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Human Rights and the Challenges of Exploitation of Space Resources (A Legal Analysis of the Principle of Common Heritage of Mankind and the Interests of Asean Countries)

Johan Rosihan[1*]

[1]Universitas 17 Agustus, Indonesia

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ABSTRACT

The development of space technology has brought humanity to the threshold of commercializing space resources, including mining on the Moon and asteroids. This activity has sparked fundamental legal debates regarding the distribution of prosperity and the protection of human rights. This research analyzes the risks of the monopolization of space resources by developed countries and private corporations, which could violate human rights, particularly the rights to development and to the common heritage of humanity. The research questions addressed include: (1) how the international legal framework balances the commercial rights of investors with the principle of protecting human rights for all humanity in space exploitation, and (2) the positions and challenges faced by ASEAN countries in the race for international space exploitation regulations. The research method used is normative juridical with a conceptual approach through the doctrine of the Common Heritage of Mankind, a legislative approach to the Outer Space Treaty of 1967 and the Moon Agreement of 1979, and a comparative approach within the ASEAN region, particularly between Indonesia, Thailand, and Vietnam. The research findings demonstrate a lack of clear international law regarding equitable benefit-sharing mechanisms, threatening the economic sovereignty of developing countries. Compared with other regions, ASEAN countries lag in codifying domestic space laws capable of protecting national interests globally. This research recommends establishing a new international regime under the UN that guarantees the inclusive distribution of space benefits and strengthening ASEAN's space diplomacy to create a collective bargaining position.

1. INTRODUCTION

The exploitation of space resources is no longer merely a science fiction narrative; rather, it has become a concrete global agenda involving substantial investments from developed countries and transnational corporations. The presence of rare minerals such as platinum, cobalt, and nickel in asteroids, as well as the potential of helium-3 on the Moon as a nuclear fusion energy source, has triggered a new phase of the space race that is fundamentally different from the Cold War-era competition. According to a 2017 Goldman Sachs report, the value of resources in near-Earth asteroids is estimated to reach quintillions of dollars, positioning space mining as one of the most promising economic frontiers of the twenty-first century.

This development is closely linked to advances in rocket propulsion technology, satellite miniaturization, and significant reductions in launch costs. SpaceX, through its reusable Falcon 9 rocket, has reduced the cost of launching payloads into low Earth orbit from approximately USD 54,500 per kilogram during the Space Shuttle era to around USD 2,720. Private entities such as Planetary Resources, Deep Space Industries (now Bradford Space), and iSpace (Japan) have actively pursued asteroid mining technologies. At the same time, NASA's Artemis program aims to establish a permanent lunar base as a stepping stone toward Mars exploration and future resource extraction.

*Corresponding author
E-mail addresses: farhanhalfan99@gmail.com

However, behind these technological and economic advancements lies a critical normative and human rights dimension that remains underexplored in contemporary space law discourse. The Common Heritage of Mankind (CHM) principle, enshrined in the 1979 Moon Agreement, asserts that the Moon and other celestial bodies, including their natural resources, constitute the common heritage of all humankind, and that benefits derived from them must be shared equitably. This principle is grounded in the normative aspiration to prevent outer space from becoming a new domain of economic colonialism.

Ironically, several technologically advanced states have adopted domestic legislation that permits private appropriation of extracted space resources. The United States, through the U.S. Commercial Space Launch Competitiveness Act of 2015 (SPACE Act), recognizes private ownership of space-derived resources. Luxembourg introduced similar legislation in 2017, followed by regulatory developments in the United Arab Emirates in 2019. These unilateral legal frameworks raise fundamental questions regarding their compatibility with the Common Heritage of Mankind principle and broader international human rights norms.

For developing countries, including ASEAN member states, these developments present a dual challenge. First, they threaten the realization of the right to development as articulated in the 1986 UN Declaration on the Right to Development, since states lacking technological capacity risk exclusion from the economic benefits of space resources. Second, they raise concerns regarding long-term economic sovereignty, as the concentration of space resource exploitation among technologically advanced actors may reproduce structural global inequalities reminiscent of historical patterns of colonial extraction.

