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AN EXCLUSIVE PROPERTY MODEL FOR THE COMMON HERITAGE OF MANKIND: A MULTILATERAL REGIME FOR NATURAL RESOURCES IN OUTER SPACE

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INTRODUCTION

The concept of the "common heritage of mankind" (CHM) was formally put forward in 1967 by Arvid Pardo,[1] Malta's Ambassador to the UN.[2] Although CHM refers to particular objects with a special legal status,[3] it has received no official definition in the past fifty years, and its substance has remained uncertain and controversial.[4] Most research to date has concentrated on the content of the CHM principle rather than on the CHM itself.[5] It should be noted that there is a difference in meaning between the two: the CHM refers to certain objects in international law, whereas the CHM principle concerns how

1. U.N. GAOR, 22nd Sess., annex 3 (Agenda item 92), at 3, U.N. Doc. A/6695 (Sept. 21, 1967).

2. Jan-Stefan Fritz, *Deep Sea Anarchy: Mining at the Frontiers of International Law*, 30 INT'L J. MARINE & COASTAL L. 449 (2015).

3. United Nations Convention on the Law of the Sea, art. 136, Dec. 10, 1982, 1833 U.N.T.S. 397 [hereinafter UNCLOS] ("The Area and its resources are the common heritage of mankind."); Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, U.N. GAOR, art. 11(1), U.N. Doc. A/RES/34/68 (Dec. 5, 1979) [hereinafter Moon Agreement] ("The moon and its natural resources are the common heritage of mankind…"); *see also* UNCLOS, at arts. 1(1), 135 (explaining that "[t]he Area," referring to the seabed and ocean floor and subsoil thereof, is defined to have a special legal status of being beyond the limits of national jurisdiction; this special legal status will not affect that of the waters superjacent to the Area or that of the air space above those waters).

4. *See, e.g.*, Jan-Stefan Fritz, *supra* note 2, at 445; Edwin Egede, *The Common Heritage of Mankind and the Sub-Saharan African Native Land Tenure System: A "Clash of Cultures" in the Interpretation of Concepts in International Law?*, 58 J. AFR. L. 71 (2014).

5. *See, e.g.*, Aline Jaeckel, Kristina M. Gjerde & Jeff A. Ardron, *Conserving the Common Heritage of Humankind–Options for the Deep-Seabed Mining Regime*, 78 MARINE POL'Y 150 (2017); Erik Franckx, *The International Seabed Authority and the Common Heritage of Mankind: The Need for States to Establish the Outer Limits of their Continental Shelf*, 25 INT'L J. MARINE & COASTAL L. 543 (2010); Carol R. Buxton, *Property in Outer Space: The Common Heritage of Mankind Principle vs. the First in Time, First in Right, Rule of Property*, 69 J. AIR L. & COM. 689 (2004); Bradley Larschan & Bonnie C. Brennan, *The Common Heritage of Mankind Principle in International Law*, 21 COLUM. J. TRANSNAT'L L. 305 (1983).

such objects are utilized.[6] For instance, in the high seas, the CHM refers to the Area and its resources, and the CHM principle refers to the rules that should be followed when exploring and utilizing the Area and the resources. The study of the CHM principle focuses primarily on clarifying which rules should be followed when entities use the existing CHM and may ignore what characteristics an object as the CHM has and what objects can be granted the legal status of the CHM in the future. Therefore, research on the CHM principle cannot comprehensively reflect the content of the CHM.

Commentators tend to elaborate on the content of the CHM principle by listing its essential elements or core principles.[7] For example, Noyes points out that the CHM principle normally includes the following elements: the prohibition against claims of sovereignty, the vesting of the rights to space resources[8] in mankind as a whole, reservation for peaceful purposes, protection of the environment, the equitable sharing of benefits, and a common management regime.[9] These elements serve as guiding rules for the use of space resources, but are not very useful in

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6. *See, e.g.*, Shadi A. Alshdaifat, *Who Owns What in Outer Space? Dilemmas Regarding the Common Heritage of Mankind*, PÉCS J. INT'L & EUR. L. 21, 22 (2018) ("The common heritage of mankind principle consists of four elements: (1) It prohibits states from proclaiming sovereignty over any part of the deep seabed; (2) Requires that states use it for peaceful purposes; (3) Sharing its management; (4) The benefits of its exploitation.").

7. *See, e.g.*, Kudirat Magaji W. Owolabi, *The Principle of the Common Heritage of Mankind*, 4 NNAMDI AZIKIWE U. J. INT'L L. & JURIS. 51, 52 (2013).; Jennifer Frakes, *The Common Heritage of Mankind Principle and Deep Seabed, Outer Space, and Antarctica: Will Developed and Developing Nations Reach a Compromise?*, 21 WIS. INT'L L. J. 409, 411–15 (2003); Harminderpal Singh Rana, *The "Common Heritage of Mankind" & the Final Frontier: A Revaluation of Values Constituting the International Legal Regime for Outer Space Activities*, 26 RUTGERS L. J. 225, 229–30 (1994); Daniel Goedhuis, *Some Recent Trends in the Interpretation and the Implementation of the Rules of International Space Law*, 19 COLUM. J. TRANSNAT'L L. 213, 219 (1981).

8. The Hague International Space Resources Governance Working Group, Building Blocks for the Development of an International Framework on Space Resource Activities, U. N. Doc A/AC.105/C.2/L.315, art 2.1 (Nov. 29, 2019) [hereinafter Building Blocks] (the Moon Agreement does not define the term "space resource," so its definition can only be found in other international instruments. Space resource is "an extractable and/or recoverable abiotic resource in situ in outer space.").

9. John E. Noyes, *The Common Heritage of Mankind: Past, Present, and Future*, 40 DENV. J. INT'L L. & POL'Y 447, 450–51 (2012).

determining the legal status and characteristics of the CHM. Even worse, there is no consensus on the application of the elements,[10] and thus it should not be taken for granted that they serve as the sole basis for an understanding of the CHM.

There is a need to clarify the content of the CHM, including its legal status, characteristics, scope, and utilization system. This article starts with an analysis of the legal status of the CHM, which forms the basis for the subsequent discussion of other relevant issues. Analysis of the CHM's legal status also helps to identify the legal subjects who can exercise rights to the CHM and the types of rights they have. For example, Christol argues that the CHM is an enlargement of *res communis*[11] rather than *res nullius*.[12] He clarifies the relevant rights that states can exercise with regard to the CHM by making reference to existing international treaties,[13] the United Nations Convention on the Law of the Sea (UNCLOS), and the Agreement Relating to the Implementation of Part XI of the UNCLOS[14] in particular. Moreover, analysis of rights attribution to certain objects does not rely entirely on analysis of their legal status, as legal subjects and their right to objects can be discussed directly in accordance with theory and practice.[15]

Comparatively speaking, the issue regarding the right holders of the CHM and their rights is less controversial. The UNCLOS regime has gained "near-universal acceptance" in seabed mining

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10. *Id.* at 454.

11. *See* Carl Q. Christol, *Evolution of the Common Heritage of Mankind Principle*, 1 W. ST. U. INT'L L. J. 63, 65 (1981) ("This is an area that is not subject to national [sovereignty] or appropriation, but does allow those who are skilled in harvesting the resources of the ocean to harvest them.").

12. *See id.* at 68 ("*Res nullius* would allow a single nation state to obtain a monopoly of ownership, control and [sovereignty] in a special area such as in the high seas, outer space, Antarctica and other so-called 'common areas.'").

13. *Id.* at 67–68.

14. Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, with Annex, July 28, 1994, 1836 U.N.T.S. 41 [hereinafter Annex].

15. *See, e.g.*, Yun Zhao ((赵云) & Shengli Jiang (蒋圣力), wài kōng zī yuán de fǎ lǜ xìng zhì yú quán lì guī shǔ biàn xī — jiān lún wài kōng zī yuán kāi fā lì yòng zhī guó jì fǎ lǜ jī zhì de gòu jiàn (外空资源的法律性质与权利归属辨析——兼论外空资源开发、利用之国际机制的构建) [The Legal Nature and Right Attribution over Space Resources—The Establishment of an International Legal Mechanism for Exploration and Utilization of Space Resources], EXPLORATION AND FREE VIEWS 87–89 (2018) (China Academic Journals).

and that implementation of the CHM principle has been "an unqualified success,"[16] suggesting that contracting states have already reached a consensus on the legal subjects of the CHM and the rights they enjoy to it. Taking the legal subjects of the CHM and their rights to it as its starting point, the article then moves on to a discussion of the characteristics, scope, and utilization system of the CHM.

Part I of the article analyzes the CHM's legal status under UNCLOS and argues that the CHM under the UNCLOS is an exclusive property of mankind. Part II then examines the characteristics of the CHM according to the exclusive property model and analyzes whether the CHM under UNCLOS complies with those characteristics. Part III elaborates on the CHM's utilization system under UNCLOS based on the exclusive property model. In Part IV, the article moves further to evaluate the feasibility of transplanting that model to the CHM in fields other than the sea. At present, the CHM is formally stipulated in only two international treaties: UNCLOS and the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Agreement). UNCLOS provides the most detailed provisions on the CHM and its operation in practice. The Moon Agreement contains far fewer of these provisions and thus affords more space for the establishment of a CHM utilization system. Part V argues that the UNCLOS model provides a useful reference for the field of space law and discusses possible ways of implementing the model in that field. Finally, some concluding remarks are offered that the CHM is an important concept in the international law arena, and hence that the international community should work together to design a utilization system that will allow everyone to benefit from the CHM. A multilateral approach, rather than unilateral measures, will best protect the interests of both international society as a whole and individual states.

I. LEGAL STATUS OF THE CHM UNDER UNCLOS

The CHM is argued to be a property exclusively owned by mankind as a whole. "Mankind" entails three levels of meaning. First, as argued in Section A, mankind is an independent legal

16. Michael W. Lodge, *The Common Heritage of Mankind*, 27 INT'L J. MARINE & COASTAL L. 733, 738 (2012).

subject that enjoys rights to the CHM. Section B clarifies that mankind enjoys exclusive ownership of the CHM. Section C further illustrates that an international entity representing mankind (e.g., the International Deep Seabed Authority [the Authority]) confers usufruct[17] to other legal subjects to realize the economic value of the CHM.

A. Mankind as an Independent Subject

As mentioned earlier, the Area and its resources belong to CHM.[18] Article 137(2) of the UNCLOS articulates the attribution of rights to the CHM as:

> All rights in the resources of the Area are vested in mankind as a whole, on whose behalf the Authority[19] shall act. These resources are not subject to alienation. The minerals recovered from the Area, however, may only be alienated in accordance with this Part and the rules, regulations and procedures of the Authority.[20]

Article 137(2) plays a significant role in interpreting whether mankind is a legal subject and whether mankind can hold the rights of the CHM.

The term "mankind" in Article 137(2) is a collective rather than non-collective concept. As used in UNCLOS, the term is a collective concept referring to an entity comprising all people in the world.[21] When used as a non-collective concept, in contrast, mankind refers to all of the individuals who constitute mankind.[22] Mankind is a "collective body of people" rather than "individuals making up that body."[23] In Article 137(2), the rights are vested in "mankind as a whole,"[24] so the use of "as a whole"

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17. "A right to use and enjoy the fruits of another's property for a period without damaging or diminishing it, although the property might naturally deteriorate over time." *Usufruct*, BLACK'S LAW DICTIONARY (11th ed. 2019).

18. UNCLOS, *supra* note 3, at art. 136.

19. *Id.* at art. 1(2) (explaining, "'Authority' means the International Seabed Authority.").

20. *Id.* at art. 137(2).

21. *See* Liu Weixian (刘卫先著), Houdai Ren Quanli Lun Pipan (后代人权利论批判) [Criticism to The Rights of Future Generations] 175–76 (2012).

22. *See id.*

23. Stephen Gorove, *The Concept of "Common Heritage of Mankind": A Political, Moral or Legal Innovation?*, 9 SAN DIEGO L. REV. 390, 393 (1972).

24. UNCLOS, *supra* note 3, at art. 137(2).

stresses that the subject of the rights in the resources is the combination of all people instead of each and every human being.[25] Thus, a natural person is a legal subject different from mankind. Since the rights of the CHM are granted to mankind and a natural person as a legal subject is not equivalent to mankind, a specific person cannot exercise those rights. Therefore, it is fair to say that Article 137(2) does not grant rights to a specific person; instead, it actually imposes an obligation on individual natural persons: natural persons cannot directly exercise rights to resources for those rights belonging to mankind as a whole.

In terms of scope, mankind is "interspatial" and "intertemporal."[26] In terms of space, mankind is a "collective body of people" "wherever they may be found."[27] In terms of time, mankind includes "past, present and future generations."[28] As to future generations, this article argues that they should not be separated from mankind. When considering the interests of mankind, people need to take the needs of future generations into account, which is also a requirement for long-term sustainability. In the eyes of some commentators, future generations are accepted as an indispensable part of mankind.[29] Although mankind encompasses people from different places and different generations, its rights are vested in the whole. As the subject of the rights, then, mankind should not be divided into groups but taken as a whole.

The rights granted to mankind are legal rights. According to Article 137(2), the rights vested in mankind can be exercised by "the Authority."[30] This shows that the word "rights" refers to rights in the legal sense rather than as a function of political rhetoric.[31] If, however, the word "rights" merely denotes rights

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25. *Id.*

26. KEMAL BASLAR, THE CONCEPT OF THE COMMON HERITAGE OF MANKIND IN INTERNATIONAL LAW 74 (1998).

27. Gorove, *supra* note 23, at 393.

28. BASLAR, *supra* note 26, at 74.

29. *See, e.g.*, Sylvia Maureen Williams, *The Law of Outer Space and Natural Resources*, 36 INT'L & COMPAR. L. Q., 150–151 (1987); CANÇADO TRINDADE, INTERNATIONAL LAW FOR HUMANKIND: TOWARDS A NEW JUS GENTIUM 286–87 (2010).

30. UNCLOS, *supra* note 3, at art. 137(2).

31. Although not yet discovered, some commentators may claim that mankind's rights referred to in Article 137 (2) are not rights with legal force, thereby denying mankind's status as a right holder. They may regard the

in a loose sense, the UNCLOS would not emphasize that the Authority shall exercise these rights on behalf of mankind, since rights as mere political rhetoric need not be enforced by a specific international organization. Thus, the word "rights" in Article 137(2) refers to legal rights. After highlighting the enforcement of mankind's rights by the Authority with regard to the resources, Article 137(2) emphasizes that the alienation of the minerals should be in accordance with "the rules, regulations and procedures of the Authority."[32] It indicates that the rights exercised by the Authority on behalf of mankind can directly control and regulate the utilization of the resources.[33] Article 153(1)[34] corresponds directly to the last sentence of Article 137(2)[35] as both provisions underline that the Authority is on behalf of mankind. Accordingly, the rights to regulate the activities essentially come from mankind and are contained in "all rights in the resources of the Area,"[36] which means the rights of the CHM granted to mankind can be used to regulate the use of the CHM. Thus, mankind's rights to the CHM have legal force, and they should be deemed as legal rights. Since the legal rights in the resources of the Area are granted to mankind as a whole, Article 137(2) provides a norm for authorization, vesting the legal rights in the resources to mankind.

