to say, to build the CMD under the dual model of “economy” and “ecology”, to share benefits and the guarantee of shared responsibility.

Promoting the development of the global ocean economy is the economic path of the CMD (Ma, 2020). With the progress and development of science and technology in all countries and the deepening of the understanding of the oceans, MGRs have been found to have a certain scientific potential and economic value, and the sharing of their benefits concerns the economic interests of members of the international community and the development of the global ocean economy. At the same time, a favorable marine ecological environment is the cornerstone of blue economy development. However, as the international community gradually recognizes the economic value of biological resources in BBNJ, countries are stepping up their exploitation and research and development efforts, which, coupled with insufficient efforts in governance and conservation, have caused serious damage to BBNJ and their habitats, and there is an urgent need for the international community to take measures to deal with it (Zhang, 2024). Therefore, the CMD, which aims at building an ecological civilization of the oceans and promoting the sustainable development of the marine economy, has not only become the basis for promoting the development of the international blue economy, but has also become the value guide for countries to implement the BBNJ Agreement.

Some of provisions of the BBNJ Agreement reflect the connotation of CMD. For example, the Agreement includes the monetary benefits of MGRs as one of the types of sharing (Mendenhall et al., 2023), and in the process of sharing, countries adhere to mutual benefit and win-win, and actively seek the “greatest common denominator” of the marine economic interests of all parties. At the same time, in order to avoid over-exploitation by some countries, which may lead to a shortage of resources, the Agreement, upholding the concept of sustainable development and the correct handling of the harmonious relationship between human beings and the sea, adopts restrictive measures on the acquisition of MGRs through the establishment of the Clearing-House Mechanism, which not only promotes the fair and effective utilization of MGRs but also contributes to the construction of a legal order for the conservation of BBNJ, as well as the research, protection and preservation of BBNJ.

3 Historical review: disputes and resolutions in establishing the provisions regarding ABS of MGRs

In establishing the provisions regarding ABS of MGRs, the concept of MCSF has played a guiding role in balancing the interests of all parties (Wang, 2021). The disputes among the parties mainly focus on the three aspects of the legal status of the MGRs, access management and benefit-sharing regime.

3.1 Freedom of the high seas or common heritage of mankind?

During the negotiation of the BBNJ Agreement, there were different arguments for applying the principle of Freedom of the Seas (hereinafter, FOS) or the principle of Common Heritage of Mankind (hereinafter, CHM) to the legal status of MGRs in ABNJ. Among them, the CHM principle has been considered as a solution to the “tragedy of the commons” of the oceans, providing a normative basis for the sustainable use of MGRs (Vadrot et al., 2022). The CHM principle represents a significant evolution in international law, reflecting humanity’s widespread recognition of shared responsibilities towards global resources (Taghizadeh, 2024). However, during the negotiation process of the BBNJ Agreement, the question of whether the CHM principle should be included in the Agreement and the dispute with the FOS principle have been at the center of discussions among some delegates (Tiller et al., 2019). Developed countries led by the United States, Russia and Japan, based on their advanced development technology and strong financial support, advocate the application of the FOS Principle, emphasizing “first-come, first-served” and “free-access”. On the other hand, most developing countries represented by the G77 bloc insist on the application of the CHM principle, and advocate that no country should possess resources in any form, and the benefits should be shared by all humanity.

The root of the controversy is that each Party has different goals and objectives based on the maximization of its own interests in the oceans and the evasion of its own responsibility for the maintenance and development of the oceans and seas (Wang, 2021). If the FOS principle is applied, it faces the theoretical dilemma of unfair resource allocation under formal justice, while if the CHM principle is applied, the dominance of countries with the most significant bargaining power makes it difficult to sustain the marine interests of other nations, leading to practical challenges in the distribution of MGRs. In light of the aforementioned dilemmas and the need for the sustainable development of marine ecosystems, the concept of MCSF with its inherent principles of CMI and CMR offers a consensus-building and conflict-resolution platform. The BBNJ Agreement provides new ideas for the negotiations by including both the CHM principle and the FOS principle in the general principles set out in Article 7, leaving some room for interpretation in the subsequent application of the regime.

The BBNJ Agreement, based on the FOS principle, stipulates that “Activities with respect to MGRs and digital sequence information on marine genetic resources of areas beyond national jurisdiction may be carried out by all Parties”³. It also emphasizes that these activities should “benefit of all humanity”⁴, with “taking into particular consideration the interests and needs of developing States”⁵, and should “be carried out exclusively for peaceful purposes”⁶, etc. The CHM principle deeply rooted in the idea of shared ownership, shared stewardship and shared responsibility for global commons and highly valuable resources, aligns with the overarching goals of UNCLOS to promote sustainable and equitable access to and utilization of genetic resources while taking into account the protection and preservation of the marine environment (Taghizadeh, 2024). It advocates peaceful use and sustainable use of MGRs for the benefit of mankind as a whole, which conforms to the institutional propositions of the concept of MCSF in the field of the law of the sea. However, compared to the idealism of purely applying the CHM principle, the concept of MCSF not only demonstrates concern for common interests but also recognizes the need to acknowledge and respect the necessary space for the survival and development of sovereign states, reflecting a more pragmatic value rationality.

