International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Unlocking Lunar Resources Responsibly: Analysing Common Heritage of Mankind Principles in The Context of Lunar Mining Under the Moon Agreement

Priyansh Sharma

LLM, NALSAR University of Law, Hyderabad.

Abstract

The exploration and utilization of lunar resources represent a promising frontier in space commercialization, offering abundant opportunities and complex challenges. The Common Heritage of Mankind (CHM) principles, rooted in collective ownership and equitable benefit sharing, have long guided the debate on lunar resource management. However, criticisms of CHM have highlighted the need for a more nuanced approach that balances collective interests with economic incentives. This paper outlines the current state of lunar resource extraction, presents alternatives to CHM, and proposes a model provision that combines CHM principles with property rights, international oversight, equitable benefit sharing, taxation, and environmental stewardship. Such a framework aims to foster responsible lunar resource utilization while safeguarding the interests of all nations and future generations in the evolving space exploration landscape.

Keywords

1. Lunar Resource Extraction
2. Common Heritage of Mankind (CHM)
3. Legal Framework
4. Equitable Benefit Sharing
5. Sustainable Space Exploration

INTRODUCTION

Humans have always been keen on conquering the world, we have always been adventurers and seafaring people. Discovery of new lands has always opened up to the discovery of new resources. Now space is the new frontier of exploration, as throughout the history the risks taken by these explorers have been offset by the economic incentives of resource extraction. The lunar environment traditionally isn't considered to be friendly, however recent explorations show reliable evidence of water on the lunar surface, which makes future human inhabitation and activities like lunar mining possible. But, realising the complete energy potential of the moon, however will require much more than advanced technology, there needs to be a legal framework in place to incentivise collection and return of benefits of resources back to earth.

The CHM principle, a legal concept in space, has been shaped by political differences between developing and developed countries. The 1979 Moon Agreement established the CHM principle in space, which is one of the vaguest in terms of legal certainty among the five major UN treaties in space. The legal uncertainty of vague principles and lack of specific rules has become an urgent problem for the international space community, as the technical reserves for commercial exploitation activities of space resources have become more mature and the demand for private entities for space mining has become stronger. The United Nation's Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, commonly known as the Moon Agreement[1], adopted in 1979, was the international community's attempt to establish a legal framework for recovering and utilizing the Moon's resources. Despite being ratified by essentially no space faring nations and narrow adoption it is the treaty that is most directly relevant to the issue of extraterrestrial resource extraction. Though most of the provisions of the Moon Treaty are merely uncontroversial restatements of the basic requirements set forth in the outer space treaty. However, the Moon Treaty makes a significant departure from the Outer Space Treaty by explicitly applying the common Heritage of mankind classification to the natural resources of the moon and other celestial bodies, thus circumventing the traditional principles of property ownership.

My research paper aims to study the current legal framework of lunar resource extraction and how do we design a framework that is more widely acceptable without completely abandoning the CHM principles.

LUNAR MINING: A NEW FRONTIER

Mining on the moon represents a promising commercial frontier for a number of compelling reasons. First, the Moon provides a variety of resources, including metals, water, helium-3, and rare earth metals, with applications ranging from energy production to construction[2]. This resource abundance presents a unique opportunity for economic growth. Secondly, lunar mining holds the potential for substantial cost savings, a critical factor in space exploration. By utilizing local lunar resources, the need for costly and perilous transport of materials from Earth can be reduced significantly.[3] This method can revolutionize space exploration and establish a circular economy in orbit. Thirdly, the growing interest of private companies in lunar endeavours, particularly in the commercial rocket industry, is driving an increase in lunar mining attention and investment. These companies intend to utilize lunar resources, such as fuel and oxygen, to fuel the expansion of the lunar economy[4]. In addition, NASA's Artemis program, which aims to establish a permanent human presence on the Moon, acknowledges the importance of lunar mining in achieving this objective, thereby attracting commercial investments. The Moon contains vast untapped resources estimated to be worth hundreds of billions of dollars, making it an irresistible mining and exploration opportunity. The convergence of abundant lunar resources, potential cost savings, increased commercial interest, and NASA's ambitious program positions lunar mining as a significant commercial frontier with enormous economic potential.[5]