Within the ASEAN regional context, these challenges are particularly pronounced. Although several member states have developed national space capabilities, their focus remains largely limited to satellite technology and earth observation systems. To date, no ASEAN member state has established a comprehensive legal framework governing the commercialization of space resources, nor has the region developed a unified position within international forums such as the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS). This regulatory and diplomatic gap risks positioning ASEAN as a passive observer in the emerging global space economy.

Despite the growing body of literature on space law and resource governance, there remains a limited scholarly engagement with the intersection of the Common Heritage of Mankind principle, international human rights law, and the regional interests of developing countries, particularly within ASEAN. Most existing studies focus either on legal doctrinal analysis of space treaties or on technological and economic aspects of space commercialization, without sufficiently integrating the distributive justice implications for developing regions.

Against this backdrop, this study examines the relationship between the exploitation of space resources and international human rights protection, with a specific focus on the normative implications of the Common Heritage of Mankind principle and the strategic position of ASEAN member states.

This study contributes to the literature in two main ways. First, theoretically, it advances the integration of space law and international human rights law by critically reinterpreting the Common Heritage of Mankind principle in the context of contemporary commercial space exploitation. Second, it provides a normative policy framework for ASEAN member states to develop a more coordinated and equitable legal and diplomatic stance on the governance of space resource utilization in international forums such as UNCOPUOS.

Therefore, this research provides an academic foundation for developing more inclusive, just, and sustainable governance of outer space resources in the emerging global space economy (Sulianto et al., 2019; Syukur et al., 2020).

2. METHOD

This research employs a normative juridical method (doctrinal legal research), examining law as a system of norms comprising principles, rules, and legal regulations. Primary data sources include international space law instruments, international human rights instruments, and national space-related legislation. Secondary data sources include academic literature, reports from international organizations, and diplomatic documents.

The approach used in this research encompasses three main, complementary approaches.

First, the Conceptual Approach, which examines the development and contestation of the concepts of Res Communis, Common Heritage of Mankind, and Res Nullius in the context of space resources. This approach analyzes how these three concepts compete and interact in shaping the contemporary space legal regime.

Second, the Statutory Approach, which systematically analyzes the Outer Space Treaty of 1967, the Moon Agreement of 1979, the SPACE Act of 2015, and international human rights instruments related to

economic and social rights, including the International Covenant on Economic, Social and Cultural Rights (ICESCR) and the 1986 UN Declaration on the Right to Development.

Third, the Comparative Approach, which compares the development of space law and policy in three ASEAN countries: Indonesia, Thailand, and Vietnam, selected based on their varying levels of space law readiness and policy development within the region.

In terms of data analysis procedures, this research employs a qualitative legal analytical framework based on systematic legal interpretation. The analysis is conducted through three sequential stages.

First, the study identifies normative tensions within international space law by mapping the legal relationship between the Common Heritage of Mankind principle and emerging national space resource legislation. This stage focuses on identifying points of divergence between multilateral treaties and unilateral domestic legal frameworks governing space resource utilization.

Second, the research analyzes normative conflicts among legal instruments by examining inconsistencies between the Outer Space Treaty (1967), the Moon Agreement (1979), and national legislation such as the U.S. SPACE Act (2015), as well as their interaction with international human rights norms, particularly the right to development under the ICESCR and the 1986 UN Declaration on the Right to Development. This stage emphasizes doctrinal legal reasoning to assess compatibility, hierarchy, and interpretative tensions among legal regimes.

Third, the study interprets the broader implications of these legal tensions for ASEAN member states. This includes assessing the strategic position of ASEAN countries in international space governance, their vulnerability to exclusion from space resource benefits, and the normative implications for regional cooperation within frameworks such as UNCOPUOS. This interpretative stage links legal analysis with normative conclusions regarding equity, justice, and global distributive concerns in space resource governance.

Through these analytical stages, the research moves from legal identification, to doctrinal conflict analysis, and finally to normative interpretation, thereby ensuring a coherent analytical pathway consistent with normative juridical research standards.

