ASSESSING INDONESIA-VIETNAM LOBSTER SUPPLY CHAINS UNDER CBD ACCESS AND BENEFIT-SHARING PRINCIPLES: IMPLICATIONS FOR SUSTAINABILITY IN TELUK JUKUNG

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Abstract

Teluk Jukung in East Lombok has been designated as a national lobster aquaculture village, yet it continues to face structural challenges, including illegal lobster seed smuggling, limited technological capacity and inconsistencies in export regulations that place cultivators in a vulnerable economic and ecological position. In response, Indonesia has pursued a lobster supply chain partnership with Vietnam focused on technology transfer and fisheries downstream development. This cooperation raises legal and governance concerns regarding its compatibility with the Access and Benefit Sharing framework under the Convention on Biological Diversity, particularly the principles of Prior Informed Consent and Mutually Agreed Terms. This study adopts a socio-legal approach to examine the implementation of Access and Benefit Sharing within the Indonesia-Vietnam partnership and to assess its implications for ecosystem sustainability and the welfare of lobster cultivators in Teluk Jukung. The findings reveal three central issues. First, there is a persistent gap between national policy objectives and the socio-economic realities experienced by local cultivators. Second, shortcomings in the application of Prior Informed Consent and Mutually Agreed Terms contribute to unequal distribution of benefits within the supply chain. Third, an Access and Benefit Sharing-based governance model is required to ensure meaningful participation of cultivators, support equitable technology transfer and strengthen Indonesia's position within the global lobster supply chain.This study offers policy recommendations aimed at developing a fair and sustainable framework for lobster aquaculture governance.

Keywords: teluk jukung; access and benefit sharing; lobster supply chain, lobster seed

A. INTRODUCTION

Global demand for lobster continues to rise and has positioned the commodity as one of the most valuable marine products in Southeast Asia.[1] Within Indonesia, coastal communities have increasingly relied on lobster aquaculture as a primary source of income, particularly in regions where marine resources form the backbone of local economies.[2] One such area is Teluk Jukung in East Lombok, West Nusa Tenggara, which has been recognised by the Ministry of Marine Affairs and Fisheries as a national lobster aquaculture village.[3] This designation reflects both the economic promise of the sector and the strategic role of local cultivators in supporting Indonesia's fisheries development agenda. Yet behind this recognition lies a complex set of ecological, economic and regulatory challenges that continue to shape the sustainability of lobster farming in the area.

The development of lobster aquaculture in Teluk Jukung has taken place within a regulatory and institutional setting that remains uneven in practice. Field observations and community engagement conducted in 2024-2025 indicate that local cultivation activities are still shaped by various constraints, including limited technological support, cultivation inefficiencies, and challenges in environmental management.[4] These conditions are important because they affect not only the productivity of lobster farming, but also its sustainability at the local level. In this context, the issue in Teluk Jukung should be understood not merely as a matter of aquaculture expansion, but as a reflection of the continuing gap between regulatory expectations and the practical realities faced by local cultivators. In many cases, weak management results in high stocking densities and, without proper systems to handle waste, uneaten feed, feces and chemical substances including antibiotics are released directly into the water.[5] These conditions illustrate the fragile ecological foundation upon which lobster aquaculture currently operates in Teluk Jukung.

Field observations and community engagement conducted in 2024 further reveal that ecological pressures cannot be separated from underlying economic constraints.[6] Local cultivators face difficulties in maintaining competitive production due to high feed costs, unstable market prices and limited access to efficient farming technology. As a result, farmed lobster from local producers often struggles to compete with products originating from Vietnam, where cultivation systems benefit from advanced technology and well-established market networks. When market access becomes uncertain and operational costs continue to rise, some cultivators perceive the sale of lobster seed to larger external actors as the only viable means of sustaining household income. This situation shows how economic pressure can push communities toward practices that end up harming the environment.

Social dependency on lobster aquaculture deepens this vulnerability. For many households in Teluk Jukung, lobster farming represents a hereditary livelihood that has supported community welfare for years. Although annual returns from cultivation can be relatively substantial, heavy

[1]Diajeng Reztrianti *et.al*, "Unveiling the Pathways to Sustainable Lobster Industry Development: A Comprehensive Case Study of Sawarna Village, Banten Province," *Ilomata International Journal of Social Science* 4, no. 4 (2023): 706, https://doi.org/10.52728/ijss.v4i4.1017.