[1] Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Agreement).
[2] "Lunar Exploration" (*ESA SEID*) <https://lunarexploration.esa.int/explore/science/224>
[3] "NASA Sees Moon Lunar Mining Trial within the next Decade" (*Reuters*, June 28, 2023) <https://www.reuters.com/science/nasa-sees-moon-lunar-mining-trial-within-next-decade-2023-06-28/>
[4] David L, "Moon Mining Gains Momentum as Private Companies Plan for a Lunar Economy" (*Space.com*, July 30, 2023) <https://www.space.com/moon-mining-gains-momentum>
[5] "The Lunar Gold Rush: How Moon Mining Could Work" (*NASA Jet Propulsion Laboratory (JPL)*) <https://www.jpl.nasa.gov/infographics/the-lunar-gold-rush-how-moon-mining-could-work>

Common Heritage of Mankind principles[6] are neither novel nor exclusive to resources pertaining to the outer space or lunar surface. The legal regime of outer space is considered to be analogous to the basic status of high seas, the deep seafloor 1970s is considered to be the golden age of international diplomacy, third world countries majorly looking to seek accountability from Richer states for their vast and rapid accumulation of resources using colonialism or military supremacy. Thus, New International Economic Order was to be adopted, trying to create equality in misplaced belief in establishing new more balanced world order. Seabed Resources were considered to be extremely impactful both economically and scientifically, so there needed to be protective measures in place to ensure that the richer nations do not use their economical and technological prowess to reap all the rewards[7].

CRITICISMS OF CHM

LACK OF ECONOMIC INCENTIVE

The absence of exclusive property rights on the Moon under the CHM principle, according to critics, presents a serious obstacle to investment and innovation in the development of lunar resources. The fundamental problem is that, according to CHM, resources on the Moon are the collective legacy of all people, meaning that no one may claim exclusive possession. The lack of property rights acts as a significant deterrent for private businesses, since the opportunity to possess and manage resources is the main driver of investment in a capitalist economy[8]. Private businesses that engage in lunar mining also run significant financial risks due to the high expense of technical advancement and space exploration. These dangers are increased and return on investment uncertainty is introduced when exclusive ownership cannot be obtained. This regulatory ambiguity leaves companies uncertain about how to proceed responsibly, from environmental protection to resource allocation. The risk of overlapping claims and disputes between nations and private entities operating in the same lunar region further exacerbates the uncertainty. Additionally, concerns about sustainability and responsible resource management remain unaddressed under CHM, as it lacks explicit guidelines for such practices. This lack of regulatory clarity may lead to unregulated mining practices, raising concerns about long-term resource availability and ecological impacts.[9] In sum, the CHM principle's inherent ambiguity surrounding the legal framework for lunar resource exploitation can deter private investment and hinder the responsible development of lunar resources.

POTENTIAL FOR MISUSE AND MISMANAGEMENT

The application of the CHM principle in lunar resource management raises concerns about the potential emergence of the tragedy of the commons—a well-known economic problem characterized by the overuse and depletion of resources due to the absence of exclusive property rights[10]. In the context of lunar resource

[6] "Unpacking Common Heritage of Mankind: In Sea and Space" (*JSIL*, July 21, 2021) <https://www.jindalsocietyofinternationallaw.com/post/unpacking-common-heritage-of-mankind-in-sea-and-space>

[7] Wang G and Huang X, "On the Common Heritage of Mankind Principle in Space" (*Acta Astronautica*, October 1, 2023) <https://doi.org/10.1016/j.actaastro.2023.07.002>

[8] Shackelford S, "The Tragedy of the Common Heritage of Mankind" (May 19, 2009) <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1407332>

[9] Cottier T and Ahmad Z, "The Principle of Common Concern of Humankind" in Thomas Cottier (ed), *The Prospects of Common Concern of Humankind in International Law* (Cambridge University Press 2021).

[10] Team I, "What Is the Tragedy of the Commons in Economics?" (*Investopedia*, June 7, 2023) <https://www.investopedia.com/terms/t/tragedy-of-the-commons.asp>

exploitation, the tragedy of the common's scenario becomes a pressing issue. Under CHM, no single entity or nation can claim exclusive ownership of lunar resources, which introduces the risk that individuals or companies may extract these resources without considering the broader societal impact. This can result in overexploitation, as each entity may prioritize its own immediate gains without regard for the long-term sustainability of lunar resources. The tragedy of the commons illustrates the challenge of balancing individual interests with the collective good, highlighting the importance of establishing clear regulatory frameworks and incentives to ensure responsible resource management in the absence of exclusive property rights[11]. To address this challenge, it becomes imperative to establish robust regulatory frameworks and incentives that promote conservation, responsible utilization, and sustainable management of lunar resources under the CHM principle.