One potential counterargument to this section is that all rights to the CHM, based on Article 157(1),[37] belonged to States Parties[38] instead of mankind. Since the Authority is "the

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phrase "all rights in the resources of the Area are vested in mankind" referred to in Article 137(2) as political rhetoric that has no legal effect.

32. UNCLOS, *supra* note 3, at art. 137(2).

33. *Id.* at art. 153(1) (explaining that "Activities in the Area shall be organized, carried out and controlled by the Authority on behalf of mankind as a whole.").

34. *Id.*

35. *Id.* at art. 137(2) ("The minerals recovered from the Area, however, may only be alienated in accordance with this Part and the rules, regulations and procedures of the Authority.").

36. *Id.*

37. *Id.* at art. 157(1) ("The Authority is the organization through which States Parties shall, in accordance with this Part, organize and control activities in the Area, particularly with a view to administering the resources of the Area.").

38. *Id.* at art. 2(1) (explaining, "'States Parties' means States which have consented to be bound by this Convention and for which this Convention is in force.").

organization through which States Parties shall… organize and control activities in the Area,"[39] the Authority may be argued to be a tool used by States Parties to manage the CHM and the Authority's rights are thus essentially derived from these states.

Such an argument, however, runs counter to the meaning of Article 157(1) and is inconsistent with other provisions of UNCLOS. First, Article 157(1) should be interpreted to establish that the Authority is an agency that controls and organizes the activities in the Area. The term "through which"[40] emphasizes that the activities of states cannot be carried out without authorization from, and management by, the Authority. This interpretation of Article 157(1) is also supported by Article 153(4), which underlines that activities in the Area need to be carried out under the control of the Authority and that States Parties should "assist" the Authority to ensure compliance.[41] Besides, other provisions of UNCLOS suggest that the right of the Authority does not stem from States Parties. Article 137(2) states that the rights of the Authority to the CHM are from mankind, and they are exercised by the Authority on behalf of mankind.[42] Article 137(3)[43] and Article 3(1) of Annex III[44] indicate that the States Parties cannot use the resources without the authorization of the Authority, which means states' right to utilize the resources

39. *Id.* at art. 157(1).

40. *Id.*

41.

> The Authority shall exercise such control over activities in the Area as is necessary for the purpose of securing compliance with the relevant provisions of this Part and the Annexes relating thereto, and the rules, regulations and procedures of the Authority, and the plans of work approved in accordance with paragraph 3. States Parties shall assist the Authority by taking all measures necessary to ensure such compliance in accordance with article 139.

Id. at art. 153(4).

42. *Id.* at art. 137(2).

43. *Id.* at art. 137(3) ("No State or natural or juridical person shall claim, acquire or exercise rights with respect to the minerals recovered from the Area except in accordance with this Part. Otherwise, no such claim, acquisition or exercise of such rights shall be recognized.").

44. *Id.* at Annex III, art. 3(1) ("The Enterprise, States Parties, and the other entities referred to in article 153, paragraph 2(b), may apply to the Authority for approval of plans of work for activities in the Area.").

essentially comes from the grant of the Authority (It will be specifically analyzed in Section C of this part). Therefore, Article 157(1) cannot be used to prove that CHM's rights belong to the State. On the contrary, Article 157(1), along with Article 153(4), Article 137(2), Article 137(3), and Article 3(1) of Annex III, demonstrates that the Authority has the right to control and regulate states' activities pertaining to the CHM. This means that the rights exercised by the Authority on behalf of mankind are legal rights, which proves once again that "all rights"[45] vested in mankind are legal rights.

Another potential counterargument to this section is that mankind cannot be a subject of international law since some commentators assert that mankind has no legal personality. This view, nevertheless, can be refuted by the formal conception of international personality. Under the formal conception of international personality,[46] mankind, as the rights-holder, is a subject of international law. According to commentators who regard international legal personality as a formal conception, any entity "being the addressee of an international norm," including rights, duty, or capacity, has international personality.[47] This is because they believe that legal personality is not a precondition but "the consequence of legal norms addressing a certain entity."[48] The theory of formal conceptions has received "considerable support" in "international legal doctrine and practice."[49] The legal person does not exist until legal norms constitute and address it.[50] Interpretation of international norms is the means by which international legal personality can be acquired.[51] If international law "confers rights, duties, or capacities" on any entity, such an entity is an "international person."[52] The term "or" emphasizes that an entity can become a subject of international

45. *Id.* at art. 137(2).

46. The formal conception originates from Kelsen's pure theory of law, which contends that there is no a priori presumption for an entity to attain international personality, and that international personality is a posteriori concept. ROLAND PORTMANN, LEGAL PERSONALITY IN INTERNATIONAL LAW 173–74 (James A. Crawford & John S. Bell eds., 2010).

47. *Id.* at 173.

48. *Id.* at 190–91.

49. *Id.* at 248.

50. *Id.* at 190.

51. *Id.* at 174.

52. *Id.*

law as long as it has one of the "rights, duties and capacities."[53] Thus, an entity, once granted rights under international law, shall be regarded as a subject of international law even if it has no obligation or capacity.

Legal capacity may not be a *conditio sine qua non* for an entity to become an international person. Verdross holds that a subject of international law may enjoy rights but has no obligation or capacity.[54] Similarly, Von Münch believes that a subject of international law may not have the capacity to act under international law.[55] For example, Von Münch points to Germany during the period after its surrender in World War II.[56] Germany, while not having international legal capacity at that time, was still able to exist as a subject of international law.[57] As a result, whether or not mankind has legal capacity under UNCLOS does not preclude mankind from acquiring the status of a subject of international law as a rights-holder. In fact, some commentators argue that mankind is a subject of international law.[58]

Affirming the status of mankind as a subject of international law under UNCLOS is of great significance because it helps reduce the negative impact of solely pursuing national interests under international law. One state's pursuit of its own interests cannot ensure the realization of "the general, superior interests of humankind."[59] When mankind coexists with states as a subject of international law, states cannot regard the pursuit of self-interest as "the sole subjects of international law" in the development of international law.[60] Thus, the recognition of the status and rights of mankind requires states to focus on the common interests of humankind rather than their own national interests.

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53. *Id.*

54. *See* ALFRED VERDROSS, VÖLKERRECHT 128, 130 (1950).

55. INGO VON MÜNCH, VÖLKERRECHT 4–5 (1997).

56. *Id.* at 5.

57. *Id.*

58. *See, e.g.,* Cançado Trindade, *New Reflections on Humankind as a Subject of International Law*, *in* NIGERIAN YEARBOOK OF INTERNATIONAL LAW 2018/2019 3, 14 (Chile Eboe-Osuji, Engobo Emesh & Olabisi D. Akinkugbe eds., 2021); Bassiouni, M. C., CRIMES AGAINST HUMANITY IN INTERNATIONAL CRIMINAL LAW 275 (1999); Aldo A. Cocca, *The Common Heritage of Mankind: Doctrine and Principle of Space Law—An Overview*, *in* PROCEEDINGS OF THE TWENTY-NINTH COLLOQUIUM ON THE LAW OF OUTER SPACE 150 (1986).

59. TRINDADE, *supra* note 29, at 275.

60. *Id.*

B. Mankind's Ownership of the CHM in UNCLOS

Since all rights to the CHM are granted to humans,[61] as long as ownership can exist in the CHM, humans can have ownership of the CHM. Under the UNCLOS, Article 1 of Annex III suggests that a title to the CHM can exist.[62] According to Article 1, Annex III, the "title to minerals shall pass upon recovery in accordance with this convention."[63]

The use of the word "pass" stresses that the title is to be transferred rather than created.[64] Two key pieces of information can be deduced from the term "pass." First, the title can exist in the minerals. Second, that title was in existence before the minerals' actual recovery. As defined in Article 133(b) of UNCLOS, "minerals" are defined as the resources "recovered from the Area."[65] Accordingly, minerals constitute a part of those resources before they are recovered by prospectors. Since all rights in the resources are vested in mankind,[66] the title to the resources naturally belongs to mankind as well. Consequently, mankind is the owner of the resources. Mankind's ownership of resources is a kind of exclusive ownership. As argued earlier, mankind is an independent legal entity; as such, its ownership of resources is a form of sole ownership rather than common ownership. In addition, the resources are exclusively owned by mankind because Article 137(2) stresses that "these resources are not subject to alienation."[67]

Some commentators claim that "mankind's ownership over natural resources is implausible and insufficient."[68] Baslar's view is representative:

> Accepting the common ownership approach necessitates mankind [having a] legal personality to enjoy these rights, duties and liabilities. In fact, mankind is not represented by any international organization. It is also hardly possible to obtain the actual consensus of all mankind, including indigent peoples

61. UNCLOS, *supra* note 3, at art. 137(2).
62. *Id.* at Annex III, art. 1.
63. *Id.*
64. According to Black's Law Dictionary, the term "pass" means "to transfer or be transferred." *Pass*, BLACK'S LAW DICTIONARY (11th ed. 2019).
65. UNCLOS, *supra* note 3, at art. 133(b).
66. *Id.* at art. 137(2).
67. *Id.*
68. *See* BASLAR, *supra* note 26, at 50.

> and future generations. Therefore, the classical property approach raises a number of difficulties.[69]

Baslar believes that no organization can represent mankind as a whole, which is the core reason that mankind cannot become the owner of resources.[70] His stance rests on three main arguments. First, international personality is a prerequisite for an entity to become a subject of international law, which is reflected in his belief that mankind must have "legal personality" before it can enjoy ownership.[71] Second, without mankind's consent, an international organization cannot acquire authorization to represent mankind. Baslar claims that there is no international organization representing mankind and that it is hard to obtain mankind's "actual consensus."[72] Although the Authority acts on behalf of mankind,[73] Baslar maintains that there is no international organization representing mankind,[74] indicating that he does not believe that the Authority has met the criteria for becoming a representative body of mankind. Considering his emphasis on the "actual consensus of all mankind,"[75] it can be inferred that Baslar believes that an organization cannot represent humanity without its consent. Third, mankind's consent cannot be said to have been obtained unless every person in the world has actually consented, for Baslar holds that it is necessary to obtain "the actual consensus of all mankind, including indigenous peoples and future generations."[76]

None of these arguments, however, is convincing and Baslar himself denies them indirectly. These three arguments are refuted one by one below. International legal personality is not a prerequisite to become the subject of international law. As to mankind's consent, it is not a sine qua non for international organizations to represent mankind, and it can be obtained without the actual consent of all individuals. First, international personality may be the result, instead of the premise, of an entity

69. *Id.*
70. *See id.*
71. *See id.*
72. *Id.*
73. UNCLOS, *supra* note 3, at art. 137(2).
74. BASLAR, *supra* note 26, at 50.
75. *Id.*
76. *Id.*

being regulated by international law.[77] As supporters of formal conceptions argue, "there are no fundamental right and duties or certain capacities attached to being an international person,"[78] since "all these powers and competences are determined by particular international norms to their effect, not by the concept of international personality itself."[79] It can also be deduced from Kelsen's view that international personality is not derived from the fact that fundamental rights of an entity are recognized by others but from "the fact that international law imposes duties and confers rights" upon an entity.[80] Thus, international personality can be deemed as an open concept used to describe entities which have rights, duties, or capacities under international law. There can be no "a priori presumption" for specific entities to become an international person.[81]

Furthermore, mankind's consent is not necessarily an essential condition for qualifying to represent mankind, a supposition with which Baslar concurs.[82] He claims that the public trust doctrine is appropriate for managing the CHM,[83] and endorses the view that states are "assumed as public guardians" of resources.[84] According to the public trust doctrine, states are the trustees of resources, with future generations being the beneficiaries.[85] Although there is no declaration of intent on the part of future generations, states obtain the trustee qualification by assumption.[86] Therefore, Baslar agrees that a legal relationship can be assumed to exist even if there is no commission contract. As a result, an international organization may also be assumed

77. PORTMANN, *supra* note 46, at 191.
78. *Id.* at 176.
79. *Id.*
80. HANS KELSEN, GENERAL THEORY OF LAW & STATE 252 (2005).
81. PORTMANN, *supra* note 46, at 177.
82. *See* BASLAR, *supra* note 26, at 65–68.
83. *See id.*
84. *Id.* at 67 (internal quotations removed).
85. *See id.* ("In this system, the State is assumed as 'public guardian of those valuable natural resources'…The legal implication of trust doctrine is that to fail in the protection, conservation and prudential management of the heritages would violate the trust and legal obligation implicit in responsibly supervising the earth's heritage for future generations.").
86. *See id.* (Baslar agrees that states can directly be assumed to be the trustees of resources without the actual consensus of future generations).

to be the representative agency of mankind without its formal consent.

Moreover, mankind's consent can also be presumed without seeking actual consensus from everyone on earth, a contention with which Baslar also agrees.[87] To determine the legal basis of "common heritage," he turns to Rawlsian contractarian philosophy.[88] More specifically, he assumes a "hypothetical intergenerational contract" that includes "all members of humanity."[89] In addition, in the process of analyzing how an organization can be established to manage the CHM, Baslar resorts to Teson's "rational hypothetical consent" theory, which assumes that states "have consented to rational international obligations."[90] Therefore, mankind's consensus can be assumed, and international organizations can represent mankind without the express consent of all people.

Consequently, the two premises that Baslar relies upon are questionable and cannot be used to support his conclusion that no organization can represent mankind. In reality, "the Authority" has already become the actual representative agency of mankind and exercised its ownership over "the resources." Under Article 137(2), the rights of mankind are exercised by the Authority,[91] which means that the rights exercised by the Authority belong to humans and not to the Authority itself. In addition, Article 153(1) asserts that "activities in the Area shall be organized, carried out and controlled by the Authority on behalf of mankind as a whole,"[92] so the Authority, when it regulates activities in the Area, is representing mankind and exercising rights that belong to mankind. Therefore, it can be concluded from Article 137(2) and Article 153(1) that the Authority derives its powers from mankind's rights to the CHM and regulates activities in the Area on mankind's behalf. Hence, the Authority can exercise mankind's ownership by managing the exploration and exploitation of resources in the Area. It must be noted,

87. *See id.* at 64–65.

88. *See id.* (It "assume[s] a hypothetical intergenerational contract to have been hammered out in a transcendental realm wherein all members of humanity: past, present and future generations behind veil of ignorance agreed that a lot to be drawn for the parties to be sent down to Earth.").

89. *Id.* at 65.

90. *Id.* at 95–96.

91. UNCLOS, *supra* note 3, at art. 137(2).

92. *Id.* at art. 153(1).

however, that the rights that the Authority can exercise are limited. For example, the Authority cannot transfer the ownership of resources at will, but rather only to comply with the provisions of the UNCLOS.[93]

In addition to its ownership of the resources, mankind also enjoys ownership of the Area. Although UNCLOS seldom mentions right holders of the Area,[94] it can be argued that those who have rights to resources should enjoy similar rights in the Area. This is because the resources are physically a part of the Area.[95] Without rights over the Area, someone with rights to resources could hardly exercise these rights in the Area. Therefore, if the rights of the Area do not belong to mankind, the Authority could not exercise mankind's rights to the resources therein.