3.2 Free access or regulation?

Access is the pivotal act that ignites the value chain of that genetic resource. Therefore, how and whether to regulate access to MGRs is another controversial dilemma in the negotiation of the BBNJ agreement.

Developed countries emphasize that the collection *in situ* of MGRs inherently falls under the freedom of marine scientific research stipulated in the FOS principle of the UNCLOS. To

3 See the BBNJ Agreement, Article 11(1).

4 See the BBNJ Agreement, Article 11(6).

5 See the BBNJ Agreement, Article 11(6).

6 See the BBNJ Agreement, Article 11(7).

maximize the creative transformation of resource value, it is argued that a regime of free access should be applied, thus opposing any form of regulation during the acquisition phase. However, developing countries not only demand that access be included in the BBNJ Agreement for unified and standardized management but are also advocate for expanding the types of acquisition beyond *in situ* collection. They further call for strict procedural conditions to be set, including prior informed consent before acquisition, public disclosure of acquisition information, and comprehensive oversight throughout the entire process (Hu, 2020).

Adopting an unrestrained mode of free access to MGRs, not only physical materials but also digital sequence information, would lead to developed countries monopolizing development opportunities and enjoying development benefits. Therefore, it is imperative to include the regulation of the access of MGRs within the framework of the BBNJ Agreement. However, according to the requests of developing countries, adhering to the access mechanism outlined in the Nagoya Protocol adopted by the United Nations in 2010, specifically advocating for the principle of “prior informed consent”, is not desirable. This is because this model implies that countries would need to incur additional costs for applications, which contradicts the goal of promoting marine scientific research and is detrimental to scientific innovation. Additionally, whether strict oversight should be applied to the access management procedures is also a matter open to debate. The development of MGRs itself is a venture fraught with considerable risks, and implementing a rigorous access management framework could potentially create unnecessary institutional barriers to their development and utilization.

The concept of MCSF advocates for active engagement from all nations in the research, development, and technological utilization of MGRs to achieve mutual benefits, while also striving to maximize the sustainable utilization of marine biodiversity. This aligns with the ultimate goal of the access regime for MGRs. Therefore, guided by the concept, the BBNJ Agreement has finally established an access regime that aims at implementing benefit sharing and managing the access of MGRs appropriately, providing a new solution to break the access dilemma.

3.3 How to determine the scope and regulatory model of benefit-sharing?

Benefit-sharing of MGRs stands as the core of their development and utilization, serving as both the cause and purpose behind disputes over their legal attribute delineation and access management. The primary controversies revolve around the scope of benefit-sharing, while issues concerning regime regulation also remain to be resolved.

Regarding the scope of benefit-sharing, the traditional focal point of debate revolves around whether monetary benefits should be included. Developed countries, represented by the United States and Japan, are opposed to monetized benefit-sharing, arguing that MGRs are essentially high seas resources and are not included in the scope of resources of the international seabed area as stipulated in

UNCLOS (Vadrot et al., 2022). The FOS principle should be applied to their development, and there is no legal basis for benefit-sharing. Moreover, since the development of MGRs has a long period of time, high input costs and uncertain benefits (Roland, 2023), the disadvantages of adopting monetized benefit-sharing outweigh the advantages, and therefore developed countries are willing to share benefits with developing countries, but only on a voluntary basis and in non-monetary terms. The uneven global distribution of capacity for the commercial exploitation of biogenetic resources has allowed a few developed countries to monopolize the economic benefits derived from MGRs. For this reason, during the negotiations at the Intergovernmental Conference on the BBNJ Agreement, most developing countries, represented by the Group of 77 and China, emphasized that the new agreement should safeguard the interests of the international community as a whole and the common interests of all countries, and that marine genetic resources should be ‘easily accessible’ and their benefits ‘reasonably shared’.

The concept of MCSF, with the basic connotation of common benefit and common prosperity, aiming to maximize consensus among Parties. It emphasizes addressing conflicts of interest between developed and developing countries and balancing the contradiction between the utilization of genetic resources and the protection of biodiversity, aligning with the objectives of benefit-sharing systems. Therefore, the BBNJ Agreement, guided by this principle, adopts a comprehensive institutional model in the construction of the benefit-sharing system for MGRs. Based on the overarching awareness of the principle of MCSF and the ethos of “extensive consultation, joint contribution and sharing”, the agreement establishes a dual-track sharing mechanism that encompasses both monetary and non-monetary benefits.