[2]Zainul Wasik *et.al*, "Contribution of Aquaculture to Future Food Security: Economic Analysis and Development in Indonesia," *International Journal of Innovative Research and Scientific Studies* 8, no. 1 (2025): 1036, https://doi.org/10.53894/ijirss.v8i1.4505.

[3]Fathul Rakhman, "Pertama di Indonesia, Teluk Jukung Lombok Timur Ditetapkan Jadi Sentra Budidaya Lobster," *Mongabay*, April 1st, 2022, accessed at November 10th, 2025, https://mongabay.co.id/2022/04/01/pertama-di-indonesia-teluk-jukung-lombok-timur-ditetapkan-jadi-sentra-budidaya-lobster/.

[4]Global Seafood Alliance, "What Is the Environmental Impact of Aquaculture?," *Global Seafood Alliance*, April 22nd, 2019, accessed February 5th, 2026, https://www.globalseafood.org/blog/what-is-the-environmental-impact-of-aquaculture/.

[5]*Ibid*.

[6]Adhitya Nini Rizki Apriliana et al., "Pendekatan Ekosistem Berkelanjutan dalam Konservasi Plasma Nutfah sebagai Bentuk Perlindungan Benih Lobster di Sentra Budidaya Lobster Teluk Jukung Lombok Timur," *Jurnal Risalah Kenotariatan* 6, no. 1 (2025): 145, https://doi.org/10.29303/risalahkenotariatan.v6i1.346.

reliance on a single commodity exposes cultivators to market fluctuations and production risks. Economic pressure, combined with limited policy alternatives and uneven market structures, may push cultivators toward practices that ultimately undermine the sustainability of the resource on which they depend. In this sense, the persistence of illegal seed trade reflects not merely regulatory non-compliance but a broader structural imbalance between policy objectives and local economic realities.

These local conditions are closely linked to a broader international supply chain where Indonesia holds an important position as a source of lobster seed and other aquaculture resources. This country is also recognised as one of the main global suppliers of wild spiny lobster seed, with more than 100 million *pueruli* estimated to settle each year along its southern coastlines, particularly from Java to Sumbawa.[7] Recognising both the challenges and opportunities within the sector, Indonesia has pursued a strategic partnership with Vietnam aimed at strengthening its position in the global lobster market.[8] The cooperation focuses on technology transfer, downstream fisheries development and improvements in cultivation efficiency.[9] By adopting certain techniques successfully implemented in Vietnam, such as depth-based cage systems and enhanced handling of lobster seed, Indonesia seeks to improve survival rates and overall productivity within domestic aquaculture.[10] The partnership also reflects broader efforts to integrate Indonesian fisheries into global value chains and to expand export-oriented growth.[11]

However, collaboration in the utilisation of marine genetic resources raises important questions within the framework of international environmental law. As a party to the Convention on Biological Diversity, or hereinafter mentioned as CBD, and Nagoya Protocol, Indonesia is bound by principles governing Open Access and Benefit Sharing. These principles require that access to genetic resources be conducted with Prior Informed Consent and that benefits arising from their utilisation be distributed through Mutually Agreed Terms.[12] In the context of lobster aquaculture, lobster seed constitutes a form of marine genetic resource whose extraction, transfer and utilisation carry both ecological and economic implications.[13] Making sure that international cooperation follows these principles is important not only to meet legal obligations but also to support fair and sustainable management of marine resources.

The Indonesia-Vietnam lobster supply chain partnership offers potential economic advantages, including expanded market access and technological advancement. Pilot initiatives in other regions of Indonesia have demonstrated improvements in productivity and state revenue through the adoption of new cultivation methods.[14] At the same time, concerns persist regarding whether the distribution of benefits within this partnership adequately reflects the contribution and vulnerability of local cultivators. Differences in technological capacity, market control and bargaining power between the two countries may create asymmetries in

[7]Mochhamad Ikhsan Cahya Utama et.al, "Lobster Cultivation in Indonesia and Vietnam: A Review," *Asian Journal of Fisheries and Aquatic Research* 13, no. 1 (2021): 13, https://doi.org/10.9734/AJFAR/2021/v13i130255.

[8]Sinta Ambarwati, "RI–Vietnam Kerjasama Budi Daya Lobster agar Masuk Rantai Pasok Global," *ANTARA News*, January 12th, 2024, accessed at September 13th 2025, https://m.antaranews.com/amp/berita/3909627/ri-vietnam-kerjasama-budi-daya-lobster-agar-masuk-rantai-pasok-global.

[9] *Ibid*.

[10]*Ibid*.

[11]*Ibid*.