COMPLEX GOVERNANCE AND ENFORCEMENT CHALLENGES

A high level of international coordination and cooperation is required for the application of the CHM principle to lunar resource management; however, this requirement may be difficult to meet in reality. Within the framework of CHM, the resources of the Moon are regarded as a global common heritage shared by all nations. Practical application of the principle can be challenging, despite its emphasis on fair benefit sharing and cooperative management. Cooperative lunar resource utilization may be hampered by the varied interests, objectives, and priorities of participating nations. Further complicating international cooperation are the Moon's enormous area and the complexities involved in allocating resources, which can lead to disagreements and conflicting claims. Significant diplomatic efforts and negotiation may be necessary to reach an agreement on regulatory frameworks, resource allocation procedures, and enforcement strategies. For the purpose of ensuring fair and responsible management of lunar resources, it is still necessary to overcome the major obstacle of effectively implementing international cooperation and jurisdiction under the CHM principle.[12] Robust mechanisms for conflict resolution and enforcement are necessary to guarantee that all parties follow the principles of collaborative management and equitable benefit sharing. Getting the international community to agree on these mechanisms could be a difficult task. To achieve responsible and equitable lunar resource management—the aim of the CHM principle—enforcement challenges and disputes must be addressed.

ALTERNATIVES TO COMMON HERITAGE OF MANKIND PRINCIPLES

PROPERTY RIGHTS AND OWNERSHIP MODELS

An alternative method of managing lunar resources is to treat these resources as if they were private property, giving corporations or individuals the sole authority to use and develop them. This method's proponents contend that granting property rights can offer strong incentives for creativity and financial support for the extraction of lunar resources. This framework would allow entities to claim ownership and control over the resources they extract because they would clearly have a stake in them. This could therefore encourage a competitive atmosphere where businesses work to enhance their operations, create cutting-edge technologies, and optimize their return on investment. Property rights proponents claim that

[11] "Tragedy of the Commons: Examples & Solutions | HBS Online" (*Business Insights Blog*, February 6, 2019) <https://online.hbs.edu/blog/post/tragedy-of-the-commons-impact-on-sustainability-issues>

[12] Wang G and Huang X, "On the Common Heritage of Mankind Principle in Space" (*Acta Astronautica*, October 1, 2023) <https://doi.org/10.1016/j.actaastro.2023.07.002>

the need for profit that comes with them will accelerate the development of lunar resources and may even result in more effective resource management techniques. The potential disadvantages, however, must also be taken into account. These include the possibility of resource monopolies and differences in a country's access to lunar resources, which call for stringent regulation and international cooperation to resolve. Finally, the property rights option presents a unique viewpoint on lunar resource management by highlighting the importance of financial incentives in encouraging wise and effective resource use.

BILATERAL OR MULTILATERAL AGREEMENTS

Rather than implementing a universal Common Heritage of Mankind (CHM) framework, a different strategy for managing lunar resources proposes that countries negotiate bilateral or multilateral agreements outlining the guidelines and roles for using lunar resources. Because of the flexibility this approach offers, agreements can be customized to particular lunar regions or resource types, taking into consideration the special qualities and difficulties that each area presents. Supporters contend that these customized agreements can more successfully take into account the various objectives and interests of participating countries. But there are drawbacks to this flexibility as well. It could become challenging to preserve uniformity and coherence in resource management due to the possible proliferation of individual agreements and the resulting fragmentation of the regulatory environment. Furthermore, disagreements and conflicts among countries might occur if these agreements do not sufficiently address disparities in interpretations and interests. Strong diplomatic efforts, cooperative mechanisms, and dispute resolution procedures would be necessary for the successful implementation of this strategy in order to guarantee that the utilization of lunar resources by participating nations remains equitable and harmonious.

COMMON CONCERN OF HUMANKIND

An alternate method of managing lunar resources is provided by the "Common Concern of Humankind" concept, which is similar to the CHM principle but allows for more freedom in resource ownership and usage[13]. Similar to CHM, this idea emphasizes how important it is for everyone to work together and coordinate their efforts to manage lunar resources. That does not, however, require that these resources be owned jointly. Rather, it recognizes that some resources might be globally significant and call for collective stewardship, but it also permits a more nuanced approach to their ownership and utilization. Under this framework, countries and organizations may continue to be the owners of lunar resources, but they will be subject to international supervision and rules that will guarantee their fair and responsible use. This method finds a middle ground between appreciating the benefits of resource ownership incentives and recognizing the significance of lunar resources on a worldwide scale. While upholding a collaborative framework for tackling more global issues like environmental preservation and benefits equity for all people, it allows for creativity in resource management. To properly handle the particular difficulties presented by lunar resource management, however, putting such a system into place would necessitate the creation of international agreements, regulatory frameworks, and enforcement mechanisms.