In line with the concept of MCSF, the BBNJ Agreement, based on the concept of safeguarding the common interests of all mankind, advocates that the system of ABS of MGRs should not only guarantee a liberal scientific research environment for some countries, but also satisfy the requirements of developing countries in terms of benefit-sharing, which once again embodies the objective of the conservation and sustainable use of BBNJ.

4 Practical actions: specific pathways and China’s responses

The BBNJ Agreement, as a complement to and improvement of UNCLOS over the past 30 years, is a milestone breakthrough in the field of the international law of the sea and opens a new chapter in global ocean governance, while the next key should focus on the implementation of the Agreement and the fulfilment by States. It requires States parties to take the necessary legislative, administrative or policy measures to ensure the fulfilment of the relevant access control responsibilities in order to create the conditions for benefit-sharing.⁷ However, it is undeniable that, as in the case of other international agreements, the interpretation and

⁷ See the BBNJ Agreement, Article 14(11).

implementation of the provisions of the BBNJ Agreement by each party will inevitably adhere to its own position, and disputes will inevitably arise (De Santo et al., 2020). Therefore, the concept of MCSF is needed to bridge differences, build consensus, and properly address and coordinate the different conflicting interests of countries so that they can effectively fulfil the relevant provisions of the Agreement.

4.1 Specific pathways: treaty interpretation and implementation mechanisms

4.1.1 Treaty interpretation

As mentioned earlier, in order to bridge the differences between developing and developed countries and to facilitate the introduction of the BBNJ Agreement, the Agreement has appropriately whitewashed the specific controversial provisions regarding ABS of the MGRs, resulting in the lack of mandatory operational norms for the contractual obligations involved in certain specific provisions, and the fulfilment of which relies to a large extent on the interpretation and discretion of the parties, which may give rise to uncertainty and even conflict of laws (Freestone, 2011). According to the Vienna Convention on the Law of Treaties, flexibility in treaty interpretation is needed to clarify the exact meaning of the specific provisions regarding ABS of the MGRs.

First, the interpretation of the provisions regarding legal status of MGRs. To begin with, the BBNJ Agreement does not clearly stipulate the principle of commercial exploitation of MGRs, so the current development of MGRs is not necessarily subject to the FOS principle, which was originally designed to break the monopoly and monopoly of a few countries over marine resources, whereas the current commercial exploitation of MGRs is based on the rule of 'first-come, first-served', which is contrary to the value and pursuit of the FOS principle. Next, limiting the application of the FOS principle and expanding the application of the CHM principle is the trend of the evolution of the international law of the sea. Nowadays, in the context of the increasingly strong sense of international community, the CHM principle is not only the intrinsic foundation of a fair ocean governance system, but also the normative basis for the distribution of common resources among countries. As a responsible country, China, during the negotiation process of the BBNJ Agreement, advocated the construction of MCSF, and continuously forged consensus in the formulation of the system of ABS of MGRs, so that many of the provisions of the Agreement show full concern for the common interests of the international community, and the objectives of the CHM principles of "promoting equity, sharing the benefits of the marine derived economy, and conserving marine biodiversity" are in line with them.

Second, the interpretation of the provisions regarding access to MGRs. The BBNJ Agreement establishes a 'facilitated access regime' based on the principle of encouraging marine scientific research, that is to say, it adopts a weakly restrictive and free access regime for MGRs in ABNJ. As mentioned above, the Agreement establishes a

chain-wide information exchange mechanism for the acquisition of MGRs as a means of regulating the acquisition phase. However, taking into account the claims of developed countries, the Agreement does not set out a strict regulatory procedure in the specific provisions, but rather embodies "taking into account current international practice"⁸, "in accordance with the current international practice"⁹, etc., To a certain extent, the obligation of States to notify information has been weakened, and therefore, such weakly restrictive wording still needs to be further defined or supplemented by national legal interpretation organs through treaty interpretation.