Finally, the existence of title in the Area should be permissible. The Area and its resources have commonality in nature because they constitute the CHM in UNCLOS. Resources are not *res nullius*,[96] and they are owned by mankind. Since there can be title to resources, there can be title to the Area as well. There are thus consistencies between rights in the resources and those in the Area with respect to the types and holders of the rights. If the right holders and their rights in the Area and the resources are inherently different, the Area and the resources would not have shared the same legal status as stated in Article 136.[97] Because mankind enjoys title to both the Area and its resources, it enjoys ownership over the CHM in UNCLOS.

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93. *Id*. at art. 137(3) ("No State or natural or juridical person shall claim, acquire or exercise rights with respect to the minerals recovered from the Area except in accordance with this Part. Otherwise, no such claim, acquisition or exercise of such rights shall be recognized."), Annex III, art. 1 ("Title to minerals shall pass upon recovery in accordance with this Convention.").

94. *See, e.g.*, *id*. at art. 137(2), Annex III, art. 3(4) (explaining that, usually, provisions in the UNCLOS only mention rights and the subjects of rights in the resources).

95. *See, e.g.*, *id.* at art. 1(1). Under UNCLOS, the resources are in the Area or beneath it. *Id.* ("'Area' means the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction."). "'Resources' means all solid, liquid or gaseous mineral resources in situ in the Area at or beneath the seabed." *Id* at art. 133(a).

96. *Res nullius* is "[a] thing that can belong to no one; an ownerless chattel." *Res Nullius*, BLACK'S LAW DICTIONARY (11th ed. 2019).

97. UNCLOS, *supra* note 3, at art. 136 ("The Area and its resources are the common heritage of mankind.").

C. Operators' Usufruct to the CHM under UNCLOS

In addition to mankind and its representative agency, UNCLOS also enumerates other entities that can enjoy relevant rights to the resources, including: "the Enterprise;"[98] state parties; state enterprises; natural or juridical persons who possess the nationality of state parties; natural or juridical persons who are effectively controlled by state parties or their nationals; and any combination thereof.[99] These entities are also referred to as "operators," who have a right to explore and exploit the resources.[100]

Operators, however, do not have rights over resources without proper authorization from the Authority. Article 137(1) emphasizes that "sovereignty or sovereign rights" over the Area or its resources should not be claimed or exercised, and appropriation is also not permitted.[101] Article 137(3) further stresses that states, natural persons, and juridical persons should not "claim, acquire or exercise rights with respect to the minerals recovered from the Area except in accordance with this Part."[102] According to UNCLOS, the acquisition of those rights, for the entities mentioned in Article 137(1), can come only through authorization.[103] More specifically, the Authority confers exclusive rights to operators by forming contracts with them.[104] All operators need to "apply to the Authority for approval of plans of work."[105] Once a plan of work is approved by the Authority, it "shall be in the form of a contract concluded between the Authority and the applicant or applicants."[106] In the form of a contract, "every approved plan of work shall confer on the operator . . . the exclusive right to explore for and exploit the specified categories of resources in

98. *Id.* at art. 170(1) ("Enterprise" means "the organ of the Authority which shall carry out activities in the Area directly, as well as the transporting, processing and marketing of minerals recovered from the Area.").

99. *Id.* at art. 153(2).

100. *See, e.g.*, *id.* at Annex III, art. 3.

101. *Id.* at art. 137(1).

102. *Id.* at art. 137(3).

103. *Id.* at art. 137(1).

104. *Id.* at Annex III, art. 3(5) ("Upon its approval by the Authority, every plan of work, except those presented by the Enterprise, shall be in the form of a contract concluded between the Authority and the applicant or applicants.").

105. *Id.* at Annex III, art. 3(1).

106. *Id.* at Annex III, art. 3; Annex, *supra* note 14, sec. 2(4).

the area covered by the plan of work."[107] Therefore, mineral rights are conferred upon the operator when the contract is concluded.

Although the Enterprise enjoys the privileges of applying for the Area in question[108] and allocating net income,[109] the exclusive right vested in the Enterprise is the same as the rights vested in other operators, especially in terms of acquisition and nature. As with all other operators, the Enterprise needs to apply for approval for its plan of work.[110] Further, the phrase "every approved plan of work" in Article 3(4) of Annex III stresses that the contents of Paragraphs (a)–(c) are applicable to each operator whose plan of work is approved.[111] According to Paragraph (c) of Article 3(4), approval vests exclusive rights in operators, and there is no distinction between the rights of the Enterprise and those of other operators.[112] The foregoing provisions regarding the acquisition of mineral rights testify to the fact that operators do not have those rights until the Authority confers them.

Different from mankind's ownership of resources, operators' mineral rights are conferred by the Authority. The Authority derives its power from mankind's ownership. Hence, operators' mineral rights also originate in that ownership. The detachment of mineral rights from ownership is in line with the exercise of mankind's ownership. For one thing, an owner is able to detach some rights from ownership[113] to enable others to attain real rights, meaning that the Authority, as mankind's representative agency, can confer mineral rights upon operators. For another, the owner of the resources remains unchanged; that is, ownership of the resources is not transferred to operators. There are precedents in international law justifying the separation and/or detachment of certain rights.[114] For example, Goldie points out

107. UNCLOS, *supra* note 3, at Annex III, art. 3(4)(c).
108. *Id.* at Annex III, art. 3(2).
109. *Id.* at Annex IV, art. 10.
110. *Id.* at Annex III, art. 3(1).
111. *Id.* at Annex III, art. 3(4).
112. *Id.* at Annex III, art. 3(4)(c).
113. "Ownership. The bundle of rights allowing one to use, manage, and enjoy property, including the right to convey it to others." *Ownership*, BLACK'S LAW DICTIONARY (11th ed. 2019).
114. *See, e.g.*, L. F. E. Goldie, *Title and Use (and Usufruct)—An Ancient Distinction Too Oft Forgot*, 79 AM. J. INTL' L. 689 (1985).

that "*[j]ura in re aliena*[115] have long been accepted and recognized in international law," as exemplified by the Treaty of Utrecht, Treaty of Peace and Friendship, and Convention on Fisheries, Boundary, and Restoration of Slaves.[116]

The mineral right of an operator is a type of usufruct.[117] First, the objects of the mineral right correspond to (or are the same as) those of usufruct. Those objects, i.e., the specified resources and specified area, are within the scope of property and, moreover, are owned by mankind rather than the operator.[118] Second, the content of a mineral right is equivalent to that of usufruct. The operator can exercise its exclusive right to explore and exploit resources belonging to mankind,[119] which can be regarded as the use of the "property belonging to another."[120] The view that a mineral right is a type of usufruct is supported by national legislative practices. For example, in China, Germany, and Italy, the mineral rights to an area owned by others are included in the section on usufruct in the relevant civil law legislation.[121] In sum, an operator's mineral right should be deemed as a usufruct detached from mankind's ownership.

The process of exercising usufruct can be summarized as follows. The operator explores an area for the specific resources therein specified by the contract and then exploits them. When extracting minerals from the area, the operator acquires

115. *Jura in re aliena* is also known as encumbrances, which is "any property right that is not an ownership interest." *Encumbrance*, BLACK'S LAW DICTIONARY (11th ed. 2019).

116. Goldie*, supra* note 114, at 694.

117. "Usufructus is . . . the right of using and enjoying property belonging to another provided the substance of the property remained unimpaired." *Usufructus*, BLACK'S LAW DICTIONARY (11th ed. 2019).

118. *See supra* Section B of this Part for further discussions.

119. UNCLOS, *supra* note 3, at Annex III, art. 3, art. 137(2).

120. *Usufructus*, BLACK'S LAW DICTIONARY (11th ed. 2019).

121. *See*, *e.g.*, Zhōnghuá Rénmín Gònghéguó Wùquán Fǎ (中华人民共和国物权法) [Property Law of the People's Republic of China] (promulgated by the Standing Comm. Nat'l People's Cong., Mar. 16, 2007, effective Oct. 1, 2007) art. 123, CLI.1.89386(EN) (Lawinfochina); Bürgerliches Gesetzbuch [BGB] [Civil Code], § 1038(2), https://www.gesetze-im internet.de/englisch_bgb/englisch_bgb.html#p4059 (Ger.); Codice civile, art. 987 (It.).

ownership of those minerals[122] and sells them to make a profit.[123] In the meantime, the Authority acts as a supervisory authority and attains "optimum revenues" from the operator's "proceeds of commercial production."[124] Problems may arise with regard to the potential conflict between the usufruct of operators and the ownership enjoyed by mankind. Article 133 provides that minerals are the resources recovered from the Area.[125] The resources, however, are owned by mankind and are not subject to alienation. If the legal status of the minerals is the same as that of the resources, then the act of obtaining title to the minerals infringes mankind's ownership of the CHM. Therefore, there is a need to differentiate the legal status of the minerals from that of resources. Such differentiation reiterates mankind's ownership of the resources and the possibility of a title transfer for the minerals.

According to UNCLOS, the resources in question are deemed to be constituents of the Area.[126] A "constituent" is "a component . . . that helps make up or complete a unit or a whole."[127] The resources are a part of the Area, and the separation of the resources from the Area would inevitably damage the latter's surface. In addition, the resources are deemed to be components of the Area in accordance with UNCLOS, which repeatedly refers collectively to "the Area and its resources."[128] Thus, the resources are parts of the Area and are not separate "things" under UNCLOS. In terms of the attribution of rights, the resources are owned by mankind and the title to them cannot be transferred. Nevertheless, they can become the objects of an operator's usufruct.

Different from resources, minerals should be considered products[129] of the Area. According to Article 133 of UNCLOS, once

122. UNCLOS, *supra* note 3, at art. 137(3), Annex III, art. 1.

123. *See, e.g.*, Annex, *supra* note 14, sec. 6 (in section 6 of the Annex, it can be concluded that the operator carries out commercial production and sells the minerals into market).

124. UNCLOS, *supra* note 3, at Annex III, art. 13(1)(a).

125. *Id.* at art. 133(b).

126. *Id.* at art. 133(a) ("'Resources' means all solid, liquid or gaseous mineral resources in situ in the Area at or beneath the seabed.").

127. *Constituent*, BLACK'S LAW DICTIONARY (11th ed. 2019).

128. *See, e.g.*, UNCLOS, *supra* note 3, at arts. 136, 137, 155(1).

129. In this place, "product" refers to "the result of fabrication or processing." *Product*, BLACK'S LAW DICTIONARY (11th ed. 2019).

resources are recovered by parties to a contract, they are referred to as "minerals," and no longer as "resources."[130] Compared with resources, minerals have the following characteristics. First, they are separated from the Area,[131] and so are no longer its components. Second, an operator obtains minerals from the Area through exploitation.[132] Third, minerals can be alienated by operators.[133] These characteristics of minerals are consistent with those of products in national legislation, which supports this article's view that minerals can be treated as products of the Area.[134] The Italian Civil Code, for example, cites different types of minerals, such as metal minerals, as examples of natural products.[135] Moreover, the Italian Civil Code stresses that products of a "thing" belong to the holder of usufruct if there is a usufruct existing in the thing.[136] Similarly, Section 99(1) of the German Civil Code defines "products" as "the products of the thing and the other yield obtained from the thing in accordance with its intended use."[137] With respect to the division of products, Section 101 of the German Civil Code stipulates that products belong to the person who "is entitled to receive the fruits of a thing" for the duration of entitlement.[138] The Civil Code of Japan also regards natural products as "products which are

130. UNCLOS, *supra* note 3, at art. 133.

131. *Id.* at art. 133(b) ("Resources, when recovered from the Area, are referred to as 'minerals'.").

132. *Id.* at art. 150. This can be concluded from the title of the article which is "policies relating to activities in the Area". *Id.* All the content of this Article is related to the development of the resources and the production of the minerals, which means that the activities in the Area are mainly the exploration and exploitation. *See id.*

133. *See id*. at Annex III, art. 1 (the operator can acquire title of the minerals according to Article 1, Annex III. Since UNCLOS has no provision prohibiting operators from transferring title of minerals, operators can alienate the minerals at will).

134. The characteristics of minerals indicate that they are the result of exploitation in the Area, so they can be regarded as a type of product, which is "the result of fabrication or processing." *Product*, BLACK'S LAW DICTIONARY (11th ed. 2019).

135. C.c., art. 820 (It.).

136. C.c., art. 984 (It.).

137. BGB § 99(1) (Ger.).

138. BGB § 101 (Ger.).

obtained from the intended use of a thing,"[139] and vests them in "the person who has the right to obtain them."[140]

Although some other states do not directly define minerals as products, qualified miners in these states are permitted to obtain minerals from land that are not owned by these people by exercising mining rights. For example, while mining in Iran is under government control,[141] those with an exploitation license can exercise "usufruct of the mineral deposit"[142] and then carry on activities for the purpose of extracting and selling marketable mineral substances.[143] More specifically, only the minerals not used by eligible exploiters belong to the government,[144] which indicates that the exploiters can own the extracted minerals. Similarly, the US Mineral Leasing Act provides the possibility for entities to mine resources on land owned by the United States.[145] South Africa, a country with a mixed legal system of

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139. MINPŌ [MINPŌ] [CIV. C.] art. 88(1) (Japan).

140. MINPŌ art. 89(1) (Japan).

141. Qanuni Assassi Jumhurii Islamai Iran [The Constitution of the Islamic Republic of Iran] art. 45 [1980].

142.

> Exploitation of mineral deposits shall require an exploitation license from the Ministry of Industry, Mine and Trade except for cases related to the Ministry of Energy, Ministry of Petroleum and the Atomic Energy Organization of Iran. The exploitation license is an official and enforceable document that can be transacted, extended and mortgaged entailing usufruct of the mineral deposit by the license holder and also including the obligations thereof in execution of the contents of same. Maximum duration of an exploitation license is 25 years."

Iran Mining Act of 17 May 1998, art. 9.

143. *See* Iran Mining Act, art. 1(V) ("Exploitation: The series of activities undertaken for the purpose of extracting and hence providing marketable mineral substances.").

144. *See* Iran Mining Act, art. 15 ("Gangue materials produced as a result of mining activities if not used by the holder of exploitation license or holder of short-term exploitation permit during the validity of the license, shall belong to the Government and shall be utilized in the manner deemed appropriate by the Ministry of Industry, Mine and Trade.").

145.

> That the Secretary of the Interior is authorized to, and upon the petition of any qualified applicant shall, divide any of the coal lands or the deposits of coal, classified and un classified

common law and civil law, also allows the entity with a prospecting right or a mining right to mine the mineral resources belonging to the country and extract the minerals.[146] Such legislative practice demonstrates that minerals and products have much in common, particularly in terms of their nature and title. Accordingly, the minerals specified in UNCLOS should be regarded as products of the Area, with operators able to attain title to those products.

When operators begin commercial operation to acquire ownership of the minerals after concluding a contract with the Authority, they shall make financial contributions[147] to the Authority according to "financial terms of contracts."[148] Given that all applicants' approved plans must be "in the form of a contract,"[149] they must agree to provide financial contributions to the Authority in light of the financial terms in order to obtain the right to exploit the resources. From this perspective, the Authority's entitlement to financial contributions can be deemed as a type of "consideration" that is "bargained for and received by a promisor from a promisee."[150] The detachment of the operator's usufruct from mankind's ownership thus serves as the basis for the operator to attain title to the Area's products. The Authority, on behalf of mankind, confers usufruct upon the operator; in exchange, the operator is obligated to make financial contributions to the Authority,[151] which gains revenues on behalf of mankind.