[12]Secretariat of the Convention on Biological Diversity, *Convention on Biological Diversity: Access and Benefit-Sharing- Introduction to Access and Benefit-Sharing* (Montreal: Secretariat of the Convention on Biological Diversity, 2010), 3-4, https://www.cbd.int/abs.

[13]Universitas Gadjah Mada, "UGM Researcher Examines Policies and Smuggling Practices in Indonesia's Lobster Seed Trade," *Universitas Gadjah Mada News*, accessed September 13th 2025, https://ugm.ac.id/en/news/ugm-researcher-examines-policies-and-smuggling-practices-in-indonesias-lobster-seed-trade/.

[14]Basten Gokkon, "Indonesia Resumes Lobster Larvae Exports Despite Sustainability, Trade Concerns," *Mongabay*, May 7th, 2024, accessed at September 14th, 2025, https://news.mongabay.com/2024/05/indonesia-lobster-larvae-exports-vietnam-aquaculture-sustainable-fisheries-illegal-smuggling/.

benefit distribution, particularly if local communities are not fully involved in decision-making processes related to resource use and technology transfer.

These developments raise a central question regarding the extent to which the partnership reflects the spirit of Open Access and Benefit Sharing. While the framework emphasises fairness, transparency and shared benefits, its practical implementation often depends on how agreements are negotiated and enforced at national and local levels. If cultivators remain excluded from mechanisms of consent and benefit negotiation, the partnership risks reinforcing existing inequalities within the global lobster supply chain. Conversely, effective implementation of Access and Benefit Sharing could provide a pathway toward more balanced cooperation that supports both ecological sustainability and community welfare.

Despite the growing body of literature on lobster aquaculture, global seafood supply chains and international environmental law, existing studies tend to examine these dimensions in isolation. Research on lobster governance in Indonesia has largely focused on regulatory frameworks and fisheries management, while studies on global value chains emphasize market efficiency and trade dynamics without adequately addressing legal obligations under the Convention on Biological Diversity. At the same time, scholarship on Access and Benefit Sharing has primarily concentrated on terrestrial genetic resources or pharmaceutical contexts, with limited attention to its application in marine aquaculture and cross-border supply chain partnerships.

Consequently, there remains a lack of integrated analysis that examines how ABS principles, particularly Prior Informed Consent and Mutually Agreed Terms, are operationalised within transnational lobster supply chains and how this affects the sustainability of local aquaculture communities. This gap is particularly evident in the context of the Indonesia–Vietnam partnership, where legal frameworks, economic interests and local realities intersect but remain insufficiently explored in existing literature.

Against this background, it becomes necessary to examine how international legal principles intersect with local aquaculture governance. Understanding whether the Indonesia-Vietnam partnership operates in accordance with Open Access and Benefit Sharing requires attention not only to formal agreements but also to the lived experiences of cultivators whose livelihoods depend on lobster farming. The case of Teluk Jukung offers a relevant site through which to explore these dynamics, particularly in relation to questions of equitable benefit distribution, community participation in decision-making and the environmental consequences of cross-border resource utilisation. By situating local realities within the broader framework of international biodiversity law, this study seeks to assess whether current cooperation supports a sustainable and just model of lobster aquaculture governance.

B. RESEARCH METHODS

This study adopts a socio-legal approach that combines normative legal analysis with empirical inquiry. This approach is appropriate for examining how Access and Benefit Sharing principles are implemented within the Indonesia-Vietnam lobster supply chain partnership, and how these legal norms operate in practice at the local level. The normative component relies on primary and secondary legal materials. Primary legal materials include international instruments, particularly the Convention on Biological Diversity and the Nagoya Protocol, as well as relevant Indonesian laws and regulations including Law Number 5 of 1994 concerning the Ratification of the Convention on Biological Diversity, Law Number 11 of 2013 concerning the Ratification of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization, as well as regulations governing fisheries, marine resource management, and lobster aquaculture, including Minister of Marine

Affairs and Fisheries Regulation Number 7 of 2024 on the Management of Lobster, Crab, and Blue Swimming Crab.

Secondary legal materials consist of scholarly articles, books, policy reports, and other academic sources relevant to Access and Benefit Sharing, Prior Informed Consent, and Mutually Agreed Terms. These materials are analysed through three approaches. First, a statute approach which used to examine the relevant legal frameworks. Second, a case approach is employed to analyse the regulatory and institutional dimensions of the Indonesia-Vietnam lobster supply chain partnership. Third, a conceptual approach is applied to explore the legal doctrines and concepts underlying Access and Benefit Sharing obligations.