CREATING A GLOBAL TRUST FUND WITH TAXATION AND ROYALTIES

Another alternative method of managing lunar resources is to impose systems of taxes and royalties, which are similar to those used in managing terrestrial resources. Governments and international organizations

[13] M. Bourrel, et al., The common of heritage of mankind as a means to assess and advance equity in deep sea mining, Mar. Policy (2016), http://dx.doi.org/10.1016/j.marpol.2016.07.017

would set up systems for taxing businesses and organizations that extract lunar resources under this model. Depending on how much or how much more of the resources these organizations take out of the Moon, they would have to pay taxes or royalties[14]. There would be several uses for the money raised by these tax and royalty schemes. First, it might help finance international space projects like lunar exploration, space infrastructure development, and scientific research. Secondly, it would contribute to the fair distribution of benefits among the countries and organizations that use lunar resources. The objective of this approach is to prevent resource monopolies and encourage the participation of less economically developed nations in space-related initiatives by redistributing a portion of the profits from the extraction of lunar resources. But in order to execute tax and royalty systems effectively, tax rates, revenue distribution strategies, and international regulatory enforcement cooperation must all be carefully considered. It also calls for the creation of accountable and transparent structures to guarantee that money is spent for the good of all people. A portion of the revenue generated from the extraction of lunar resources would be contributed to a fund that helps finance international research, exploration, and development in space, which would be to the benefit of all of humanity.

DESIGNING A MORE NUANCED MODEL

Recognising that there is a lot of pushback against CHM principles as they stand now, we need a regulatory model that takes a more nuanced approach and offers some form of property and resource ownership rights, without completely abandoning sustainability principles under the overarching goals of the Moon Treaty. Following provisions can be used to create a more equitable lunar resource utilisation treaty.

ARTICLE I - RESOURCE OWNERSHIP AND RIGHTS:

Lunar resources shall be considered the common heritage of all humanity, with the recognition that ownership rights may be claimed by participating nations and entities over the resources they extract. Such ownership rights shall be subject to international oversight and regulation.

ARTICLE II - INTERNATIONAL OVERSIGHT AND REGULATIONS:

An international regulatory body, comprised of representatives from participating nations and relevant stakeholders, shall be established to oversee lunar resource management. This body shall have the authority to set environmental standards, enforce compliance with international agreements, and ensure the responsible extraction and utilization of lunar resources.

ARTICLE III - EQUITABLE BENEFIT SHARING:

A portion of the revenue generated from lunar resource extraction shall be directed toward international space initiatives, research, and equitable benefit sharing among participating nations. The distribution of these funds shall prioritize inclusion and equal participation.

ARTICLE IV - TAXATION AND ROYALTIES:

Entities engaged in lunar resource mining shall be required to pay taxes or royalties based on the volume or value of resources extracted. These funds shall contribute to international space endeavours, scientific exploration, and the promotion of responsible lunar resource utilization

[14] Jaeckel, A. (2020). Benefitting from the Common Heritage of Humankind: From Expectation to Reality. *The International Journal of Marine and Coastal Law*, *35*(4), 660-681. https://doi.org/10.1163/15718085-BJA10032

ARTICLE V- RESOURCE-SPECIFIC AGREEMENTS:
Participating nations and entities are encouraged to engage in bilateral or multilateral agreements tailored to specific lunar regions or resource types. These agreements shall define rules, responsibilities, and resource-sharing mechanisms to accommodate the diverse interests and goals of the involved parties.

ARTICLE VI - ENVIRONMENTAL STEWARDSHIP:
Environmental protection and sustainable resource management shall be fundamental principles of lunar resource utilization. Guidelines and regulations shall be established to minimize ecological impact and ensure the responsible use of lunar resources.

ARTICLE VII - DISPUTE RESOLUTION:
Mechanisms for dispute resolution shall be developed, facilitated by the international regulatory body, to address conflicts arising from resource ownership, extraction rights, or environmental concerns. These mechanisms shall prioritize fair and timely resolutions.