> owned by the United States, outside the Territory of Alaska, into leasing tracts of forty acres each, or multiples thereof, and in such form as, in the opinion of the Secretary of the Interior, will permit the most economical mining of the coal in such tracts, but in no case exceeding two thousand five hundred and sixty acres in any one leasing tract . . . ."

See Mineral Leasing Act of 1920, § 2, 41 Stat. 437 (codified as amended at 30 U.S.C. § 181).

146. "Subject to this Act, any holder of a prospecting right or a mining right . . . may . . . remove and dispose of any such mineral found during the course of prospecting [or] mining . . ." Mineral and Petroleum Resources Development Act 28 of 2002 § 5(3)(c) (S. Afr.).

147. UNCLOS, *supra* note 3, at Annex III, art. 13(4) ("Within a year of the date of commencement of commercial production… a contractor shall choose to make his financial contribution to the Authority…").

148. *Id.* at Annex III, art. 13.

149. *Id.* at art 153(3), Annex III, art. 3(5); Annex, *supra* note 14, sec. 2(4).

150. *Consideration*, BLACK'S LAW DICTIONARY (11th ed. 2019).

151. UNCLOS, *supra* note 3, at Annex III, art. 13(4).

For this reason, the financial terms of the contract concluded between the operator and the Authority establish a "system of payments."[152] The revenues to be paid to the Authority belong to mankind as a whole. As mankind includes all people, the revenues should naturally benefit people all over the world, and the Authority should "provide for the[ir] equitable sharing."[153]

D. CHM as Exclusive Property of Mankind

The CHM in UNCLOS is owned exclusively by mankind, and usufructs to the CHM are conferred upon operators by the Authority on mankind's behalf. Mankind's ownership of the CHM under UNCLOS is a type of exclusive rather than common ownership. Although "common heritage has been generally seen to be a new form of common ownership,"[154] the owner of the CHM specified in UNCLOS is a separate legal entity. All rights in that heritage are vested in mankind as an independent legal subject rather than in individual natural persons, and the rights are exercised by the Authority on mankind's behalf. Operators can acquire usufructs to the CHM by means of authorization. Their usufructs are separate from mankind's ownership, meaning the owner of the CHM remains mankind. Hence, no states, natural persons, or juridical persons enjoy co-ownership of the CHM under UNCLOS, which should thus be regarded as the exclusive property of mankind rather than the common property of individual persons.

One may hold that the CHM is common property belonging to each person such that everyone can exercise common ownership over the CHM. The common property model is not conducive to regulation of the exploitation of space resources because it emphasizes the rights of co-owners and neglects their obligations. Accordingly, the model cannot properly restrain the acquisition and exercise of co-ownership. As the model stresses that ownership of the CHM belongs to all people, each co-owner enjoys co-ownership of that heritage. "Covenant-lite" access to rights could lead to the over-exploitation of space resources. Furthermore, the common property model also fails to effectively regulate the exercise of rights because the boundaries of each co-owner's co-

152. Annex, *supra* note 14, sec. 8.
153. UNCLOS, *supra* note 3, at art. 140(2).
154. BASLAR, *supra* note 26, at 39.

ownership are unclear. Owing to physical, technological, and economic constraints, some areas or resources are difficult to measure and/or divide.[155] If a co-owner wants to exercise his or her co-ownership of the CHM, it would be difficult indeed to determine the exact area and resources he or she could utilize.

The exclusive property model, in contrast, emphasizes the sole ownership of mankind, thereby properly restraining the acquisition and exercise of operators' usufructs. Operators can obtain usufructs only by means of authorization, and any entity satisfying certain requirements or conditions has an opportunity to be granted such authorization. The scope and content of the rights for authorization can be approved only by the Authority entrusted with acting on behalf of mankind.

II. CHARACTERISTICS OF THE CHM UNDER UNCLOS

Under UNCLOS, the scope of the CHM is limited to the specified area and its resources. Under the exclusive property model, the CHM shares the following characteristics: international territory, worldwide value, and anti-monopoly.

A. International Territory

The first characteristic, international territory, means that the CHM is located in international space. Mankind's ownership and state sovereignty are mutually exclusive and thus cannot coexist in the same "thing." According to White, since mankind's right to the CHM is "one of title," "no State can assert sovereignty in derogation of that right."[156] Thus, the CHM should be the thing beyond the national jurisdiction. Meanwhile, resources or areas within the sovereignty of a state cannot become mankind's property or the CHM. Part I of the Declaration on the Inadmissibility of Intervention and Interference in the Internal Affairs of States emphasizes the inviolability of sovereignty.[157] A state can "exercise permanent sovereignty over its natural resources, in accordance with the will of its people," and that

155. *See, e.g.*, Per Magnus Wijkman, *Managing the Global Commons*, 36 INT'L ORG. 511, 514–19 (1982).

156. Mary Victoria White, Note, *The Common Heritage of Mankind: An Assessment*, 14 CASE W. RES. J. INT'L L. 509, 535 (1982).

157. *See* G.A. Res. 36/103, annex, ¶ 1(b), Declaration on the Inadmissibility of Intervention and Interference in the Internal Affairs of States (Dec. 9, 1981) [hereinafter Declaration].

sovereignty should not be threatened by "outside intervention, interference, subversion, coercion or threat in any form whatsoever."[158] Accordingly, resources or areas under state sovereignty cannot become the CHM. Under UNCLOS, the Area is "beyond the limits of national jurisdiction,"[159] and so are its resources.

B. Worldwide Value

The CHM stipulated under UNCLOS, as a valuable resource, is closely related to the well-being of mankind on a global scale. Worldwide value stems from the value of "things," and things can satisfy people's needs in their social lives.[160] Since mankind is a separate legal entity representing all people in the world, the CHM, as mankind's property, should meet the demands of mankind.

Baslar argues that "only those natural and cultural resources which globally affect the survival and welfare of mankind can be exploited, conserved or protected under the common heritage regime."[161] Li also stresses that the CHM is of both economic and strategic importance and plays an important role in the overall long-term development of mankind.[162] In addition to its economic value, Kiss notes, the CHM may also have cultural and scientific value.[163] Under the terms of UNCLOS, however, the worldwide value of the CHM is reflected mainly in its economic value. Considering that things can satisfy people's needs,[164] whether the value is economic or cultural, depends on the needs of the owner or the user. The value of the Area, as the CHM, can be realized only through the exploitation of the resources therein. Accordingly, Part XI, Annex III of UNCLOS, and the

158. *Id.* at Part I, ¶ b.

159. UNCLOS, *supra* note 3, at art. 1(1).

160. *See* HUIXING LIANG (梁慧星) & HUABIN CHEN (陈华彬), wù quán fǎ (物权法) [PROPERTY LAW] 29 (1997).

161. BASLAR, *supra* note 26, at 110.

162. Zhiwen Li (李志文), guó jì hǎi dǐ zī yuán zhī rén lèi gòng tóng jì chéng cái chǎn de zhèng chéng (国际海底资源之人类共同继承财产的证成) [The Justification of the International Sea-bed Area Resources as the Common Heritage of Mankind], 6 shè huì kē xué (社会科学) [SOC. SCI.] 90, 93 (2017).

163. Alexandre Kiss, *The Common Heritage of Mankind: Utopia or Reality*, 40 INT'L J. 423, 438 (1985); Alexandre Kiss, *Conserving the Common Heritage of Mankind*, 59 REVISTA JURIDICA U.P.R. 773, 776 (1990).

164. *See* HUIXING LIANG (梁慧星) & HUABIN CHEN (陈华彬), *supra* note 160, at 29.

Annex as a whole focus on the exploration and exploitation of the resources in the Area.[165] Operators can obtain revenues by exploiting the resources in the Area.[166] Meanwhile, the Authority, on behalf of mankind, shares the proceeds of commercial production.[167] Therefore, the immense economic value of the resources within the Area justifies the Area's status as the CHM.

Although the Area certainly has scientific value, its CHM status lies primarily in its economic value. Scientific research in the Area is an embodiment of the "conduct and promotion of marine scientific research,"[168] rather than an element of heritage.[169] Article 143 of Part XI of UNCLOS stresses that marine scientific research in the Area shall be carried out "in accordance with Part XIII."[170] Article 256, Section 3 of Part XIII, also provides that all state and competent international organizations can "conduct marine scientific research in the Area."[171] Moreover, states cannot claim any legal rights to "the marine environment or its resources" on the basis of scientific research.[172] Hence, states conduct scientific research in the Area according to the right to scientific research rather than usufruct detached from mankind's ownership. In other words, the Area's CHM status has nothing to do with the right of states to conduct research therein. It is thus understandable that "most commentators do not specifically include scientific research as one of the features characterizing how a CHM resource or area must be utilized."[173]

There is no direct mention of the cultural value of the CHM in UNCLOS. "The Area" is defined simply as the "seabed and ocean

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165. *See generally* UNCLOS, *supra* note 3, at part XI, sec. 3, Annex III, art. 3; Annex, *supra* note 14, sec. 6.

166. The operator entering into the contract may pay a production charge in light of the percentage of commercial production, which indicates that the operator can obtain financial revenue through commercial production in the Area. *See* UNCLOS, *supra* note 3, at part XI, sec. 3, Annex III, art. 13(5).

167. *See* Annex, *supra* note 14, sec.8.

168. UNCLOS, *supra* note 3, at Part XIII, sec. 3.

169. *See generally id.* at Part XIII, Part XI (the provisions on Marine scientific research (in Part XIII) and those on the CHM (in Part XI) are located in different parts of the UNCLOS, indicating their respective emphasis on different aspects).

170. *Id.* at art. 143(1).

171. *Id.* at art. 256.

172. *Id.* at art. 241.

173. Noyes, *supra* note 9, at 454.

floor and subsoil,"[174] and its resources as "solid, liquid or gaseous mineral resources."[175] It is obvious that such resources are not carriers of cultural value, and it could thus be argued that neither the Area nor its resources have cultural value. Furthermore, archaeological and historical objects found in the Area are independent objects and not constituents of the Area.[176] Thus, archaeological and historical objects do not fall within the scope of the Area and its resources.

Moreover, the legal status of such objects differs from that of the CHM under UNCLOS. The Area and its resources are the exclusive property of mankind, and other entities can acquire rights to that heritage by means of authorization. By contrast, states have preferential rights to archaeological and historical objects.[177] Although Article 149 provides that such objects "are preserved or disposed of for the benefit of mankind,"[178] that provision is limited to the purposes of preservation and disposition. It does not state that all of the rights in the objects are vested in mankind.[179] Therefore, archaeological and historical objects cannot be considered exclusive property of mankind.

Last, but not least, the utilization of underwater cultural heritage is quite different from that of the CHM in the sea. The main treatment to underwater cultural heritage, according to the UNESCO Convention on the Protection of the Underwater Cultural Heritage (UNESCO Convention), is preservation and protection rather than commercial exploitation.[180] As stipulated

174. UNCLOS, *supra* note 3, at art. 1(1).

175. *Id.* at art. 133(a).

176. *Id.* at art. 1(1). According to Article 1, the Area is "seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction," so it obviously does not include archaeological and historical objects. *Id.* Besides, Article 149 describes them and the Area separately, stating that "an archaeological and historical nature found in the Area." *Id.* at art. 149. It implies that UNCLOS treats them as separate objects.

177. *Id.* at art.149.

178. *Id.*

179. *See id.* ("All objects of an archaeological and historical nature found in the Area shall be preserved or disposed of for the benefit of mankind as a whole, particular regard being paid to the preferential rights of the State or country of origin, or the State of cultural origin, or the State of historical and archaeological origin.").

180. UNESCO Convention on the Protection of the Underwater Cultural Heritage, pmbl., Nov. 2, 2001, 2562 U.N.T.S. 45694 [hereinafter UNESCO Convention] ("Realizing the importance of protecting and preserving the

in Article 2(1), the UNESCO Convention "aims to ensure and strengthen the protection of underwater cultural heritage."[181] Article 2(7) emphasizes that underwater cultural heritage should not be subject to commercial exploitation.[182] As an international treaty that "does not regulate ownership questions" and "focuses solely on heritage values,"[183] the UNESCO Convention shows that the "thing" whose worldwide value mainly lies in cultural value should be treated differently from the CHM.

C. Anti-Monopoly

Under the exclusive property model, operators can only exercise usufruct to the CHM, and the limits of their usufruct are explicitly defined in their agreement with the Authority, which can effectively prevent the CHM from being monopolized by a specific operator. The anti-monopoly feature of the CHM indirectly enriches the content of controllability. In the civil law arena, things are controllable for people.[184] It should be noted, however, that entities need not have immediate control over the CHM. Even if the CHM cannot be physically controlled in the contemporary era, human beings can confirm their legal status and explore how to establish a regime to prevent monopoly. The anti-monopoly feature of the CHM justifies the necessity and possibility of defining the CHM's legal status before its actual exploration and utilization. Therefore, the controllability of the CHM also includes the situation that the CHM is controllable for the foreseeable future.

Under the UNCLOS framework, operators cannot monopolize the Area's resources, and nor can they adjust the price and yield of those resources at will. First, the Area held by a state party cannot exceed the maximum extent prescribed by UNCLOS.[185]

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underwater cultural heritage and that responsibility therefore rests with all States…").

181. *Id.* at art. 2 ¶ 1.

182. *Id*. at art. 2 ¶ 7.

183. *The UNESCO 2001 Convention on the Protection of the Underwater Cultural Heritage and its Context*, UNESCO, http://www.unesco.org/new/en/culture/themes/underwater-cultural-heritage/underwater-cultural-heritage/definition-of-underwater-cultural-heritage/ (last visited Oct. 8, 2021).

184. XIANZHONG SUN (孙宪忠), Déguó Dāngdài Wùquánfǎ (**德国当代物权法**) [CONTEMPORARY GERMAN PROPERTY LAW] 4 (1997); *see also* HUIXING LIANG (梁慧星) & HUABIN CHEN (陈华彬), *supra* note 160, at 28.

185. UNCLOS, *supra* note 3, at Annex III, art. 6(3)(c).

The Authority is expected to ensure that state parties or their sponsored entities cannot "monopolize the conduct of activities in the Area or … preclude other States Parties from activities in the Area."[186] Second, every applicant should divide the area covered by its application into "two parts of equal estimated commercial value" and let the Authority designate which part is "to be reserved solely for the conduct of activities by the Authority through Enterprise or in association with developing States."[187] Third, activities in the Area should ensure that "minerals derived both from the Area and from other sources" have "just and stable prices."[188] Fourth, operators' production schedules, including the maximum amount of minerals they can extract annually, must be approved by the Authority.[189] Finally, according to Article 155(2), "the prevention of monopolization of activities in the Area" should be ensured.[190] Section 4 of Annex III stresses that "the principles, regime and other terms referred to in Article 155, paragraph 2, of the Convention shall be maintained."[191] Accordingly, to prevent a monopoly, UNCLOS lays down clear provisions, including but not limited to the foregoing provisions,[192] to regulate the acquisition and exercise of operators' usufructs. The fact that the Authority exercises mankind's ownership of the CHM provides a theoretical basis for the Authority to organize and control the activities involved in utilizing the CHM.