The empirical component uses qualitative data collected in Teluk Jukung, West Nusa Tenggara, during 2024-2025. The empirical data were obtained from two main sources, field observations and semi-structured interviews. Field observations were conducted to examine local lobster cultivation practices, the socio-economic conditions of cultivators, and the practical interaction between community activities and existing regulatory frameworks. Semi-structured interviews were carried out with selected informants who were directly connected to lobster aquaculture and related supply chain activities.

Informants were selected through purposive sampling which means that participants were chosen based on their relevance to the research objectives. These informants included local lobster cultivators, community members involved in lobster farming activities, and other relevant stakeholders with knowledge of cultivation practices, local governance, or supply chain dynamics. The empirical data were analysed using a qualitative descriptive method. The analysis focused on identifying patterns, challenges, and inconsistencies between the applicable legal frameworks and the realities found in the field. Through this integration, this study seeks to assess not only the formal legal framework governing lobster resources, but also its practical implementation within the Indonesia-Vietnam lobster supply chain context.

C. ANALYSIS AND DISCUSSION

1. Understanding the Basic Concept of Genetic Resources in Lobster Seed Conservation

In international law governing marine and fisheries resources, the conservation of genetic resources occupies a central position in efforts to protect aquatic biodiversity and to secure the long-term sustainability of fisheries. From a biological standpoint, genetic resources refer to the hereditary material contained within reproductive cells that determines the survival, reproductive capacity and adaptive potential of a species.[15] In fisheries contexts, the integrity of this genetic material is important, as it shapes a species' ability to respond to environmental change, disease and human intervention.

Concern over the loss of genetic diversity first emerged in scientific discourse during the mid-nineteenth century, when researchers observed the phenomenon of genetic erosion.[16] Early agricultural developments demonstrated that intensive breeding and widespread adoption of selected varieties often led to the replacement of local genetic stock, resulting in a significant reduction in diversity. [17] Although initially identified in terrestrial agriculture, these concerns later extended to aquatic species, which face similar risks of genetic homogenisation when exploitation exceeds ecological limits.

[15]Veerala Priyanka, Rahul Kumar, Inderpreet Dhaliwal, dan Prashant Kaushik, "Germplasm Conservation: Instrumental in Agricultural Biodiversity-A Review," *Sustainability* 13, no. 12 (2021): 6743, https://doi.org/10.3390/su13126743

[16]David S. Woodruff, "Populations, Species, and Conservation Genetics," in *Encyclopedia of Biodiversity*, ed. S. A. Levin, vol. 4 (San Diego: Academic Press, 2001), 811–29, DOI: 10.1016/B0-12-226865-2/00355-2.

[17]Mark van de Wouw, Chris Kik, Theo van Hintum, Rob van Treuren, dan Bert Visser, "Genetic Erosion in Crops: Concept, Research Results and Challenges," *Plant Genetic Resources: Characterization and Utilization* 8, no. 1 (2009), https://doi.org/10.1017/S1479262109990062

International responses to these concerns gradually took shape through institutional and regulatory initiatives. The Food and Agriculture Organization played a key role by promoting the sustainable management of genetic resources, beginning with the establishment of institutional frameworks in the late 1940s that eventually evolved into the International Treaty on Plant Genetic Resources for Food and Agriculture. While these instruments were designed primarily for plant resources, the principles they articulated, including sustainability, responsible utilisation and fair benefit distribution, later informed governance approaches for animal and marine genetic resources.

During the late 1960s and early 1970s, conservation thinking expanded through the development of in-situ and ex-situ conservation models.[18] In-situ conservation emphasises the protection of genetic resources within their natural habitats, whereas ex-situ conservation involves preservation outside the original environment, such as through hatcheries, gene banks or research facilities.[19] For lobster resources, in-situ conservation remains essential to maintaining natural life cycles and ecological balance, while ex-situ measures may serve a complementary role in breeding and restocking initiatives.

Further normative guidance emerged with the adoption of the FAO's International Code of Conduct for Plant Germplasm Collecting and Transfer in the 1990s. Although focused on plant genetic resources, the Code established general standards for responsible collection, transfer and precautionary management of genetic materials. Its emphasis on preventing irreversible loss through excessive extraction resonates strongly with marine contexts, particularly for species such as lobster, whose reproduction cannot yet be reliably replicated through artificial means.