Third, the interpretation of the benefit-sharing rules. The BBNJ Agreement postponed the formulation of the specific rules on benefit-sharing of MGRs currencies by setting up mandatory annual contributions in order to temporarily balance the conflicting interests of the parties, but the subsequent formulation of the specific rules is still dependent on the fulfilment of the parties' obligations to make contributions to the Agreement. The Agreement is committed to reaching a new agreement that develops progressively during the negotiation process, so it can neither stagnate nor disregard the existing system to create a new one. Taking the concept of MCSF as a theoretical basis, the mandatory annual contributions should be reasonably interpreted by States as being in the common interest of each State Party, and measures could be taken to encourage voluntary contributions on the basis of the mandatory contributions, which would be allowed to be used to offset some of the mandatory monetary benefit-sharing obligations on the basis of compliance with the international regulatory basis, and so on. At last, to reconcile principle divergences within the benefit-sharing provisions of BBNJ Agreement, a phased benefit-sharing mechanism is recommended. In the initial stage, a flexible management approach aligned with FOS principle would permit nations to freely access MGRs after simple registration, facilitating deep-sea biodiversity research. As MGR development progresses toward commercialization, the CHM principle should be gradually introduced, with clear trigger conditions established at patent application, product development, or market sale stages to activate benefit-sharing obligations (Steel and Wang, 2025).

4.1.2 Implementation mechanisms

The BBNJ Agreement has created many new institutions and governance mechanisms for the realization of ABS of MGRs, including the establishment of the ABS Committee and the Clearing-House Mechanism for detecting and managing the economic benefits derived from MGRs, and the establishment of mechanisms such as the Area-based management tool and the environmental impact assessment, in order to realize the objectives of BBNJ in terms of conservation and sustainable use. However, the specific rules and operating procedures of the above mechanisms are not clearly stipulated in the Agreement, so in order to effectively implement the ABS system, it is still necessary for countries to

⁸ See the BBNJ Agreement, Article 12(2)(j).

⁹ See the BBNJ Agreement, Article 12(6).

strengthen international cooperation through new consultations in the course of practice, and to take action to inject vitality into the specific implementation mechanisms (Tiller and Mendenhall, 2023).

First, the improvement of the Clearing-House Mechanism. According to Article 12 of the BBNJ Agreement, at the three stages of *in situ* collection, *ex situ* acquisition (here mainly refers to the acquisition of resource samples in MGRs repositories) and exploitation, each party is required to notify the clearing-house mechanism set up by the BBNJ Agreement,¹⁰ so as to lay the foundation for the subsequent benefit-sharing. The clearing-house mechanism monitors access to MGRs through the establishment of a clearing-house platform, whereby States Parties can be informed of access to and research on MGRs by other States or organizations, subject to provisions of information on their own access. Next, the Agreement establishes an ABS committee to fulfil the work of benefit-sharing and make recommendations to the Conference of the Parties on the basis of the information provided by countries on access to and benefit-sharing of MGRs. Learn from the Global Biodiversity Framework-related Decisions, these regulations include a notification system that creates transparency and permits the monitoring of these provisions at various stages of the value chain (Taghizadeh, 2024). However, the specific rules of the clearing-house mechanism, as a mechanism for monitoring the transparency of access to resources, have not yet been clearly defined. In the process of subsequent notification of information, it is still necessary for States Parties to strengthen international cooperation with the goal of benefit sharing, further refine the relevant system, and promote the linkage between the clearing-house mechanism and genebanks, so as to facilitate the accumulation of high-quality information on access to MGRs and the innovative use of such information. At the same time, States Parties should proactively publish information on access to resources, promote the sharing of information on MGRs, and build a global network information base on MGRs, so as to encourage countries to proactively provide access information for the purpose of accessing resources in genebanks, and to lay the foundation for subsequent benefit-sharing of MGRs.

Second, the interface with other regimes of the BBNJ Agreement. For one thing, Area-Based Management Tools (hereinafter, ABMTs), which regulate specific marine areas through the establishment of MPAs, have a unique status and role in balancing the exploitation and acquisition of marine living resources, especially MGRs, with their conservation. Furthermore, due to the increasing exploitation and research and development of MGRs, coupled with the lack of effective management and conservation, serious irreversible damages have been caused to the marine ecological environment, the introduction of Environmental Impact Assessments (hereinafter, EIAs) system as a precautionary protection measure before the acquisition of MGRs is particularly necessary.

Although the BBNJ Agreement provides for a monetary benefit-sharing system for MGRs, in practice, non-monetary benefits such as Capacity Building and Marine Technology Transfer (hereinafter

referred to as CBTT) are still the main source of benefits. In addition, through the establishment of the CBTT Committee, the Agreement helps countries that do not have the capacity to access MGRs, especially the least developed countries (LDCs), geographically disadvantaged countries (GDCs) and small island developing States (SIDS), to participate in the development and use of MGRs (Collins et al., 2019), and this can, to a certain extent, rectify the problem of unequal opportunities for benefit-sharing of MGRs arising from the lax access regime.