III. UTILIZATION SYSTEM OF THE CHM IN UNCLOS

According to the exclusive property model, the CHM utilization system under UNCLOS can be divided into three stages: authorization, utilization, and benefit-sharing. The CHM is exclusively owned by mankind, but it cannot be directly utilized by mankind. According to UNCLOS, operators are permitted to carry out the exploration and exploitation of the resources within the Area under the utilization system.[193] It is this regime

186. *Id.* at Annex III, art. 6(4).
187. *Id.* at Annex III, art. 8.
188. *Id.* at art. 150(f).
189. Annex, *supra* note 14, sec. 6(1)(e).
190. UNCLOS, *supra* note 3, at art. 155(2).
191. Annex, *supra* note 14, sec. 4.
192. *See, e.g.,* UNCLOS, *supra* note 3, at Annex III, art. 7.
193. *Id.* at Annex III, art. 3.

through which the Authority confers usufruct upon operators and shares in their benefits. From this perspective, the utilization system of the CHM fulfills three main functions: separating usufruct from mankind's ownership, regulating the exercise of usufruct, and ensuring that the benefits derived from such exercise are shared equitably. The three functions are elaborated upon below to provide a fuller picture of the operation and framework of the utilization system.

A. Authorization

To acquire usufruct, an operator not only needs to meet the expected qualifications of applicants but also to submit an application that meets certain conditions.[194] The Authority then takes both requirements into consideration when deciding whether to confer usufruct upon the applicant.[195] All applicants need to abide by "Part XI, the rules, regulations and procedures of the Authority and the decisions of the organs of the Authority and terms of his contracts with the Authority."[196] In addition, they should have the necessary "financial and technical capabilities."[197] Further, applicants other than the Enterprise should also have "the nationality or control and sponsorship required by article 153, paragraph 2(b)"[198] and "be sponsored by [a] State Party."[199] When the applicant is a state party, the procedures for assessing its qualifications "shall take into account [its] character as [a] State[]."[200]

An eligible applicant can apply for a plan of work to conduct activities in the Area.[201] That plan of work "shall comply with and be governed by the relevant provisions of this Convention and the rules, regulations and procedures of the Authority, including those on operational requirements, financial contributions, and the undertakings concerning the transfer of technology."[202] Article 6(3) also adds the following requirements to the

194. *Id.* at Annex III, art. 4.
195. *Id.*
196. *Id.* at Annex III, art. 4(6)(a); Annex, *supra* note 14, sec. 2(4).
197. UNCLOS, *supra* note 3, at Annex III, art. 12(2).
198. *Id.* at Annex III, art. 4(1).
199. *Id.* at Annex III, art. 4(3).
200. *Id.* at Annex III, art. 4(5).
201. *Id.* at Annex III, arts. 4,7.
202. *Id.* at Annex III, art. 6(3).

plan of work: the area covered by the proposed plan of work should not be included "in an approved plan of work or a previously submitted proposed plan of work which has not yet been finally acted on by the Authority;"[203] activities in the area covered by the proposed plan of work should not cause "serious harm to the marine environment;"[204] and the sponsor or applicant of the proposed plan of work should not hold an excessive area for exploration or exploitation.[205]

If an application is not "submitted by the Enterprise or by any other entities for reserved areas," it should include two mining areas with an "equal estimated commercial value."[206] When approving an application for a plan of work, the Authority will designate one of the mining areas as a "reserved area."[207] In reserved areas, different applicants have different degrees of priority in submitting an application for a plan of work.[208] The Enterprise has the highest priority in carrying out activities "in each reserved area" and "exploit[ing] such areas in joint ventures."[209] Applicants from developing countries have the second highest priority in applying to utilize a reserved area.[210] The third highest priority belongs to the contractor that "has contributed a particular area to the Authority as a reserved area," although its priority is limited to the area it contributed.[211]

The prioritization of applications may unfold as follows. Under Article 9(4) of Annex III, if the applicant is "a developing State or any natural or juridical person sponsored by it and effectively controlled by it or by other developing State which is a qualified applicant, or any group of the foregoing," the applicant can notify the Authority and submit a plan of work covering a reserved area.[212] The plan of work provided by an applicant from a developing country will be considered in situations in which the Enterprise decides not to carry out activities in the area in

203. *Id.* at Annex III, art. 6(3)(a).
204. *Id.* at art. 162(2)(x); *see also id.* at Annex III, art. 6(3)(b).
205. *Id.* at Annex III, art. 6(3)(c).
206. *Id.* at Annex III, art. 8.
207. *Id.*
208. *See* UNCLOS, *supra* note 3, at Annex III, at art. 9.
209. *Id.* at Annex III, art. 9(1).
210. *See id.* at Annex III, art. 9(4).
211. Annex, *supra* note 14, sec. 2(5).
212. UNCLOS, *supra* note 3, at Annex III, art. 9(4).

question.[213] As for the tertiary group, a contractor can apply to utilize that area to which it has contributed if the Enterprise "does not submit an application for a plan of work for activities in respect of such a reserved area" within a specified period of time.[214]

During the examination phase, the Authority conducts a review of the applicant's qualifications and the substance of its application.[215] The Authority first ascertains whether the applicant has complied with Article 4 of Annex III, which is called "Qualifications of applicants,"[216] and then examines whether the plan of work conforms to the relevant requirements.[217] It considers plans of work "in the order in which they are received"[218] and strictly follows the principle of non-discrimination.[219] Only when its plan of work is approved can the applicant acquire the usufruct to the CHM under UNCLOS. Such approval, however, does not directly grant usufruct. Approval is just one of the preconditions of its acquisition, as an approved plan of work must be "in the form of a contract."[220] To be more precise, the approved plan of work does not include all the terms of the contract; further negotiations are needed to conclude the contract following approval. The Authority needs to negotiate the financial terms of the contract with the applicant according to the relevant provisions.[221] Those terms not only impose financial obligations on the applicant but also ensure that the Authority shares the revenues of commercial production.[222]

Once the work plan is approved, the Authority and the applicant will continue with the conclusion of a contract.[223] Since they have to sign a contract, they should reach a consensus on each and every term of the contract. It may be argued that the contract is concluded even if the Authority does not reach a

213. *Id.*
214. Annex, *supra* note 14, sec. 2(5).
215. UNCLOS, *supra* note 3, at Annex III, art. 6.
216. *Id.* at Annex III, art. 6(2).
217. *Id.* at Annex III, art. 6(3).
218. *Id.*
219. *Id.* at Annex III, arts. 6(3), 6(5); *see also id.* at art. 152(1).
220. *Id.* at art. 153(3), Annex III, art. 3(5); Annex, *supra* note 14, sec. 2(4).
221. UNCLOS, *supra* note 3, at Annex III, art.13; Annex, *supra* note 14, sec. 8.
222. UNCLOS, *supra* note 3, at Annex III, arts. 13(1)(a), 13(1)(c).
223. *Id.* at Annex III, art. 3(5).

consensus or make a decision since Section 3(11) of the Annex provides that the work plan is approved if the Council does not make a decision within the prescribed period on whether to approve a "recommendation for approval of a plan of work."[224] It must be noted that the approval of a work plan is not equivalent to the conclusion of the contract; these are two separate steps.[225] After the plan is either approved or deemed to be approved, the Authority and the applicant still need to negotiate some terms of the contract.[226] If the Authority ultimately decides not to sign the contract, the applicant cannot conduct activities in the Area,[227] let alone acquire title to the minerals.[228]

B. Utilization

In the utilization stage, the operator exercises the usufruct to the CHM, and the Authority takes measures to regulate the exercise thereof. The operator utilizes the CHM in accordance with the usufruct granted by the Authority, and the relevant activities in the Area are carried out in accordance with the plan of work.[229] The utilization stage can be further divided into two phases: exploration and exploitation.[230] The types of activities the operator can carry out are defined in the plan of work.[231] If that plan is only for exploration or exploitation, then the operator can exercise the usufruct only with respect to that specified phase.[232] In the exploration stage, the operator needs to survey specific areas and complete the design and construction of mining equipment and processing plans.[233]

When the exploration stage is over, the exploitation stage begins, but there is an interval between the end of the exploration

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224. Annex, *supra* note 14, sec. 3(11).

225. UNCLOS, *supra* note 3, at Annex III, art. 3(5) ("Upon its approval by the Authority, every plan of work, except those presented by the Enterprise, shall be in the form of a contract concluded between the Authority and the applicant or applicants.").

226. *Id.* at Annex III, art. 13 (such as financial terms of contracts.).

227. *Id.* at Annex III, art. 3(1).

228. *Id.* at Annex III, art. 1.

229. *Id.* at art. 153(3).

230. *See id.* at Annex III, art. 3 (operators are subject to different rules at these two phases).

231. *Id.* at Annex III, art. 3(4)(c).

232. *Id.* at Annex III, art. 4(c).

233. *Id.* at Annex III, art. 17(2)(b)(ii).

stage and the start of the exploitation stage.[234] This interval is a "reasonable time period for construction of commercial-scale mining and processing systems,"[235] which aims to make commercial production feasible. The Authority shall determine the maximum time interval in reference to the time required for the construction.[236] After completion of the construction, commercial production starts, which means that the operator begins to carry out actual exploitation. Exploitation is a continuous process consisting of multiple separate mining activities. In practice, the operator may carry out multiple mining activities at the same time during the exploitation stage, so the end of one mining activity does not necessarily mean the end of the exploitation stage. The duration of the exploitation stage depends on the "economic life of the mining project."[237] Although UNCLOS does not specify when the exploitation stage ends, the statement that "the duration of exploitation should be related to the economic life of the mining project"[238] indicates that the exploitation period ends when the operator terminates the mining project.

An operator should not abuse its right in the exercise of the usufruct. According to Article 4(6), the operator needs to fulfill the obligations "created by the provisions of Part XI, the rules, regulations, and procedures of the Authority, the decisions of the organs of the Authority, and terms of his contracts with the Authority."[239] First, the operator should utilize the Area exclusively for peaceful purposes.[240] Second, it should cooperate with the Authority to promote the transfer of technology.[241] Third, the exercise of usufruct should not harm the marine environment.[242] Fourth, the operator should meet its financial obligation in the utilization stage.[243] Finally, the exercise of usufruct should meet

234. *Id.* at Annex III, art. 17(2)(c).
235. *Id.* at Annex III, art. 17(2)(b)(iii).
236. *Id.* at Annex III, art. 17(2)(c).
237. *Id.* at Annex III, art. 17(2)(b)(iii).
238. *Id.*
239. *Id.* at Annex III, arts. 4(6)(a), 4(6)(c), 4(6)(d).
240. *Id.* at arts. 138, 141.
241. *Id.* at art. 144; Annex, *supra* note 14, sec. 5.
242. UNCLOS, *supra* note 3, at Annex III, art. 17(2)(f); Annex, *supra* note 14, secs. 1(5)(g), 1(5)(k).
243. *See* UNCLOS, *supra* note 3, at Annex III, art. 13.; Annex, *supra* note 14, sec. 8.

the operational requirements, including the size of the area, duration of operation, and performance requirements.[244]

To ensure the lawful and appropriate utilization of the CHM, the Authority is entitled to supervise all operators' exercise of their usufruct. Article 153(4) authorizes the Authority to exercise necessary control over activities in the Area.[245] Article 153(5) adds that it can take "any measures provided for under this Part (Part XI)" to "ensure compliance with its provisions and the exercise of the functions of control and regulation assigned to it thereunder or under any contract."[246] The Authority closely monitors both exploration activities[247] and exploitation activities[248] in the Area. If an operator fails to comply with the terms of the contract, relevant provisions, and binding decisions, the Authority can penalize it by imposing monetary penalties and/or suspending or even terminating the usufruct.[249]

C. Sharing of Benefits

The Authority receives revenues from operators according to financial terms of contracts.[250] Each operator, if usufruct has been conferred upon it, is obliged to comply with the benefit-sharing mechanism.[251] The Authority, after receiving revenues from operators, must share the benefits equitably.[252] Thus, the benefit-sharing process can be described as one of charging fees and sharing benefits.

The Authority acquires revenues in accordance with the financial terms of its contracts with operators. The basic principles of those terms are prescribed in Article 13 of Annex III and Section 8 of Annex IV. First, the funds connected with activities in the Area are received by the Authority "pursuant to Annex III, article 13."[253] Second, Article 10 of Annex IV provides that "the Enterprise shall make payments to the Authority under Annex III,

244. UNCLOS, *supra* note 3, at Annex III, art. 17(1)(b).
245. *Id.* at art. 153(4).
246. *Id.* at art. 153(5).
247. Annex, *supra* note 14, sec. 1(5)(c).
248. *Id.* sec. 6(6).
249. UNCLOS, *supra* note 3, at Annex III, art. 18.
250. *Id.* art. 13.
251. Annex, *supra* note 14, sec. 8(1)(c).
252. UNCLOS, *supra* note 3, at art. 140(2).
253. *Id.* at art. 171(b).

article 13, or their equivalent."[254] The acquisition of revenues is realized by the "system of payments,"[255] which should be fair and efficient. On the one hand, the system should be fair not only to "the contractor and to the Authority,"[256] but also to land-based and deep-seabed miners.[257] On the other hand, "the system should not be complicated and should not impose major administrative costs on the Authority or on a contractor."[258] The system of payment can be either "a royalty system or a combination of a royalty and profit-sharing system."[259] If different systems are adopted, the contractor can "choose the system applicable to its contract."[260]

In addition to royalties and profit-sharing, the Authority also charges annual fixed fees to ensure its acquisition of revenues.[261] The annual fixed fee should be charged "from the date of commencement of commercial production," and it can be credited against payments made under another system.[262] Because the fee and payment are not added up, the function of the annual fixed fee system is to supplement the income accruing from the payment system adopted. Therefore, the annual fixed fee system can be regarded as a part of the system of payment, which can be revised periodically.[263] For existing contracts, such changes can take place "at the election of the contractor."[264] If there is a "subsequent change in the choice between alternative systems," an agreement between the Authority and contractor is needed.[265]

After acquiring benefits derived from activities in the Area, the Authority must share them equitably "on a non-discriminatory basis."[266] The ISA Assembly should "consider and approve the rules, regulations, and procedures on the equitable sharing"[267]

254. *Id.* at Annex IV, art. 10.
255. Annex, *supra* note 14, sec. 8(1).
256. *Id.* sec. 8(1)(a).
257. *Id.* sec. 8(1)(b).
258. *Id.* sec. 8(1)(c).
259. *Id.*
260. *Id.*
261. *Id.* sec. 8(1)(d).
262. *Id.* sec. 8(1)(d).
263. *Id.* sec. 8(1)(e).
264. *Id.*
265. *Id.*
266. UNCLOS, *supra* note 3, at art. 140(2).
267. *Id.* at art. 160(2)(f)(i).

and "decide upon the equitable sharing consistent with this Convention and the rules, regulations, and procedures of the Authority."[268]

More specifically, the sharing of benefits should take into particular consideration "the interests and needs of developing states and peoples who have not attained full independence or other self-governing status."[269] Benefit-sharing under UNCLOS is compulsory[270] because the "financial and other economic benefits"[271] are intended to benefit mankind as a whole.[272]

At present, owing to a lack of technology and money, many developing states and other self-governing entities cannot participate effectively in activities in the Area. If they cannot participate in commercial production, they are unable to gain economic benefits by exploiting the resources of the Area. Hence, the sharing of benefits needs to pay particular attention to these states' interests and needs. So far, there is "no market for deep seabed minerals,"[273] nor regulatory measures for benefit-sharing.[274] Thus, the detailed arrangement of benefit-sharing is yet to be determined,[275] which depends largely on the future implementation of the regulations concerning the distribution of benefits. Nonetheless, it is clear that "the law on the Area and CHM" "mandate[s] collection and redistribution of revenue by the ISA,"[276] which also stresses the compulsory nature of benefit-sharing.