The international legal framework governing genetic resources was significantly strengthened by the adoption of the Convention on Biological Diversity in 1992. As the first comprehensive multilateral agreement addressing conservation, sustainable use and benefit sharing of genetic resources, the CBD formally recognises genetic material from plants, animals and microorganisms as resources of actual or potential value. In the marine context, these obligations intersect with the duties imposed under Articles 192 to 196 of the 1982 United Nations Convention on the Law of the Sea, which require states to protect and preserve the marine environment and its living resources.

Within this framework, lobster seed constitutes a marine genetic resource of strategic importance for Indonesia. Biologically, the genetic composition of lobster seed determines resilience, growth and reproductive success. Legally, its protection aligns with Indonesia's obligations as a coastal state to regulate the exploitation of living marine resources within areas under national jurisdiction, including the exclusive economic zone. The absence of viable large-scale artificial breeding further underscores the vulnerability of lobster seed and reinforces the necessity of in-situ conservation measures.

Therefore, the conservation of lobster seed as a genetic resource carries strategic importance across three main dimensions. First, from the perspective of preserving genetic diversity and strengthening aquaculture resilience, lobster seed represents a highly valuable source of genetic material. Maintaining its diversity ensures that aquaculture systems retain a strong genetic foundation capable of responding to disease, climate change and dynamic environmental fluctuations. Second, lobster seed conservation plays a role in reducing pressure on wild populations by limiting the overexploitation of natural stocks, restoring population balance

[18]Nigel Maxted, "In Situ, Ex Situ Conservation," in *Encyclopedia of Biodiversity*, 2nd ed., ed. Simon A. Levin (Waltham, MA: Academic Press, 2013), https://doi.org/10.1016/B978-0-12-384719-5.00049-6

[19]Terkuma Saaondo dan Olasan Olalekan, "Ex Situ and In Situ Conservation of Plant Genetic Resources in Nigeria," *ScienceOpen Preprints*, January 22, 2023, https://doi.org/10.14293/S2199-1006.1.SOR.-PPAUI0E.v1.

within their original habitats and maintaining the overall stability of coastal ecosystems.[20] Third, from the perspective of global food security, lobster is a high-value fisheries commodity in international markets.[21] Sustainable conservation management of lobster seed supports the production of high-quality marine protein that is not only essential for meeting nutritional needs but also strengthens Indonesia's contribution to global food security.[22]

With the existing international legal framework, ranging from the Convention on Biological Diversity and the 1982 UNCLOS to various FAO instruments, Indonesia has a strong normative foundation for developing policies on lobster seed conservation. The main challenge lies not in the absence of regulation but in the effectiveness of implementation, law enforcement and the integration of scientific knowledge, local wisdom and fair benefit-sharing mechanisms.

2. Monitoring and Control of Illegal Lobster Seed Distribution Practices in Indonesia

Lobster aquaculture in Indonesia began to develop more intensively in the early twenty-first century, particularly in Lombok, West Nusa Tenggara, which later emerged as one of the country's key production centres.[23] The practice originated from local observations of lobster pueruli attaching to floating ropes used in seaweed cultivation.[24] This stage represents a crucial phase in the lobster life cycle, when larvae complete their planktonic stage and transform into a juvenile form resembling adult lobster, though still extremely small and highly vulnerable to predation.[25]

Coastal communities that had previously relied on seaweed farming gradually adapted their practices to capture and grow these pueruli. Using simple equipment such as hand nets, bamboo traps and artificial collectors, local fishers developed techniques that were initially small-scale and subsistence-oriented.[26] Over time, however, increasing demand for lobster in domestic and international markets transformed this activity into a rapidly expanding economic sector. What began as a locally driven practice soon became integrated into broader commercial networks linked to regional and global seafood markets.

Indonesia's position as one of the world's most biodiverse marine regions has further amplified the economic value of lobster resources. The country hosts a significant share of global marine biodiversity and plays a central role in regional fisheries production. Within the blue economy framework promoted by the Ministry of Marine Affairs and Fisheries, lobster has been identified as a priority commodity alongside tuna, crab, shrimp and seaweed. Its high market price, particularly in export destinations such as Vietnam, China and Singapore, has turned lobster seed into a highly lucrative commodity with substantial profit margins across the supply chain.

This high economic value has created a persistent dilemma. On one hand, lobster resources offer considerable income opportunities for fishers and cultivators. On the other hand, they have stimulated the growth of transnational smuggling networks that capitalise on price differentials and regulatory gaps. Illegal distribution of lobster seed is carried out through various methods, including maritime routes using high-speed vessels that evade detection and

[20]Shahida Anusha Siddiqui, Sunayana Baruah, Yuan Seng Wu, Sunrixon Carmando Yuansah, Roberto Castro-Muñoz, Andrzej Szymkowiak, dan Piotr Kulawik, "Investigating the Sustainability, Utilisation, Consumption and Conservation of Sea Mammals-A Systematic Review," *Sustainable Production and Consumption* 46 (2024), https://doi.org/10.1016/j.spc.2024.01.030.