However, the provisions of the BBNJ Agreement on the establishment of the above mechanism still have institutional gaps and lack an effective implementation mechanism, imposing only the obligation on parties to 'ensure that activities in maritime areas beyond national jurisdiction under their jurisdiction or control' are in conformity with the obligations established under the Agreement. Moreover, the system regarding MGRs in ABNJ is different from other areas that require CBTT, and requires long-term and comprehensive technical support from the exporting countries, so developing and developed countries are faced with the difficulties of objective capacity and subjective willingness in the process of compliance, which are still to be filled in and clarified by the Parties in the future.

In view of this, it is necessary to take the concept of MCSF as a guide in the follow-up process of implementation, and with the goal of safeguarding the common interests of the international community, encourage the parties to actively participate in the mechanism construction of the above-mentioned institutions, and promote the formulation and improvement of the relevant norms. At the same time, it is necessary to take the initiative to strengthen the communication and coordination of interests among countries, and to promote the Conference of the Parties to formulate and introduce more reasonable specific standards and guidelines on the basis of shared interests. Developed countries are encouraged to provide developing countries with data exchange and financial support, and at the same time effectively enhance their endogenous capacity for the conservation and sustainable use of MGRs through technical training and joint development, so as to promote developed and developing countries to focus on their willingness to cooperate, build a cooperation mechanism, seek common development while sharing responsibilities, and achieve fair and equitable sharing of the benefits of MGRs.

4.2 China's responses: convergence of laws and domestic legislation

The report of the twentieth CPC National Congress emphasizes "strengthening legislation in key, emerging and foreign-related areas, and promoting the rule of law at the national level and in foreign-related areas in an integrated manner" (Xi, 2023). In the process of building a system of ABS for MGRs, China, as a member of the United Nations and a party to the BBNJ Agreement, should actively fulfil its international obligations in the strategic context of promoting the rule of law at the domestic level in an integrated manner with the rule of law relating to foreign affairs, and, based on

¹⁰ See the BBNJ Agreement, Article 12.

the concept of MCSF, build a comprehensive and appropriate domestic legal system in China, while strengthening global maritime governance and promoting the effective implementation of the BBNJ Agreement.

4.2.1 Convergence of laws

At present, China has not yet formed a specialized legal system on the exploration, exploitation and protection of ABNJ resources, and the *Law of the People's Republic of China on Exploration and Development of Deep Seabed Regional Resources* (hereinafter, *Deep Sea Law*), *Marine Environment Protection Law of the People's Republic of China* (hereinafter, *Marine Environmental Protection Law*) and *Biosecurity Law of the People's Republic of China* (hereinafter, *Biosecurity Law*) are relevant to the ABNJ marine activities and the ABS regime for biogenetic resources are relevant.

First, the Deep Sea Law was enacted prior to the adoption of the BBNJ Agreement, making it difficult to bring it into line with the new provisions of the Agreement, and it primarily regulates activities related to mineral resources in the Area. In addition, with regard to international cooperation, the Deep Sea Law does not address the specifics of international cooperation on access to resources in ABNJ, and lacks clear provisions and guidance on international cooperation and multi-stakeholder participation, as well as detailed requirements for the fulfilment of obligations (Quan, 2024). Therefore, with the goal of promoting the building of MCSF, it should be appropriately aligned with the BBNJ Agreement and, in the course of the implementation of the law, establish a Clearing-House Mechanism and exploration of international cooperation, support the adoption of various forms of interaction and communication, including informal consultations, and promote the reaching of a common understanding among all parties on international cooperation and the assumption of responsibilities.

Second, article 36 of the *Marine Environmental Protection Law* clearly stipulates that the State shall strengthen the protection of marine biodiversity, improve the system of investigation, monitoring, assessment and protection of marine biodiversity, and implement effective protection of important biological genetic resources in the exploitation of marine resources¹¹. However, the *Marine Environmental Protection Law* applies to the sea areas under the jurisdiction of China¹², and as a general law in the field of marine environmental protection, there is a system gap between this law and the BBNJ Agreement. It is therefore recommended that when the law is revised, principle provisions on the conservation and sustainable use of BBNJ should be added, so as to establish general law support for a future special law regulating this issue.

Third, Article 6 of the *Biosecurity Law* stipulates that the State shall strengthen international cooperation in the field of bio-safety, fulfil its obligations under international treaties it has concluded or to which it has acceded, and actively participate in the research and

formulation of international rules on biosafety. Although the Act was amended in April 2024, MGRs were not included in the legal provisions, and provisions such as those on the regulation and utilization of genetic resources are too broad, and there is a lag in responding to the BBNJ Agreement. Therefore, in the subsequent revision process, it is necessary to expand the scope of application of Chapter 6 of the Biosafety Law, "Human Genetic Resources and Biological Resources Security", and add the relevant provisions on the security of MGRs of the ABNJ, and at the same time, establish a monitoring and management mechanism compatible with the BBNJ Agreement, and refine and improve the system of risk lists, information sharing and assessment and early warning of MGRs, assessment and early warning system (Shi and Zeng, 2024).