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268. *Id.* at art. 160(2)(g).

269. *Id.* at arts. 140(1), 160(2)(f)(i).

270. *Id.* at art. 140(2).

271. *Id.*

272. The benefit-sharing clause is laid down under Article 140. Article 140 is entitled "benefit of mankind", implying that distribution should benefit mankind as a whole.

273. Isabel Feichtner, *Sharing the Riches of the Sea: The Redistributive and Fiscal Dimension of Deep Seabed Exploitation*, 30 EUR. J. INT'L L. 601, 624 (2019).

274. Jonathan Sydney Koch, *Institutional Framework for the Province of all Mankind: Lessons from the International Seabed Authority for the Governance of Commercial Space Mining*, 16 ASTROPOLITICS INT'L J. SPACE POL. & POL'Y. 1, 10–11 (2018).

275. Aline Jaeckel, Jeff A. Ardron & Kristina M. Gjerde, *Sharing Benefits of the Common Heritage of Mankind—Is the Deep Seabed Mining Regime Ready*?, 70 MARINE POL'Y. 198, 199 (2016).

276. Feichtner, *supra* note 273, at 618.

IV. FROM CHM IN THE SEA TO CHM IN ALL FIELDS

The CHM is a collective and general concept for specific types of objects.[277] The exclusive property model in UNCLOS serves as a useful reference for the CHM in other fields, as there are commonalities among the objects deemed to be CHM regardless of what exactly they are and where they are located. This section analyzes whether the CHM model in UNCLOS can be extended to the CHM in other fields and, if so, how it should be applied.

A. The CHM under the Moon Agreement

The CHM concept is formally introduced to the field of space law in the Moon Agreement, Article 11(1) of which defines "the moon and its natural resources" as the CHM.[278] The provision also applies to "other celestial bodies within the solar system" (other than the earth and celestial bodies to which other effective legal norms have been applied).[279] Thus, the CHM in outer space includes most of the celestial bodies within the solar system and their resources. This section argues that the exclusive property model in the law of the sea can be extended to outer space.

In terms of the CHM, the biggest difference between UNCLOS and the Moon Agreement is that there is no international regime that governs the use of the CHM. As Tronchetti points out, the Moon Agreement *per se* does not provide a detailed regime for the application of the CHM concept.[280] The lack of such a regime makes the CHM incomplete. The "meaning and effect" of the CHM in the Moon Agreement, according to Jakhu, Pelton, and Nyampong, is simply a requirement of establishing an international regime that regulates the exploitation of space resources.[281]

To start with, the international regime is essential to clarify the connotation of the CHM. Article 11(1) provides that Article 11(5) plays an important role in clarifying the connotation of

277. *See* Zhiwen Li (李志文), *supra* note 162, at 91.

278. Moon Agreement, *supra* note 3, at art. 11(1).

279. *Id.* at art. 1(1).

280. FABIO TRONCHETTI, THE EXPLOITATION OF NATURAL RESOURCES OF THE MOON AND OTHER CELESTIAL BODIES: A PROPOSAL FOR A LEGAL REGIME 54 (F. G. von der Dunk ed., 2009).

281. RAM S. JAKHU, JOSEPH N. PELTON & YAW O.M. NYAMPONG, SPACE MINING AND ITS REGULATION 128 (Scott Madry ed., 2017).

CHM.[282] According to Article 11(5), States Parties are required to build an international regime. It states:

> States Parties to this Agreement hereby undertake to establish an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the Moon as such exploitation is about to become feasible. This provision shall be implemented in accordance with article 18 of this Agreement.[283]

This provision obliges States Parties to establish an international regime to govern the space mining activities before the exploitation is feasible, so the exploitation by States Parties of the moon and its resources should be carried out under such an international regime.

Some scholars argue that states can exploit moon resources before the international regime is established.[284] Nonetheless, if states are allowed to exploit these resources prior to the establishment of the regime, they tend not to set up the regime that will limit their freedom of exploitation.[285] What is worse, permission to exploit the CHM before the establishment of the regime indicates that entities are able to mine the CHM in outer space without the establishment of any international regime. Consequently, space powers are likely to exploit space resources directly rather than wasting time in establishing an international regime that might constrain them. This would render Article 11(5) meaningless. After all, Article 11(1) stresses that the connotation of CHM is particularly reflected in Article 11(5),[286] which means the international regime proposed in Article 11(5) is indispensable to clarifying the CHM. In accordance with Article 11(5), before carrying out the mining missions of the CHM in outer space, States Parties must establish a regime to govern these activities. Article 11(5) does not aim to impose a moratorium on the exploitation of the CHM because the regime should be built when the exploitation "is about to become

282. Moon Agreement, *supra* note 3, at art. 11(1).

283. *Id.* at art. 11(5).

284. Carl Q. Christol, *The Common Heritage of Mankind Provision in the 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, 14 INT'L LAW. 429, 464 (1980).

285. BASLAR, *supra* note 26, at 171.

286. Moon Agreement, *supra* note 3, at art. 11(1).

feasible."[287] As long as the regime can be established before the space mining activities become technically and economically feasible, the exploitation of the CHM will not be objectively delayed. Hence, States Parties not only need to establish an international regime but also need to reach a consensus relating to such regime within a reasonable period so as to not hinder the launch of space mining activities.

The exploitation of the CHM in outer space should not be carried out without the governance of an international regime, and the regime will have significant legal implications on what rights States Parties have for the CHM and how to exercise these rights. However, the Moon Agreement does not provide for such a regime, nor does it specify the terms of the regime.[288] The absence of the regime leaves many unresolved problems related to the CHM in outer space. Among them, this article holds that there are three problems that have a particularly important negative impact on both the connotation and utilization system of the CHM in outer space, including the problem of title to remove minerals, the problem of benefit-sharing, and the problem of regulating the utilization.

In terms of the first problem, the Moon Agreement does not even establish a regime regarding the exploitation of lunar resources,[289] so it does not mention at all how to obtain ownership of the removed minerals through space mining. Due to the absence of a regime that governs the utilization of the CHM, the Moon Agreement cannot, as Article 137(3) of the UNCLOS does, provide that no entities "shall claim, acquire or exercise rights with respect to the minerals recovered from the Area except in accordance with this Part."[290] Article 137(3) essentially requires the subject to obtain rights to minerals only through the utilization system of the CHM.[291] A similar provision can only be formulated when such a system is established. Since the regime has yet to be established, the Moon Agreement can only briefly

287. *See id.* at art. 11(5).

288. RICKY J. LEE, LAW AND REGULATION OF COMMERCIAL MINING OF MINERALS IN OUTER SPACE 265 (Ram S. Jakhu, M. Davis, S. Le Goueff, P. Nesgos, S. Mosteshar & L.I. Tennen eds., 2012).

289. Moon Agreement, *supra* note 3, at art. 11(5).

290. UNCLOS, *supra* note 3, at art. 137(3).

291. *See id.*

introduce the main purpose of the regime[292] and cannot elaborate on details such as the legal status of extracted minerals or the right of the actor to the minerals.

According to some commentators, however, Article 11(3) implies that ownership of the removed mineral is permissible.[293] Article 11(3) provides that the listed entities, including persons, different types of organizations, and states, cannot own the moon and its "natural resources in place."[294] The commentators believe that "natural resources in place" do not include the extracted minerals, so entities can gain title to minerals when they are no longer in place.[295] But it is a bit far-fetched to conclude that States Parties can own extracted minerals solely according to Article 11(3). After all, the last sentence of Article 11(3) emphasizes that "the foregoing provisions are without prejudice to the international regime referred to in paragraph 5 of this article." Thus, in terms of governing the utilization of the CHM, the regime should have priority. Whether miners can acquire title to remove minerals and how they can do this should be derived from the regime rather than from a provision that does not even directly mention the extracted minerals. Considering that the Moon Agreement proposes no procedure about exploiting space resources, if States Parties are allowed to own extracted minerals simply according to Article 11(3), it will cause unregulated and unrestricted exploitation.

Further, Article 6(2) also indicates that the users of the CHM cannot attain ownership over extracted minerals in the absence of the international regime.[296] According to Article 6(2), States Parties have the right to collect, remove, and dispose of the Moon samples in carrying out scientific investigations.[297] The provision not only avoids the expression of ownership, but it also puts forward requirements in terms of the purpose for using the

292. *See* Moon Agreement, *supra* note 3, at art. 11(7).

293. *See, e.g.*, Eleni-Anna Mavroeidi, *The Effectiveness and Applicability of the Moon Agreement in the Twenty-First Century: Will There Be a Future?*, *in* THE SPACE TREATIES AT CROSSROADS 35, 42 (George D. Kyriakopoulos & Maria Manoli eds., 2019).

294. Moon Agreement, *supra* note 3, at art. 11(3).

295. BASLAR, *supra* note 26, at 168.

296. *See* Moon Agreement, *supra* note 3, at art.6(2).

297. *Id.*

sample[298] and the quantities of samples.[299] If the acquisition of title to extracted minerals by States Parties is permitted in the absence of an international system, it will lead to an absurd conclusion that scientific research is more restricted than commercial development. After all, scientific research should be less constrained than commercial exploitation since scientific research per se contributes to the advancement of human science and technology and does not lead to the monopoly of space resources in the same manner as commercial exploitation does. Thus, given that the Moon Agreement even explicitly regulates the right to collect and dispose of samples in scientific investigations, it is unreasonable to hold that commercial exploitation can directly acquire ownership of extracted minerals without being regulated by any provision of the regime to be established. Additionally, if States Parties can own exacted minerals directly through unregulated exploitation, the Moon Agreement need not adopt Article 6(2) to allow States Parties to collect lunar samples under the restrictions.

Since Article 6(2) is the only clause that directly mentions the removal of resources, it should be considered an exception to the prohibition of removing celestial resources until the regime is established. This clause can be deemed as a solution to the question of how lunar samples can be collected for research when the ownership of removed minerals is not yet defined and permitted. Nonetheless, the right of States Parties to the sample should not be simply regarded as ownership, for the right is subject to the restrictions mentioned above. The restrictions pertaining to scientific purposes and appropriate quantities and the avoidance of referring to ownership indicates that the Moon Agreement does not want such rights to be interpreted as ownership. It helps to prevent some States Parties from using Article 6(2) to unduly appropriate minerals. Nonetheless, without a regime that confers the title of the removed minerals and regulates the acquisition of the title, some States Parties may abuse Article 6(2) to carry on de facto exploitation and further own the removed

298. *Id.* ("Such samples shall remain at the disposal of those States Parties which caused them to be collected and may be used by them for scientific purposes.").

299. *Id.* ("States Parties may in the course of scientific investigations also use mineral and other substances of the Moon in quantities appropriate for the support of their missions.").

minerals. To ensure the orderly utilization of the CHM, a regime is needed to clarify whether users can have ownership over the extracted minerals and, if it is allowed, the procedure for obtaining such ownership.

The second problem is related to benefit-sharing. Paragraph (d) of Article 11(7) provides that one of the key tenets of the international regime is the distribution of benefits derived from space resources.[300] To achieve it, the regime should contain a benefit-sharing mechanism. But the Moon Agreement does not specify the terms of such a mechanism, making many issues ambiguous. First, the entity that implements distribution is unclear. The Moon Agreement does not mention who is responsible for the implementation of benefit-sharing. According to Paragraph (d), the interests and needs of both developing countries and spacefaring countries that have contributed to the exploration shall be given special consideration,[301] which seems to describe the States Parties as subjects that receive the distributed benefits. It implies that States Parties, whether involved in the development of the moon or not, are those who accept the distributed benefits, and there is a specialized agency that implements the allocation.

Second, the method of distribution is unclear. Should it be voluntary or compulsory? This question remains unanswered. Since benefit-sharing is one of the "main purposes of the international regime,"[302] it should be deemed as an obligation, and a mechanism needs to be established to ensure the fulfillment of the obligation.

Third, the scope of distributed benefits is unclear. Are all the benefits derived from space resources charged and allocated? If not, what is the standard that distinguishes between the distributable and non-distributable benefits? In light of the high spending of spacefaring states, it seems appropriate to consider the costs and profits of the miners when determining the scope of distributable benefits.

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300. *Id.* at art. 11(7)(d) ("An equitable sharing by all States Parties in the benefits derived from those resources, whereby the interests and needs of the developing countries, as well as the efforts of those countries which have contributed either directly or indirectly to the exploration of the Moon, shall be given special consideration.").

301. *Id.*

302. *Id.* at art. 11(7).

Last, but not least, the standard of allocation is unclear. Paragraph (d) also stresses that the sharing should be "equitable" and the balance should be tilted towards both developing nations' and spacefaring nations' interests and needs.[303] The standard is abstract and vague, so it needs a more specific and equitable standard to determine the exact proportion of benefits distributed among different countries.

As to the third problem, the Moon Agreement, despite foreshadowing a regime to be established, does not specify what institutional arrangements should be adopted to regulate the utilization of the CHM. Consequently, it cannot ensure that users of the CHM will abide by the obligations contained in the proposed principles. According to the Moon Agreement, when users utilize the CHM in outer space, they should adhere to some given principles. Article 4(1) provides that "the exploration and use of the Moon shall be the province of all mankind and shall be carried out for the benefit and in the interests of all countries."[304] In Article 4(2), the principle of cooperation and mutual assistance is put forward.[305] Article 3(1) emphasizes that "the Moon shall be used by all States Parties exclusively for peaceful purposes"[306] Article 7(1) underlines the importance of environmental protection in exploring and using the Moon.[307] In addition to the above principles, in Article 11(7), the main purposes of the regime to be established imply some obligations, such as "orderly and safe development,"[308] "rational management" of space resources,[309] expanding opportunities to use space resources[310] and sharing of benefits.[311] These principles impose objective requirements on the utilization of the CHM in the Moon Agreement, which affects the costs and benefits of the space mission. For instance, the principle of environmental protection may lead to an increase in costs, and the principle of the distribution of benefits can cause a decrease in profits. Without any regulations, the user will not willingly comply with the obligations. To ensure

303. *Id.* at art. 11(7)(d).
304. *Id.* at art. 4(1).
305. *Id.* at art. 4(2).
306. *Id.* at art. 3(1).
307. *Id.* at art. 7(1).
308. *Id.* at art. 11(7)(a).
309. *Id.* at art. 11(7)(b).
310. *Id.* at art. 11(7)(c).
311. *Id.* at art. 11(7)(d).

compliance with the principles, there needs to be a regime with effective regulatory measures.