[21] Kementerian Kelautan dan Perikanan RI, *Profil Pasar Lobster* (Jakarta: Kementerian Kelautan dan Perikanan, 2023), accessed at September 20th, 2025, https://kkp.go.id/storage/Materi/profil-pasar-lobster667532b740870/materi-667532b771c21.pdf.

[22]*Ibid*.

[23]Muhammad Junaidi, *Buku Lobster* (Mataram: Universitas Mataram, September 2018), 20, https://eprints.unram.ac.id/21295/1/MUHAMMAD%20JUNAIDI-Buku_LOBSTER.pdf

[24]*Ibid*.

[25]Rita Rostika, "Ingin Berhasil Budidaya Lobster? Kenali Siklus Hidupnya," PSDKU Universitas Padjadjaran, 8 Desember 2020, accessed at September 20th, 2025, https://perikanan.psdku.unpad.ac.id/berita/siklus-hidup-lobster-budidaya/

[26]Muhammad Junaidi, *Loc.Cit*.

land routes supported by falsified shipping documents. Many shipments are conducted at night or through remote islands that function as informal transit points before reaching international markets.

The financial impact of these illegal activities has been substantial. Ministerial Regulation No. 7 of 2024 initially provided the regulatory basis for Indonesia's lobster governance, including the broader cooperation framework linked to lobster cultivation and trade. However, subsequent developments showed that illegal lobster seed smuggling continued despite this regulatory arrangement. In 2025, Indonesia's Minister of Marine Affairs and Fisheries reported that annual losses associated with lobster seed smuggling to Vietnam had reached approximately IDR 16 trillion.[27] The Minister further acknowledged that the Indonesia-Vietnam lobster supply chain cooperation had not operated effectively under these conditions.[28] In response, the Ministry suspended the partnership and proposed a presidential regulation to strengthen the prohibition on illegal lobster seed distribution, which would also end the cooperation framework previously established under Ministerial Regulation No. 7 of 2024.[29]

This policy shift echoes earlier regulatory developments. In 2019, the government briefly permitted lobster seed exports under a policy introduced during the tenure of a previous minister. The policy was framed as part of a benefit-sharing approach intended to improve the welfare of small-scale fishers. In practice, however, it generated outcomes that diverged from conservation and sustainability objectives. Rather than strengthening domestic aquaculture capacity, the policy allowed well-capitalised actors to dominate the supply chain while small-scale fishers remained economically marginalised. Statistical data from Indonesia's Central Statistics Agency indicated a sharp rise in lobster seed exports during this period, most of which were directed to Vietnam, where advanced aquaculture technology enabled higher value production.[30] Consequently, Indonesian genetic resources were exported and reintroduced into global markets as high-value products, with much of the economic gain accruing outside Indonesia.

Recognising the ecological risks and economic losses associated with this trend, Indonesia reinstated a ban on lobster seed exports in mid-2021. This measure aligned with conservation obligations under the Convention on Biological Diversity and the 1982 United Nations Convention on the Law of the Sea, both of which emphasise sustainable management of living marine resources. Although the ban did not completely eliminate smuggling, it positioned Indonesia more firmly within a conservation-oriented policy framework. Illegal distribution nonetheless continued through established transit routes, particularly in areas such as the Riau Islands, where proximity to Singapore facilitates cross-border movement of marine commodities.

Recognizing the significant ecological risks and economic losses, in June 2021 the Indonesian government reimposed a ban on lobster seed exports. Legally, this policy was consistent with the conservation mandates embodied in the Convention on Biological Diversity (CBD) and the 1982 United Nations Convention on the Law of the Sea (UNCLOS), both of which require coastal states to manage marine living resources sustainably. Although the ban did not immediately stop lobster seed smuggling, and illegal practices continued through major routes in the Riau Islands, located only about an hour by boat from Singapore, Indonesia was at least, at that time, taking the correct position in terms of fisheries conservation.

[27]Alfitria Nefi P, "Menteri Kelautan: Negara Rugi hingga Rp 16 Triliun Akibat Penyelundupan Benih Lobster," *Tempo.co*, 10 September 2025, Accessed at September 20th, 2025, https://www.tempo.co/ekonomi/menteri-kelautan-negara-rugi-hingga-rp-16-triliun-akibat-penyelundupan-benih-lobster-2068532.