3. RESULT AND DISCUSSION

1. Normative Conflict Between Space Commercialization and the Human Rights Regime

The contemporary legal framework governing outer space is characterized by a fundamental normative tension between the principle of freedom of exploration under the 1967 Outer Space Treaty (OST) and the emerging logic of commercial exploitation of space resources. Article I of the OST establishes that outer space shall be free for exploration and use by all states without discrimination. Technologically advanced states have increasingly interpreted this provision as a legal basis for the commercialization of space resources, including extraction and private ownership claims.

However, this interpretation generates a direct tension with international human rights norms, particularly the right to development under the 1986 UN Declaration on the Right to Development and Article 15(1)(b) of the ICESCR, which guarantees equitable access to the benefits of scientific progress. From a normative justice perspective, unilateral appropriation of space resources risks undermining humanity's collective entitlement to benefit from common scientific advancements beyond national jurisdiction.

The ambiguity of the non-appropriation principle under Article II of the OST further intensifies this normative conflict. While territorial sovereignty is prohibited, the treaty does not explicitly regulate ownership of extracted resources. This legal vacuum has enabled states such as the United States (SPACE Act 2015), Luxembourg (2017), and the United Arab Emirates (2019) to adopt domestic legislation recognizing private ownership of space-derived resources. Competing interpretations among legal scholars demonstrate unresolved doctrinal fragmentation between analogies of high-seas freedom and principles of indivisible celestial sovereignty.

The absence of a binding benefit-sharing mechanism further exacerbates this tension. Although the Moon Agreement (1979) introduces the Common Heritage of Mankind (CHM) principle, its limited ratification renders it ineffective in regulating contemporary space activities. Comparative insights from the UNCLOS regime demonstrate that structured benefit-sharing mechanisms are possible, yet institutional transplantation to outer space remains constrained by political and technological asymmetries.

2. Fragmentation of Global Space Governance: From Multilateralism to Plurilateralism

The emergence of the Artemis Accords represents a shift from universal multilateral governance toward fragmented plurilateral norm-setting in space law. While framed as a cooperative framework for peaceful exploration, the Accords effectively reinforce an interpretation of the OST that legitimizes commercial resource extraction without requiring a comprehensive international benefit-sharing regime.

Section 10 of the Artemis Accords, which affirms that resource extraction does not constitute national appropriation, aligns closely with unilateral domestic legislation such as the U.S. SPACE Act. This convergence indicates the formation of an alternative normative order outside the UNCOPUOS multilateral framework.

Critically, this fragmentation produces structural inequality in global governance. States that are not part of the Artemis coalition, including many developing countries, are excluded from the norm-making process that will define future space resource governance. From a human rights perspective, this raises concerns regarding procedural justice, as affected states and populations have limited participation in shaping rules that may significantly affect global resource distribution.

3. ASEAN Marginalization in the Emerging Space Economy

Within this fragmented governance structure, ASEAN occupies a structurally marginal position. Although several ASEAN states have developed space-related capabilities, their engagement remains largely limited to satellite technology and earth observation systems. No ASEAN member has established a comprehensive legal framework governing the commercialization of space resources or articulated a unified regional position within UNCOPUOS.

Comparative analysis of Indonesia, Thailand, and Vietnam reveals institutional asymmetry. Indonesia has the most comprehensive legal framework through Law No. 21/2013, yet it does not regulate the exploitation of space resources. Thailand and Vietnam demonstrate technological development but lack legislative foundations for the governance of space commercialization.

This institutional gap results in three interrelated vulnerabilities: technological dependency on external space powers, regulatory fragmentation within ASEAN, and diplomatic weakness in global negotiations. The absence of a coordinated regional space policy further limits ASEAN's capacity to influence emerging legal norms governing the utilization of space resources.

From a geopolitical perspective, ASEAN risks becoming a passive norm-taker rather than a norm-shaper in the emerging space economy. This condition reflects broader patterns of global inequality in technological governance.

4. Legal Imperative for a New International Regime on Space Resources

The structural weaknesses identified above indicate that the current international space law regime is insufficient to regulate the complexities of 21st-century space commercialization. Normative ambiguity, regulatory fragmentation, weak institutional enforcement, and the collapse of the Moon Agreement as an effective legal instrument collectively demonstrate the urgency for legal reform.