In addition, in March 2017, the Ministry of Ecology and Environment issued a "Letter on Publicly Soliciting Opinions on the Draft Regulations on Access and Benefit-Sharing of Biological Genetic Resources (Draft)", but no substantial progress has been made so far (Shi and Zeng, 2024). Similarly, the Regulations on Access and Benefit-Sharing of Biological Genetic Resources (hereinafter, the Regulations) are limited to areas within China's jurisdiction, and cover access and benefit-sharing mechanisms, such as prior informed consent, clarification of the forms of benefit-sharing, including monetary and non-monetary benefits, and the establishment of a fund for the protection of genetic resources and benefit-sharing, among others. As an administrative regulation specifically regulating ABS in areas within China's jurisdiction, the relationship between this regulation and China's fulfilment of the provisions of the BBNJ Agreement on ABS for MGRs in ABNJ should be resolved during the legislative process. In addition, the *Basic Law of the People's Republic of China on Oceans and Seas* has also been included in China's legislative program, and as China's basic law on oceans and seas, it is necessary to be appropriately forward-looking in its legislative process, so as to implement the treaty obligations of the BBNJ Agreement and to deal with the relationship of articulation with the relevant domestic special laws.

4.2.2 Domestic legislation

China's domestic legislation on the regime regarding ABS of MGRs is not yet in place, and as a concrete practice to promote the rule of law at the national level and the rule of law in relation to foreign affairs in a coordinated manner, it should be guided by the concept of MCSF, and the form, concept and content of the legislation should be clarified. At the same time, it should actively fulfil its obligations under international law and promote a complete domestic legal system to the international arena, so as to provide a Chinese template for States parties to implement the regime regarding ABS of MGRs under the BBNJ Agreement.

First, the form of the legislation. Although the *Deep Sea Law* involves relevant provisions of the ABNJ marine legal regime, its scope of application is mainly limited to the mineral resources of the Area, and does not directly regulate activities related to MGRs. China has made great progress in marine scientific research and marine technology, and has demonstrated a certain degree of competitiveness in the field of MGRs research in ABNJ, which requires domestic laws on access to and benefit-sharing of MGRs in

11 See the Marine Environment Protection Law of the People's Republic of China, Article 36(1) and 36(2).

12 See the Marine Environment Protection Law of the People's Republic of China, Article 2.

the ABNJ to specifically regulate, standardize and safeguard the orderly conduct of related activities. Furthermore, the BBNJ Agreement stipulates that “Parties shall take the necessary legislative, administrative or policy measures, as appropriate, to ensure the implementation of this Agreement”¹³. Therefore, one of the ways to fulfil the obligations under the Agreement is to enact domestic laws, and in addition to the above linkage with the relevant laws, it is recommended that a targeted domestic law be established to regulate the activities related to the acquisition of MGRs and benefit-sharing under the ABNJ Agreement, while at the same time being in line with the BBNJ Agreement.

Second, the legislative philosophy. The BBNJ Agreement was formulated around guaranteeing the conservation and sustainable use of BBNJ, so in formulating the relevant domestic legal norms, attention should be paid to the concept of China’s marine legislation in line with international standards, stressing the equal importance of the conservation and use of BBNJ. At the same time, the concept of MCSF should be used as a guide to adjust the concept of marine conservation and utilization from territorialism to the aspect of paying more attention to international cooperation and co-beneficial legislation (Wang and Chen, 2024). In the subsequent process of formulating legal norms for MGRs in ABNJ, consideration will be given to strengthening cooperative and co-beneficial marine legislation on the premise of safeguarding national sovereignty, security and development interests, so as to create a new path of international win-win development.

Third, the content of legislation. In the first place, with regard to the access regime, a specialized agency should be set up to regulate the access to MGRs and disclose information, pay attention to coordinating the information sharing and supervisory responsibilities among relevant departments, and formulate a domestic information notification system and a traceability monitoring system for the development and utilization of MGRs. Next, in terms of the benefit-sharing system, refine the specific rules on the payment rate and payment mode for the delayed construction of the agreement, and determine the payment rate of less than 1 per cent on the premise of stimulating the developers’ scientific and technological innovation and R&D inputs, with reference to the application of the provisions of the *International Treaty on Plant Genetic Resources for Food and Agriculture*. Finally, in terms of the monitoring system, establish the domestic ABS Committee and the Clearing-House Mechanism, etc., which are appropriate to the BBNJ Agreement, and improve its specific operating procedures and rules of procedure in accordance with China’s own maritime rights and interests.