The absence of a regime and the three major problems that arise from it means that the Moon Agreement itself cannot determine the connotation and utilization system of the CHM in outer space. To a great extent, the international system to be established determines the content of rights to utilize the CHM in outer space and how to exercise the right. Without such a regime, it is difficult to conclude the right of the user to the CHM and further explain the legal status of the CHM. The Moon Agreement alone is not enough to offer a complete and convincing explanation of what is CHM. The Moon Agreement cannot clarify the CHM and how it should affect exploitative space activities,[312] and what the Agreement lays down are "general principles and future commitments."[313] Since the "exact meaning of CHM was not defined within the Moon Agreement,"[314] it is fair to say that "the legal implications of the CHM vis-à-vis celestial resources are yet to be determined."[315]

Additionally, the method of constructing the utilization system of CHM in outer space cannot be determined by merely using the Moon Agreement. Do space miners need authorization to carry out mining missions and acquire exclusive rights to the extracted minerals? The Moon Agreement does not provide an answer. There is no doubt that space miners should have the necessary qualifications and capabilities. At the same time, the acquisition of exclusive rights, if permitted, should comply with certain procedures and not violate the principles set out in the Moon Agreement. An authorization mechanism can set qualifications and codes of conduct to ensure that space miners are qualified and capable and that their exploitation activities are not excessive and harmful. In terms of utilization, there are no provisions in the Moon Agreement that clearly stipulate what kind of regulatory system should be constructed to regulate the

312. Fabio Tronchetti, *Legal Aspects of Space Resource Utilization*, *in* HANDBOOK OF SPACE LAW 769, 787 (Frans von der Dunk & Fabio Tronchetti eds., 2015).

313. *Id.*

314. Naman Khatwani, *Common Heritage of Mankind for Outer Space*, 17 ASTROPOLITICS INT'L J. SPACE POL. & POL'Y. 89, 92 (2019).

315. Leslie I. Tennen, *Enterprise Rights and the Legal Regime for Exploitation of Outer Space Resources*, 47 UNIV. PAC. L. REV. 281, 291 (2016).

utilization of the CHM. Thus, one cannot rely solely on the Moon Agreement to determine how to build a regulatory mechanism. Similarly, the mechanism of sharing of benefits cannot be built based on the Moon Agreement alone. As analyzed before, there are many uncertain issues pertaining to benefit-sharing, including the entity that implements distribution, the method of distribution, the scope of distributed benefits, and the standard of allocation.

B. Applicability of the Exclusive Property Model to the CHM under the Moon Agreement

The previous section shows that it would not be sufficient to interpret existing treaties alone to elucidate the CHM in outer space. The exclusive property model helps to fill in the gaps. After all, the Moon Agreement is insufficient to fully clarify the meaning of the CHM in outer space. If the Moon Agreement is regarded as the sole source of determining the connotation and utilization system of the CHM in outer space, one can only obtain an incomplete answer. Even worse, when the Moon Agreement is deemed the only basis for designing a system of the CHM, one may conclude that there is no need to build an international regime to govern the utilization and that space miners can directly utilize the CHM in outer space. It would create a model of the CHM that substantially circumvents the establishment of an international regime. Thus, it is necessary to use a model that contains elements beyond the Moon Agreement to solve the unsolved problems listed in Section A of Part IV. In terms of evaluating the applicability of a model to the CHM in outer space, the most important standard is not whether the Moon Agreement has obvious and plentiful evidence to support the model but whether the model can fully solve the unsolved problems in the Moon Agreement and complement the incomplete version of the CHM.

The exclusive property model is conducive to the establishment of an international regime governing the use of the CHM in outer space for the following reasons. First, the model can provide a sufficient legal basis for the construction of the regime. In the model, mankind would have ownership over the CHM, and the right would be exercised by the representative agency of mankind. In the authorization stage, the representative agency of mankind grants usufruct to the operators, making them

eligible to use outer space resources.[316] It then monitors and regulates the operators' activities utilizing the CHM. Therefore, the model requires the establishment of a representative agency of mankind and a regime for the agency's management and coordination of CHM use. In short, the model demonstrates the necessity of the regime.

Second, the model can play a guiding role in constructing the regime. Part III of this paper divides the utilization system into three stages, including authorization,[317] utilization,[318] and sharing of benefits.[319] Article 11(7) states that an international regime regarding the utilization of lunar resources, the CHM in outer space, should involve the following aspects: "the orderly and safe development of the natural resources," "rational management of those resource," "the expansion of opportunities in the use of those resources," and "an equitable sharing" of benefits.[320] The above aspects are covered by three stages. For example, the stage of authorization and utilization contains the development of the lunar resources,[321] the management of those resources,[322] and the expansion of opportunities for exploitation.[323] The equitable sharing of benefits is included in the benefit-sharing stage. Accordingly, the utilization system of the CHM offers a basic framework for the establishment of a regime governing the utilization of the CHM in outer space.

Third, the exclusive property model can achieve the main purposes of the international regime defined in the Moon

316. Unless operators' plans of work are approved by the Authority, the representative agency of mankind, they cannot utilize the resources in the Area. *See* UNCLOS, *supra* note 3, at Annex III, art. 3. It indicates that the representative agency of mankind grants the operator's right to use the CHM.

317. *See, e.g.*, UNCLOS, *supra* note 3, at Annex III, arts. 4, 6, 8.

318. *See, e.g.*, *id*. at art. 153; at Annex III, arts. 16, 17.

319. *See, e.g.*, *id*. at art. 140(2); at Annex III, art. 13; Annex, *supra* note 14, sec. 8.

320. Moon Agreement, *supra* note 3, at art. 11(7).

321. Provisions on the exploitation of the CHM, such as Article 153 of the UNCLOS, can provide a reference for guidance to operators on how to mine the CHM in outer space.

322. Provisions on the authorization of the CHM, such as Article 6(3) of Annex III of the UNCLOS, can effectively regulate resource extraction activities by specifying the requirements of operators' plans of work.

323. The Authorization stage can broaden access to resources by prioritizing applications in favor of specific entities, such as developing countries. One example is Article 8 of Annex III of the UNCLOS.

Agreement. This model highlights the role of the representative agency of mankind for the following reasons. First, under this model, the agency could both define the limits of each operator's usufruct and regulate its exercise. Hence, the model helps to ensure "the orderly and safe development of the natural resources"[324] and the ability to exercise the "rational management of those resources."[325] Second, governance by the agency increases the likelihood of expanding "opportunities in the use of those resources"[326] and of sharing the benefits derived from the CHM in outer space.[327] For instance, the agency may offer preferential qualifications or other assistance to certain entities from less developed countries in the authorization stage to encourage them to participate in the use of the CHM. Meanwhile, the agency, in the authorization stage, may require all the actors to commit to sharing the benefits obtained from space resources.

In addition to facilitating the construction of the regime to be established, the exclusive property model also contributes to solving the three unresolved problems proposed previously. Above all, the model can affirm the ownership of the actor over the removed minerals. In the model, the user of the CHM can obtain title to removed minerals through the authorization of mankind's representative agency. The authorization must be a prerequisite for the acquisition of mineral ownership. If a user can acquire the ownership directly, it is difficult to ensure that their utilization is properly regulated. While emphasizing the rights of subjects, we should not neglect their obligations. The authorization may add a little bit to the cost of utilization to some extent.[328] The criteria for granting authorization can be adjusted appropriately to avoid increasing the difficulty of obtaining ownership over minerals. To be more specific, authorization may be granted as long as the entity meets the necessary qualifications and capabilities, and undertakes not to violate the obligations in the utilization and benefit-sharing stages.

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324. Moon Agreement, *supra* note 3, at art. 11(7)(a).

325. *Id.* at art. 11(7)(b).

326. *Id.* at art. 11(7)(c).

327. *Id.* at art. 11(7)(d).

328. For example, if the authorization stage imposes high technical and financial requirements on operators, the operators need to spend more time and money to participate in the use of the CHM.

As to benefit-sharing, the exclusive property model can set a foundation upon which a mechanism of the distribution of benefits can be built. The model could establish a basic operating process under which mankind's representative agency can receive revenues and then share the benefits of those revenues with members of the international community. On this basis, specific issues can be further refined, such as the scope of distributed benefits, the method of distribution, and the standard of allocation. To resolve these issues, the representative agency may take into account the interests of different states and find a widely accepted answer.

In terms of the third question, the model can impose necessary governance and regulation on the utilization of the CHM. The exclusive property model emphasizes mankind's ownership and thereby properly restrains the acquisition and exercise of operators' usufructs.[329] Thus, mankind's representative agency has sufficient legal basis and authority to supervise the utilization of the CHM. The agency may recognize the principles set out in the Moon Agreement as obligations and further refine them into specific codes of conduct. Also, the agency may define the limits of each operator's usufruct. Nonetheless, the agency should appropriately determine the specific regulatory modalities and regulatory strength so as not to discourage utilization.

The exclusive property model shares two important similarities with the content of the CHM in the Moon Agreement regarding the legal status of CHM and the rights of users. In terms of the legal status of the CHM, both regard non-appropriation as an indispensable legal feature of the CHM. The Moon Agreement provides that the CHM is "not subject to national appropriation"[330] and that it should not become the "property of any State, international intergovernmental or nongovernmental organization, national organization or non-governmental entity,

329. Since the ownership of CHM belongs to mankind, operators cannot directly use the CHM. According to Article 137, "all rights in the resources of the Area are vested in mankind as a whole, on whose behalf the Authority shall act." Therefore, if operators want to use CHM that belongs to humans, it needs to be authorized by the Authority on behalf of mankind. Under Article 153(1), when operators are granted usufruct to use the CHM, their "activities in the Area shall be organized, carried out and controlled by the Authority on behalf of mankind." Therefore, the exclusive property model's focus on mankind's ownership is helpful to regulate the behavior in using the CHM.

330. Moon Agreement, *supra* note 3, at art. 11(2).

[n]or of any natural person."[331] Similarly, in the exclusive property model, the CHM is owned exclusively by mankind, and no other entities can appropriate or own it. Hence, the exclusive property model not only conforms to the characteristics of the CHM in outer space but can also explain why that heritage cannot be appropriated or owned by states or other listed entities. Entities other than mankind are not allowed to occupy or use CHM without prior authorization, and nor can they acquire ownership over it.

Additionally, when it comes to users' rights, the exclusive property model is also in line with the Moon Agreement. Under the Moon Agreement, users' rights to the CHM can be regarded as a type of usufruct.[332] The substance of users' rights is primarily the exploitation of resources and the attainment of benefits therefrom.[333] Moreover, users cannot assume ownership of the CHM.[334] Therefore, users' rights under the Moon Agreement are largely the same as those under the exclusive property model.

It needs to be further explained that mankind's ownership of the CHM does not violate the Moon Agreement, which does not exclude mankind from acquiring ownership of the CHM in outer space. Article 11(3) enumerates the entities that cannot acquire such ownership rather than banning it entirely.[335] This provision stresses that the CHM should not be owned by "any State, international intergovernmental or nongovernmental organization, national organization or non-governmental entity, [nor by] any natural person."[336] There is no mention of "mankind." As detailed in Section A of Part I, mankind is a collective concept standing for a separate entity; as such, mankind is a legal subject different from natural persons.[337] Moreover, mankind is neither a state nor an international organization. Accordingly, Article 11(3) does not forbid mankind from enjoying ownership of the CHM.

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331. *Id.* at art. 11(3).
332. *See id.* at arts. 11(2), (4) (State Parties can utilize the moon but cannot own it).
333. *See id.* at arts. 11(4), (7).
334. *Id.* at art. 11(3).
335. *Id.*
336. *Id.*
337. *See* Liu Weixian (刘卫先 著), *supra* note 21, at 175–76.

Failing to specify mankind's ownership of the CHM does not necessarily mean that mankind cannot become the legal subject of the CHM in outer space. It was premature to establish an international regime or representative agency for the CHM at the time the Moon Agreement was concluded.[338] Mankind is a legal entity that cannot exercise its own rights; a representative agency is necessary for the exercise of those rights on behalf of mankind. Consequently, no rights in the CHM in outer space can be vested de facto in mankind until the establishment of a representative agency and international regime. An international regime may be established once the conditions are right, but mankind will become the de facto owner of the CHM only after such establishment.

Although the exclusive property model can be applied to the CHM in outer space, its utilization system needs to be adjusted appropriately. Compared with the utilization system of the CHM in the sea, the system of the CHM in outer space should focus more on the interests and needs of spacefaring countries. There is a huge gap between different states in terms of space technology. Only a few wealthy states can explore and exploit outer space.[339] The utilization of the CHM in outer space is highly dependent on the participation of spacefaring countries. These nations, however, dislike the concept of the CHM.[340] It is mainly because they are concerned that the CHM may bring harm to their interests. Therefore, adjustments should be made to the utilization system of the CHM to give more consideration to the interests of spacefaring countries. The adjustment can be achieved because the framework of the utilization system is both flexible and adaptable, which is explained below.

In the authorization stage, the representative agency of mankind can simplify authorization procedures and appropriately lower the standards of authorization to encourage the utilization of the celestial resources. For instance, the agency should eliminate the unnecessary restriction on the qualifications of the

338. *See* Moon Agreement, *supra* note 3, at art. 11(5).

339. Tyler A. Way, *The Space Gap: Unequal Access to Technology, and the Perpetuation of Poverty*, 5 INT'L RESEARCHSCAPE J. 1, 7 (2018).

340. Morgan Sterling Saletta & Kevin Orrman-Rossiter, *Can Space Mining Benefit All of Humanity?: The Resource Fund and Citizen's Dividend Model of Alaska, the 'Last Frontier'*, 43 SPACE POL'Y 1, 4 (2018); *see generally* Koch, *supra* note 274.

applicant, allowing entities with various backgrounds and types to participate in the utilization of the CHM. Also, it can set relaxed entry criteria. The agency can authorize applicants to utilize the CHM if they have requisite capacities, appropriate plans of missions, and commitment to sharing the benefits, complying with obligations of relevant treaties[341] and accepting the governance of the agency. Moreover, the time limit for reviewing an application shall be set as a short period, which can reduce costs and increase efficiency.

In the utilization stage, the representative agency needs to avoid its governance constraining space activities excessively. When defining the obligations of the actor, the agencies should reasonably formulate the content of the obligations to prevent them from adding unnecessary costs to relevant space missions. In actual management, the agency should not actively interfere with actors' activities unless their activities deviate from the submitted plan of work or they violate international obligations.

In the benefit-sharing stage, the representative agency should make reasonable arrangements for distributing benefits, including the method of distribution, and the standard of allocation, so as to avoid excessive burden on the actor. If an ongoing project of utilizing the CHM does not breakeven, its benefits obtained from the space resources should not be distributed. Further, the distribution benefits should be diversified. One good example of diversification is an international instrument named Building blocks for the development of an international framework on space resource activities. It holds that the sharing of benefits may include promoting the development of space technology, facilitating capabilities of states, promoting cooperation in education, and establishing an international fund.[342] Diversification will not only reduce the cost for spacefaring states but also improve the space capability of less developed countries.

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341. In addition to the moon agreement, applicants should abide by other treaties relating to outer space such as Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (Outer Space Treaty), Agreement on the Rescue of Astronauts, the Return of Astronauts and Return of Objects Launched into Outer Space (Rescue Agreement), Convention on International Liability for Damage Caused by Space Objects (Liability Convention), and Convention on Registration of Objects Launched into Outer Space (Registration Convention).