ARTICLE VIII - TRANSPARENCY AND ACCOUNTABILITY:
Entities engaged in lunar resource extraction shall be required to maintain transparency by reporting their activities and financial contributions. Accountability mechanisms shall be in place to ensure that funds are allocated for their intended purposes.

This model can be used to create provisions that seek to strike a balance between the principles of common heritage and property rights, emphasizing responsible resource management, equitable benefit sharing, and international cooperation in the exploration and utilization of lunar resources. It acknowledges the global significance of lunar resources while providing mechanisms to incentivize innovation and investment in a way that benefits all of humanity.

CONCLUSION

Exploration and use of lunar resources present humanity with unprecedented opportunities as well as complex challenges. As we move into the realm of space exploration, it becomes increasingly important to establish a legal framework that not only encourages resource extraction but also ensures responsible and equitable practices. The principles of the Common Heritage of Mankind (CHM) have long been at the heart of the debate over lunar resource management. However, CHM critics have emphasized the need for a more nuanced and balanced approach.

While emphasizing collective ownership of lunar resources and equitable benefit sharing, the CHM principles have received significant criticism. According to critics, the lack of exclusive property rights under CHM creates a lack of economic incentives, potentially leading to underinvestment and resource mismanagement. Concerns have also been raised about the possibility of mismanagement and misuse, as the lack of clear ownership may result in a tragedy of the commons. Furthermore, complex governance and enforcement issues impede effective CHM implementation.

Alternative approaches have been proposed in response to these criticisms. These options for lunar resource management include property rights and ownership models, bilateral or multilateral agreements, the Common Concern of Humankind concept, and the establishment of a global trust fund through taxation and royalties. A model provision is proposed to strike a balance between CHM and its alternatives. This

provision recognizes lunar resources as the common heritage of all humanity, allowing participating entities to claim ownership rights subject to international oversight. An international regulatory body would ensure responsible resource management, with a portion of the revenue going toward international space initiatives and equitable benefit sharing. The framework also includes taxation and royalties, resource-specific agreements, environmental stewardship, dispute resolution mechanisms, transparency, and accountability.

This model provision seeks to align the principles of common heritage and property rights, while also promoting responsible lunar resource utilization, equitable benefit sharing, and international cooperation. As humanity embarks on the exciting journey of lunar exploration and resource utilization, a balanced framework like this can pave the way for a prosperous and sustainable future in space while protecting the interests of all nations and future generations.

BIBLIOGRAPHY

1. Robert.Wickramatunga, "Moon Agreement" <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/intromoon-agreement.html>
2. "Lunar Exploration" (*ESA SEID*) <https://lunarexploration.esa.int/explore/science/224>
3. "NASA Sees Moon Lunar Mining Trial within the next Decade" (*Reuters*, June 28, 2023) <https://www.reuters.com/science/nasa-sees-moon-lunar-mining-trial-within-next-decade-2023-06-28/>
4. David L, "Moon Mining Gains Momentum as Private Companies Plan for a Lunar Economy" (*Space.com*, July 30, 2023) <https://www.space.com/moon-mining-gains-momentum>
5. "The Lunar Gold Rush: How Moon Mining Could Work" (*NASA Jet Propulsion Laboratory (JPL)*) <https://www.jpl.nasa.gov/infographics/the-lunar-gold-rush-how-moon-mining-could-work>
6. "Unpacking Common Heritage of Mankind: In Sea and Space" (*JSIL*, July 21, 2021) <https://www.jindalsocietyofinternationallaw.com/post/unpacking-common-heritage-of-mankind-in-sea-and-space>
7. Wang G and Huang X, "On the Common Heritage of Mankind Principle in Space" (*Acta Astronautica*, October 1, 2023) <https://doi.org/10.1016/j.actaastro.2023.07.002>
8. Shackelford S, "The Tragedy of the Common Heritage of Mankind" (May 19, 2009) <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1407332>
9. Team I, "What Is the Tragedy of the Commons in Economics?" (*Investopedia*, June 7, 2023) <https://www.investopedia.com/terms/t/tragedy-of-the-commons.asp>
10. "Tragedy of the Commons: Examples & Solutions | HBS Online" (*Business Insights Blog*, February 6, 2019) <https://online.hbs.edu/blog/post/tragedy-of-the-commons-impact-on-sustainability-issues>