5 Conclusions

After 19 years of negotiation, the BBNJ Agreement was finally approved, establishing new governance mechanisms and formulating a new legal framework for ocean affairs, with significant implications across various sectors of the international community. The implementation and execution of the provisions

regarding the ABS of MGRs, a core issue within the Agreement, has become a new maritime dispute faced by States Parties today. The subsequent efforts to promote compliance will lead to a restructuring of the global maritime interest landscape, highlighting the practical necessity of coordinating various interests under the concept of MCSF.

Interpreting the concept of MCSF through three dimensions—CMI, CMR, and CMD—illuminates its theoretical groundwork for implementation. Its core essences include shared benefits, the pursuit of shared responsibilities, and the ultimate goal of common development. By analyzing the specific text of the Agreement and addressing issues such as ownership disputes, access management, and benefit-sharing related to MGRs, the concept of MCSF seeks to resolve the challenges in implementation by reconciling the principles of CHM and FOS, establishing an appropriate yet limited regime for resource access and a comprehensive system for benefit-sharing. This approach provides a new pathway for the establishment for the provisions regarding ABS of MGRs, thereby offering practical significance for the effective implementation of the Agreement.

To this end, China needs to pursue a strategy of internal and external development at both the macro level of global ocean governance and the micro level of domestic legal system construction. The implementation of the BBNJ Agreement presents a crucial opportunity for effectively advancing the institutional transformation of the concept of MCSF, thereby providing China with strategies to respond to the international community’s efforts to implement the provisions regarding the ABS of MGRs.

The concept of MCSF as China’s international approach to participating in global ocean governance, continuously consolidates consensus and coordinates interests among different Parties in establishing a system for the ABS of MGRs. It provides theoretical guidance and a systemic foundation for its implementation. As a responsible major power, China should actively fulfill its international legal obligations and promote the establishment of a long-term effective international soft law governance mechanism, enhancing the enthusiasm and effectiveness of various countries in fulfilling their treaty obligations.

Simultaneously, it is necessary to construct a domestic legal system that resonates with international soft law. On the foundation of perfecting laws and regulations such as the Deep Sea Law and the Biosafety Law, China should establish a mature and effective domestic legal system for MGRs through standalone legislation. This approach would facilitate the integration and development of marine interests beyond national jurisdiction with the common interests of the international community, thereby contributing to China’s response to the international society.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary Material. Further inquiries can be directed to the corresponding author.

¹³ See the BBNJ Agreement, Article 53.

Author contributions

CW: Writing - original draft, Writing - review & editing, Conceptualization. MZ: Writing - original draft. DW: Writing - review & editing, Funding acquisition. XA: Writing - review & editing, Supervision.

Funding

The author(s) declare financial support was received for the research and/or publication of this article. This work was supported by the Key R&D Program (Soft Science Project) of Shandong Province, China (Grant No. 2025RKY0703), the Social Science Planning Research Project of Shandong Province (Grant No. 24CFXJ10) and the China Postdoctoral Science Foundation (Grant No. 2023M730456).