342. Building Blocks, *supra* note 8, art. 13.1.

C. Applicability of the Exclusive Property Model to the CHM in Other Fields

At present, only the area in the deep seabed and celestial bodies in outer space have been formally declared CHM by international treaties.[343] We cannot exclude the possibility of expanding the scope of CHM to other fields or the application of the exclusive property model to other types of CHM. If different objects are granted the status of CHM, it means that they are the same type of object in law, and they should have the same legal status. As objects with the same legal status, the object that is considered as the CHM should be consistent in terms of the right holders and the types of relevant rights. If the so-called CHM in different fields were to have a different legal status in each, then it could not be regarded as the same type of thing. Accordingly, it should be excluded from the CHM concept and left to other legal regimes for regulation.

According to the exclusive property model, the ownership of CHM is exercised through mankind's representative agency. Under the international regime, the representative agency confers usufruct upon users,[344] regulates the exercise of usufruct,[345] and ensures the equitable sharing of benefits derived from the CHM.[346] The exclusive property model helps to achieve the following three functions: preventing resources from being appropriated, realizing international management of the use of resources, and ensuring that benefits are shared among the international community. Further, the model lays a strong legal foundation for the realization of these three functions. Since the CHM is the exclusive property of mankind, its use is permitted, and appropriation is banned. The utilization of the CHM should be carried out under the management and regulation of mankind's representative agency so that it can ensure compliance with international obligations as well as the distribution of benefits. These functions and their legal basis, offered by the model, can enable the use of things similar to CHM to benefit all human beings. Therefore, the exclusive property model can, and should, be applied to other types of CHM. A model that covers all types

343. *See, e.g.*, UNCLOS, *supra* note 3, at art. 136; Moon Agreement, *supra* note 3, at art. 11(1).

344. UNCLOS, *supra* note 3, at Annex III, art. 6.

345. *Id.* at art. 153(1).

346. *Id.* at art. 140(2).

of CHM reflects the legal status of the CHM, which is conducive to clarification of the characteristics, scope, and utilization system of the CHM.

The three characteristics analyzed in Part II, namely, international territory,[347] worldwide value,[348] and anti-monopoly,[349] are determined by mankind's exclusive ownership of the CHM. Since Part II summarizes that CHM has these three characteristics, it can be deduced that objects with these three characteristics can be granted the status of CHM. Therefore, this paper uses these three features to judge whether an object should be regarded as CHM or not. First, International territory means that the thing in question must be beyond the jurisdiction of national sovereignty and situated in international space, for objects under national jurisdiction are subject to the sovereignty of the state.[350] As to worldwide value, only objects with beneficial effects on all of humanity should be deemed as the CHM.[351] If an object lacks the value to benefit the welfare of mankind, it should not be considered CHM. In terms of anti-monopoly, it is a characteristic to which the thing is entitled by law rather than being an inherent attribute.[352] Therefore, only something that is prone to being monopolized can be deemed to be the exclusive property of mankind so as to prevent it from being monopolized. There is no need to grant a thing that cannot be monopolized, such as wind energy or solar energy, the legal status of CHM.

The three foregoing conditions can be used to judge whether a particular thing can be regarded as CHM. Among the many things that commentators have proposed granting CHM status

347. *See, e.g.*, UNCLOS, *supra* note 3, at art. 1(1).

348. *See, e.g.,* BASLAR, supra note 26, at 110.

349. *See, e.g.*, UNCLOS, *supra* note 3, at Annex III, art. 6(4).

350. G.A. Res. 36/103, *supra* note 157, annex, ¶ 1(b), Declaration.

351. BASLAR, *supra* note 26, at 110.

352. Article 137(1) of the UNCLOS shows that it is the international law that protects CHM from monopolized. *See, e.g.*, UNCLOS, *supra* note 3, Article 137(1). ("No State shall claim or exercise sovereignty or sovereign rights over any part of the Area or its resources, nor shall any State or natural or juridical person appropriate any part thereof. No such claim or exercise of sovereignty or sovereign rights nor such appropriation shall be recognized.")

include Antarctica,[353] cultural heritage,[354] biodiversity,[355] fossil aquifers,[356] atmospheric absorptive capacity,[357] and the human genome.[358] Only Antarctica, however, satisfies all three conditions. First, Antarctica is located in international territory.[359] Although some states claimed sovereignty over part of Antarctica, these claims are frozen in accordance with the Antarctic Treaty.[360] Thus, no state exercises de facto national sovereignty over Antarctica, which means there is no existing exclusive right to Antarctica that conflicted with the ownership of mankind. Second, Antarctica is of great global value. McLean and Rock summarize that Antarctica has three "intrinsic values" and three "instrumental values."[361] Third, Antarctica is prone to monopolization. Contracting Parties of the Antarctic Treaty have not given up their "previously asserted rights of or claims to territorial sovereignty in Antarctica."[362] Considering that there is increasing interest in Antarctica's mineral resources[363] and

353. *See, e.g.*, Ellen S. Tenenbaum, Note, *A World Park in Antarctica: The Common Heritage of Mankind*, 10 VA. ENV'T L. J. 109 (1990).

354. *See, e.g.*, Craig Forrest, *Cultural Heritage as the Common Heritage of Humankind: A Critical Re-Evaluation*, 40 COMPAR. & INT'L L. J. S. AFR. 124 (2007).

355. *See, e.g.*, K Divakaran Prathapan & Priyadarsanan Dharma Rajan, *Biological Diversity: A Common Heritage*, 46 ECON. & POL. WKLY. 15 (2011).

356. *See*, *e.g.*, Renee Martin-Nagle, *Fossil Aquifers: A Common Heritage of Mankind*, 2 J. ENERGY & ENV'T L. 39 (2011).

357. *See, e.g.*, Tsung-Sheng Liao, *MNCs Under International Climate Change Regime: Recognizing Atmospheric Absorptive Capacity as the Common Heritage of Mankind*, 9 J. E. ASIA & INT'L L. 379 (2016).

358. *See, e.g.*, Pilar N. Ossorio, Symposium, *The Human Genome as Common Heritage: Common Sense or Legal Nonsense?*, 35 J. L. MED. ETHICS 425 (2007).

359. *See* The Antarctic Treaty art. IV ¶ 2, Dec.1, 1959, 402 U.N.T.S. 5778.

360. *Id.*

361. These three intrinsic values embody in Antarctica's status as "a component in Earth's climate system", a "pristine wilderness", and "an environment for wildlife." Lydia McLean & Jenny Rock, *The Importance of Antarctica: Assessing the Values Ascribed to Antarctica by Its Researchers to Aid Effective Climate Change Communication*, 6 POLAR J. 291, 302 (2016). Its instrumental values mainly reflect in "science, tourism and future mineral extraction." *Id.* at 303.

362. The Antarctic Treaty, *supra* note 359, art. IV ¶ 1.

363. E. Paul Newman, *The Antarctica Mineral Resources Convention: Developments from the October 1986 Tokyo Meeting of the Antarctic Treaty Consultative Parties*, 15 DENVER J. INT'L L. & POLY. 421, 421 (1987).

living resources,[364] countries that have tried to exercise sovereignty over Antarctica are less likely to give up their claims in the future. Thus, Antarctica still risks being appropriated and monopolized. Since Antarctica meets these conditions, it may be deemed as CHM in the future. By contrast, the others cannot be considered the exclusive property of mankind and should be protected through other means.

The CHM utilization system includes three stages: authorization,[365] utilization,[366] and sharing of benefits.[367] For various types of CHM, the utilization system should be assumed to share a similar framework but that does not mean that the utilization system for one specific type of CHM should be automatically applied to CHM in other fields. Although such heritage in different fields may share the same legal status, it can differ with respect to location, value, and difficulty of exploitation, which inevitably requires special considerations in designing the appropriate utilization system. Accordingly, this article does not intend, nor does it claim, to elaborate on what detailed arrangement must be included in the utilization system. In fact, the CHM utilization system is an open and flexible framework consisting of authorization, utilization, and benefit-sharing. As analyzed earlier, even if the same framework is shared, the utilization system in outer space can be rather different from that in the deep seabed. Under this framework, the specific institutional arrangement can and should be adjusted to suit the needs of utilizing CHM in different fields.

The authorization stage, which is closely related to the attribution of rights, is the most essential. Under the exclusive property model, although the CHM is exclusively owned by mankind, utilization activities are carried out by the users of such heritage. Hence, the utilization system needs to separate the usufruct from mankind's ownership and allow the user to exercise the usufruct, which is achieved by the authorization stage. Further, it has an important impact on the other two stages because it

364. Daniel Bray, *The Geopolitics of Antarctic Governance: Sovereignty and Strategic Denial in Australia's Antarctic Policy*, 70 AUSTL. J. INT'L AFF. 256, 257 (2016).

365. *See, e.g.*, UNCLOS, *supra* note 3, at Annex III, arts. 4, 6, 8.

366. *See, e.g.*, *id*. at art. 153; at Annex III, arts. 16, 17.

367. *See, e.g.*, *id*. at art. 140(2); at Annex III, art. 13; Annex, *supra* note 14, sec. 8.

determines the users' rights of utilizing the CHM and obligations to distribute the benefits. Since the authorization phase is critical to the entire utilization system, its specific mechanisms should be carefully arranged to adapt to CHM in different fields. The authorization mechanism has high flexibility. By setting the preconditions for acquiring rights, it can require applicants to meet necessary qualifications or to agree to various institutional arrangements, which can adapt to different types of the CHM.[368]

The representative agency of mankind can flexibly determine the preconditions of authorization and the content of the granted usufruct so as to adapt to diverse needs. For instance, if the system focuses on encouraging exploitation, it can set looser licensing conditions and more rights to use the CHM. Meanwhile, the authorization stage allows some specific institutional arrangements to be embedded in the utilization system. The reserved-area system is a good example.[369] Its establishment and operation are ensured by the authorization stage.[370] Each application, excluding applications from the Enterprise and for reserved areas, must cover a reserved area.[371] The reserved area is "reserved solely for" the use by the Enterprise or by the Enterprise in conjunction with developing countries.[372] This shows how the authorization stage can link a certain mechanism with the grant of usufruct, which is conducive to promoting the realization and operation of this mechanism.

In the utilization stage, the representative agency of mankind governs and regulates the activities of users to make them comply with relevant international obligations. This stage is also

368. For instance, under Article 8 of Annex III, the authorization stage in the UNCLOS requires applicants to include a reserved area in their applications, which provides a sufficient basis for the operation of the reserved area system. In the utilization systems of different CHM, different requirements can be put forward to applicants in the authorization stage, thus laying a foundation for the operation of different institutional arrangements. UNCLOS, *supra* note 3, at Annex III, art. 8.

369. *See, e.g.*, *id.* at Annex III, arts. 8, 9.

370. *Id.* at Annex III, art. 8.

371. *Id.* ("Each application, other than those submitted by the Enterprise or by any other entities for reserved areas, shall cover a total area, which need not be a single continuous area, sufficiently large and of sufficient estimated commercial value to allow two mining operations. The applicant shall indicate the coordinates dividing the area into two parts of equal estimated commercial value and submit all the data obtained by him with respect to both parts.").

372. *Id.*

significant to the utilization system, for actual activities and actual regulations have an important influence on the extent of utilization. In this stage, the means and methods of regulations are not immutable. The methods and strength of regulation can be flexibly determined according to the standard that is most beneficial to the interests of mankind. For instance, the agency can even authorize national departments of different states to assist in regulating the utilization activities.

The third stage, benefit-sharing, is probably the most controversial part of the utilization system. Nevertheless, it is in and of itself indispensable to the utilization system. The sharing of benefits is not only regarded as "one of the sine qua non elements" of the CHM,[373] but is also stipulated in both UNCLOS and the Moon Agreement.[374] Most importantly, the benefit distribution mechanism can be flexibly arranged to reduce controversy. The distributed benefits, the method of distribution, and the standard of allocation can be properly adjusted to balance the interests of different states, which also helps to embody the adaptability of the framework to different types of CHM. The mechanism can be flexibly arranged to cater for the interests of spacefaring countries. This article suggests that it can raise the threshold for charging fees,[375] diversify the forms of distributing benefits,[376] and even allow operators who meet certain conditions to receive distributed benefits.[377] There are also many institutional arrangements that take into account the interests of non-spacefaring countries, which can appropriately increase the amount of allocated benefits and give priority to entities representing those countries in receiving the distributed profits. These institutional arrangements could be integrated to balance the interests of different countries. These suggestions proposed

373. BASLAR, *supra* note 26, at 97.

374. UNCLOS, *supra* note 3, at art. 140(2); Moon Agreement, *supra* note 3, at art. 11(7)(d).

375. For example, this article suggests that only operators above a specific profit margin need to share the benefits they attain from the CHM.

376. For instance, this article suggests that operators can replace the sharing of economic benefits with transferring technology at preferential prices.

377. This article proposes a method that allows operators to apply for distributed benefits under certain situations. If operators have ever allocated a large amount of benefits to the representative agency, they can also apply for distributed profits when they face a shortage of funds in their use of CHM's activities.

in this article demonstrate that the benefit distribution mechanism is flexible enough to meet different countries' needs. In benefit distribution, institutional arrangements can still be designed to coordinate different countries' interests.

In sum, the exclusive property model and the utilization system based on it can be applied to other types of CHM. The model can provide a unified explanation for the legal status, characteristics, scope, and utilization system of the CHM, which will be significant both in theory and in practice. On the one hand, it can establish a unified theory covering all types of CHM. On the other hand, it not only helps to ensure that the actual use of CHM will benefit all humans but also has the flexibility to adapt to different types of CHM through appropriate adjustments.

CONCLUSION

This article argues that the CHM can be defined as an exclusive property of mankind under the terms of UNCLOS. The exclusive property model views mankind as an independent entity that enjoys ownership of the CHM,[378] to which all other entities can only exercise usufruct.[379] The three characteristics of the CHM and three stages of the CHM utilization system, derived from mankind's exclusive ownership of the CHM, are in line with the provisions of UNCLOS.[380]

As the exclusive property model is already in use for deep seabed resources,[381] the article further argues that the model can be extended to other types of CHM, particularly the CHM in outer space as defined in the Moon Agreement. Given the varying characteristics of different types of CHM, modifications to various rules and procedures may be needed to accommodate the unique features of the CHM in question. The exclusive property model offers a new perspective on the commercial use of the CHM in practice by answering three important questions: What is the CHM? What can be considered as CHM? How can we make use of the CHM?

A proper understanding of the CHM and a possible mechanism for its commercial use leads to the conclusion that a multilateral

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378. *See, e.g.*, UNCLOS, *supra* note 3, at arts. 136, 137(2), 153(1), Annex III, art. 1.

379. *See, e.g.*, *id*. at arts. 137(1), 137(3), 153(1), Annex III, art. 3.

380. *See, e.g.*, *id*. at arts. 140(2), 153, Annex III, arts. 4, 6, 8, 16, 17.

381. *See, e.g.*, *id*. at arts. 136, 137(2), 140(2), Annex III, art. 1.

rather than unilateral approach to revitalizing the CHM would best serve the interests of the international community. The sleeping beauty of the CHM has been awakened. Its legal status and characteristics can be justified only by the multilateral approach of establishing an international regime for the exploitation and utilization of natural resources in outer space.