A new international regime should be grounded in five interrelated principles: inclusive benefit-sharing, mandatory technology transfer, environmental sustainability, human rights due diligence, and democratic governance. These principles collectively aim to reconcile commercial interests with distributive justice and human rights protection in outer space activities.

Such a regime requires institutional innovation through a reformed multilateral authority under UNCOPUOS or a new international space governance body inspired by, but not identical to, the International Seabed Authority model under UNCLOS. Importantly, any future framework must ensure equitable participation of developing countries, including ASEAN members, in norm-setting and benefit distribution mechanisms.

Ultimately, the transition toward a new space governance regime reflects not only a legal necessity but also a normative imperative to prevent the reproduction of historical patterns of resource inequality in a new extraterrestrial domain.

4. CONCLUSION AND RECOMMENDATION

Based on the legal analysis, this study draws two main conclusions that address the proposed problem formulation. First, the current international legal framework fails to balance the commercial rights of investors with the protection of human rights for all humanity in space exploitation. The fundamental tension between the freedom of exploration regime (Outer Space Treaty 1967) and the principle of the Common Heritage of Mankind (Moon Agreement 1979) has created a legal vacuum that developed countries have exploited to issue unilateral regulations permitting the appropriation of space resources. The ambiguity in Article II of the Outer Space Treaty regarding the distinction between the non-appropriation of celestial bodies and the ownership of extracted resources has created a legal loophole. The most critical issue. The absence of an operational and legally binding benefit-sharing mechanism threatens the right to development of developing countries, as guaranteed in the 1986 UN Declaration, and the right to enjoy the benefits of scientific progress, as guaranteed in Article 15 of the ICESCR. Regulatory fragmentation through

domestic legislation (the SPACE Act 2015, the Luxembourg Law 2017) and plurilateral agreements (the Artemis Accords) further erodes the principle of the universality of space law.

Second, ASEAN countries are in a fragile position in the international race to regulate space exploitation. Comparative analysis shows that although Indonesia has a comparative advantage as the only ASEAN country with comprehensive space legislation (Law No. 21/2013), this law does not yet accommodate the commercialization of space resources. Thailand and Vietnam, despite actively developing institutional capacity, lack adequate legislative foundations. Collectively, ASEAN faces three main challenges: limited technological capacity, a lack of harmonization of regional regulations, and weak collective diplomacy in international fora. Without immediate corrective measures, ASEAN risks becoming a mere spectator in the formation of a new space economy.

Based on the above conclusions, this study formulates the following recommendations:

First, at the international level, it is necessary to encourage the establishment of an Additional Protocol to the Outer Space Treaty or a new international instrument under the UN framework that specifically regulates: (a) an equitable benefit-sharing mechanism for the exploitation of space resources, including the establishment of an international trust fund financed by royalties; (b) human rights due diligence obligations for all space actors, including transnational corporations; (c) a mechanism for mandatory technology transfer to developing countries; and (d) the establishment of an international authority with a mandate for oversight and enforcement.

Second, at the ASEAN regional level, there is an immediate need to establish a structured regional space coordination mechanism, ideally in the form of an ASEAN Space Agency or an ASEAN Space Consortium. This institution is tasked with: (a) coordinating the common position of ASEAN countries in space law negotiations at UNCOPUOS and other international forums; (b) facilitating the harmonization of domestic space regulations among member states; (c) encouraging regional cooperation in space technology research and development; and (d) advocating for the interests of developing ASEAN countries in the international space benefit-sharing regime.

Third, at the national level, Indonesia, as the ASEAN country with the most advanced space legislation, needs to take a leadership role in three areas: (a) revising the 2013 Space Law to include provisions on the commercialization of space resources, including the protection of national interests and benefit-sharing mechanisms; (b) formulating a clear national diplomatic position on space mining issues, taking into account the balance between investment opportunities and the protection of the right to development; and (c) initiating strategic dialogue with other ASEAN countries to build a collective bargaining position in international space diplomacy.

Fourth, strengthening academic and research capacity in space law in the ASEAN region requires establishing a regional space law study center, implementing scholarship programs, and fostering research collaborations with leading international institutions. Investment in human resource development in the field of space law is a prerequisite for meaningful participation in shaping international space law norms.

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