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

- Bai, J. Y. (2023). Evolution of the international rule of law in maritime areas beyond national jurisdiction and opportunities for China (in Chinese). *Study Explor.* 2, 73–85. doi: 10.3969/j.issn.1002-462X.2023.02.010
- Chang, Y. C. (2020). On legal implementation approaches toward maritime community with shared future. *China Legal Sci.* 8, 3–31.
- Collins, J. E., Harden-Davies, H., Jaspars, M., Thiele, T., Vanagt, T., and Huys, I. (2019). Inclusive innovation: Enhancing global participation in and benefit sharing linked to the utilization of marine genetic resources from areas beyond national jurisdiction. *Mar. Policy* 109, 103696. doi: 10.1016/j.marpol.2019.103696
- De Santo, E. M., Mendenhall, E., Nyman, E., and Tiller, R. (2020). Stuck in the middle with you (and not much time left): The third intergovernmental conference on biodiversity beyond national jurisdiction. *Mar. Policy* 117, 103957. doi: 10.1016/j.marpol.2020.103957
- Freestone, D. (2011). Responsibilities and obligations of states sponsoring persons and entities with respect to activities in the area. *Am. J. Int. Law* 105, 755–760. doi: 10.5305/amerjintlaw.105.4.0755
- Hu, B. (2020). Controversies in ABNJ marine genetic resources exploitation and their resolution: on the role of China in the “South-north divides” (in Chinese). *Pac. J.* 28, 59–71. doi: 10.14015/j.cnki.1004-8049.2020.06.005
- Ma, J. X. (2020). The connotation and path of building “a Marine Community with a shared future” from the perspective of global ocean governance (in Chinese). *Pac. J.* 28, 1–15. doi: 10.14015/j.cnki.1004-8049.2020.09.001
- Mendenhall, E., Tiller, R., and Nyman, E. (2023). The ship has reached the shore: the final session of the ‘Biodiversity beyond national jurisdiction’ Negotiations. *Mar. Policy* 155, 105686. doi: 10.1016/j.marpol.2023.105686
- Quan, Y. B. (2024). The development of global deep sea resources policy and China’s path: perspectives from the BBNJ agreement (in Chinese). *Chin. J. Maritime Law* 35, 53–63.
- Roland, H. R. J. (2023). Exploiting the deep seabed for the benefit of humankind: A universal ideology for sustainable resource development or a false necessity? *Leiden J. Int. Law* 37, 1–23. doi: 10.1017/S092215652300064X
- Shi, J. Y., and Zeng, J. (2024). International experience and Chinese model of legal governance of biosafety (in Chinese). *Academics* 3, 53–64.
- Steel, R., and Wang, W. (2025). Unlocking the global commons: legal analysis of benefit-sharing for marine genetic resources in the BBNJ agreement. *Front. Mar. Sci.* 12. doi: 10.3389/fmars.2025.1541331
- Taghizadeh, Z. (2024). Marine Genetic Resources as Common Heritage of Mankind under the BBNJ Agreement: The International Community toward a Pragmatic Benefit-Sharing Approach? *Int. J. Biodivers. Conserv.* 34, 131–153. doi: 10.1007/s10531-024-02962-2
- Tiller, R., De Santo, E., Mendenhall, E., and Nyman, E. (2019). The once and future treaty: Towards a new regime for biodiversity in areas beyond national jurisdiction. *Mar. Policy* 99, 239–242. doi: 10.1016/j.marpol.2018.10.046
- Tiller, R., and Mendenhall, E. (2023). And so it begins – The adoption of the ‘Biodiversity Beyond National Jurisdiction’ treaty. *Mar. Policy* 157, 105836. doi: 10.1016/j.marpol.2023.105836
- Vadrot, A. B. M., Langlet, A., Tessnow-von, and Wysocki, I. (2022). Who owns marine biodiversity? Contesting the world order through the ‘common heritage of humankind’ principle. *Environ. Politics* 31, 226–250. doi: 10.1080/09644016.2021.1911442
- Wang, C. L. (2021). On the legal status of marine genetic resources in areas beyond national jurisdiction. *Sustainability* 13, 7993. doi: 10.3390/su13147993
- Wang, C. L. (2023). The significance of the concept of a maritime community with a shared future in the international law-making process: Taking the BBNJ Agreement as an example. *Mar. Policy* 149, 105509. doi: 10.1016/j.marpol.2023.105509
- Wang, Y., and Chen, X. R. (2024). Theoretical analysis and specific paths of the alignment of China’s ocean law with the BBNJ agreement (in Chinese). *J. Yangzhou Univ. (Humanities Soc. Sciences)* 28, 66–80. doi: 10.19411/j.cnki.1007-7030.2024.04.006
- Xi, J. P. (2023). *Holding High the Great Banner of Socialism with Chinese Characteristics and Striving in Unity for the Comprehensive Construction of a Modernised Socialist Country-Report on the Twentieth National Congress of the Communist Party of China (in Chinese)* (Beijing: People’s Publishing House) 2023.
- Xu, Q., and Tan, Z. (2023). Building a maritime community with a shared future: Scholarly reflections on China’s new ocean vision. *Mar. Policy* 149, 105508. doi: 10.1016/j.marpol.2023.105508
- Xue, G. F. (2021). The concept of maritime community with a shared future: the transition from consensus discourse to institutional arrangement from the perspectives of BBNJ instrumental consultation (in Chinese). *Law Sci. Magazine* 42, 53–66. doi: 10.16092/j.cnki.1001-618x.2021.09.005
- Zhang, S. B. (2024). Monetary benefit-sharing of marine genetic resources in BBNJ agreement: construction logic, deficiency and perfection (in Chinese). *J. Boundary Ocean Stud.* 9, 20–40.
- Zhu, X., Mao, Z., Qu, J., and Zhang, Z. (2024). Historical logic and maritime cultural foundation of China’s initiative of building a maritime community with a shared future. *Front. Mar. Sci.* 11. doi: 10.3389/fmars.2024.1362399

The handling editor Y-CC declared a past co-authorship with the author CW.

Generative AI statement

The author(s) declare that no Generative AI was used in the creation of this manuscript.

Any alternative text (alt text) provided alongside figures in this article has been generated by Frontiers with the support of artificial intelligence and reasonable efforts have been made to ensure accuracy, including review by the authors wherever possible. If you identify any issues, please contact us.

Publisher’s note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.