[28]*Ibid*.

[29] *Ibid*.

[30]Marcus Wisnu Murti, "Lobster Seed Exports Jump 75 Percent in August: BPS," *Tempo.co*, September 21, 2020, https://en.tempo.co/read/1388724/lobster-seed-exports-jump-75-percent-in-august-bps.

Regulatory dynamics shift again with the adoption of Ministerial Regulation No. 7 of 2024, which reopened limited export opportunities for lobster seed through licensed corporate entities. While intended to stimulate economic growth and formalise trade, this policy introduced new challenges for monitoring and enforcement. The existence of legal export channels created opportunities for illegally harvested seed to be blended into authorised shipments, complicating traceability and increasing the risk of laundering within the supply chain. Distinguishing between lawful and unlawful distribution became more difficult for enforcement authorities, raising concerns about the long-term sustainability of natural stocks. In this context, the subsequent decision to revoke the regulation and suspend cooperation with Vietnam represented an attempt to restore tighter control over lobster seed management.

Historical patterns in Indonesia-Vietnam maritime relations further complicate the issue. Despite various bilateral agreements and action plans, tensions have persisted over illegal fishing and resource use. Indonesian authorities have continued to intercept Vietnamese vessels engaged in unlawful fishing activities, indicating an ongoing gap between formal cooperation and operational compliance.[31] Without stronger regulatory alignment and mutual commitment, similar challenges may recur in future cooperation frameworks.

The issue is also shaped by broader regional regulatory differences. Divergent policies between Indonesia and neighbouring countries create legal loopholes that facilitate transboundary trade. For example, while Indonesia restricts lobster seed exports, some neighbouring jurisdictions permit imports, effectively creating transit points that are legal under their domestic law but inconsistent with Indonesian regulations. This regulatory asymmetry enables smuggling networks to move lobster seed through intermediate markets before reaching global buyers.

Efforts to address these challenges have included bilateral cooperation initiatives such as joint maritime patrols, intelligence sharing and capacity-building programmes for enforcement agencies. Such cooperation can be situated within the framework of Articles 73 and 197 of UNCLOS, which encourage international collaboration in fisheries enforcement and marine environmental protection. However, the effectiveness of these measures depends heavily on regulatory harmonisation and sustained political will among participating states.

Illegal lobster seed distribution in Indonesia therefore extends beyond a narrow fisheries management issue. It intersects with biodiversity conservation, governance of genetic resources, national legal integrity and international relations. Addressing the problem requires a comprehensive approach that combines stronger domestic enforcement, cross-border policy coordination, community-based economic alternatives and adherence to international legal principles that prioritise sustainability and equitable resource management.

3. International Legal Framework and the Principle of Access and Benefit Sharing (ABS)

In international legal discourse, fair and equitable benefit sharing is recognised as a core principle in the governance of genetic resources, including marine genetic materials.[32] The principle affirms that benefits derived from the use of genetic resources, whether monetary or non-monetary, should be distributed proportionally to those who provide and maintain such resources, particularly local communities and the country of origin. [33]

The principle of benefit sharing was formally embedded in the Convention on Biological Diversity of 1992, which established three primary objectives: the conservation of biodiversity, the sustainable use of its components and the fair and equitable sharing of benefits arising from

[31]Yogi Eka Sahputra, "Mengapa Pencurian Ikan oleh Kapal Vietnam Terus Terjadi?" *Mongabay Indonesia*, May 30th, 2025, accessed at September 20th, 2025, https://mongabay.co.id/2025/05/30/mengapa-pencurian-ikan-oleh-kapal-vietnam-terus-terjadi/.

[32]Tae Jung Park dan Sung-Pil Park, "Legal and Economic Perspectives on Fair and Equitable Benefit Sharing in the Nagoya Protocol," *Conservation Biology* 39 (2025), https://doi.org/10.1111/cobi.14410.

[33]Secretariat of the Convention on Biological Diversity. *Introduction to Access and Benefit-Sharing*. Brochure. February 2010. https://www.cbd.int/abs/infokit/brochure-en.pdf

the utilisation of genetic resources.[34] In parallel, the 1982 United Nations Convention on the Law of the Sea provides coastal states with sovereign rights over living marine resources within areas under their jurisdiction while imposing obligations to ensure their conservation and sustainable use. UNCLOS requires states to adopt conservation measures that maintain marine populations at sustainable levels and grants them authority to regulate access to such resources, including the ability to enforce fisheries laws within their exclusive economic zones. At the same time, it places a general obligation on all states to protect and preserve the marine environment and encourages international cooperation in achieving this objective.

Article 62 grants coastal states the authority to regulate the utilisation of living marine resources, including the limitation of access for foreign parties, while Article 73 strengthens enforcement powers in addressing violations of fisheries regulations within the Exclusive Economic Zone. Furthermore, Articles 192 to 194 establish the general obligation of all states to protect and preserve the marine environment, whereas Article 197 encourages international cooperation in the protection and preservation of the marine environment.

The CBD is ratified by Indonesia through Law No. 5 of 1994, expands this legal framework by specifically addressing the conservation of genetic resources. Article 6 requires state parties to integrate conservation strategies into cross-sectoral policies, Article 8 emphasises the importance of in-situ conservation within natural habitats, Article 10 regulates the sustainable use of biodiversity and Article 15 stipulates that access to genetic resources must be based on the prior informed consent of the providing country and on mutually agreed terms.

The implementation of Article 15 of the CBD is further elaborated in the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization 2010, which Indonesia ratified through Law Number 11 of 2013. Under this framework, ABS requires that access to genetic resources be subject to PIC and that the utilization of such resources be governed by MAT. In this study, PIC refers to prior authorization granted by the competent authority of the provider State before access to lobster seed or related genetic resources takes place. MAT refers to the negotiated terms that regulate the purpose of utilization, the forms of monetary and non-monetary benefits, and the mechanisms for implementation, monitoring, and compliance. In this respect, the Nagoya Protocol requires that benefits arising from the utilization of genetic resources be shared fairly and equitably, whether in monetary forms, such as royalties, profit-sharing, and licensing fees, or in non-monetary forms, such as technology transfer, training, joint research, and access to research data. The Protocol also extends protection to traditional knowledge associated with genetic resources under Article 7, while its compliance provisions require Parties to take measures to support adherence to domestic ABS requirements and agreed arrangements.

In the context of lobster seed conservation, ABS should therefore be understood not merely as a general principle of fairness, but as an analytical framework for assessing whether the utilization of lobster seed is legally and institutionally structured in a fair and sustainable manner. In practical terms, this means examining whether access to lobster seed is supported by valid PIC, whether the relevant cooperation or partnership arrangement contains clear MAT, and whether the resulting benefits are distributed in a measurable way to the provider State and affected local communities. Through this approach, the problem of inequality in the Indonesia-Vietnam lobster partnership is not treated as a mere assumption, but as a question that can be assessed through the presence or absence of consent, negotiated benefit-sharing arrangements, and compliance mechanisms.

In this research, the relevance of ABS lies not only in its normative value, but also in its function as an analytical framework for assessing the Indonesia-Vietnam lobster partnership.

[34] *Ibid.*

Accordingly, the alignment of the partnership with the CBD and Nagoya Protocol should be examined through several core elements, namely the existence of prior informed consent, the presence of mutually agreed terms, the clarity of monetary and non-monetary benefit-sharing arrangements, and the availability of compliance or monitoring mechanisms. Through this approach, the issue of inequality raised in this study is not treated as a mere assumption, but as a question that must be tested against the legal and institutional design of the cooperation itself.

This analytical approach may also be situated within the broader regional context of ASEAN cooperation on biodiversity conservation and sustainable resource management. Although ASEAN does not establish a specific ABS regime equivalent to the CBD and the Nagoya Protocol, regional cooperation remains relevant in promoting conservation-oriented governance, capacity building, and shared responsibility among member states. In this respect, cross-border cooperation involving lobster resources should not be assessed solely in terms of trade or production efficiency, but also in light of sustainability, fairness, and the protection of resource-providing communities.

Beyond its legal dimension, ABS also carries an ethical component grounded in fairness, solidarity and shared responsibility. This perspective is consistent with the Rio Declaration on Environment and Development of 1992, which emphasises that environmental sustainability cannot be achieved without equitable distribution of benefits. For Indonesia's coastal communities, ABS does not merely signify economic gain but also includes access to sustainable aquaculture technology, strengthened fisheries management capacity, legal protection of traditional rights and assurance of resource availability for future generations. The application of ABS in lobster seed conservation therefore represents a strategic step toward ensuring ecological sustainability, social justice and integrated economic empowerment in line with both international legal commitments and national priorities.

D. CONCLUSION

This study highlights the strategic importance of conserving lobster seed as a marine genetic resource from ecological, economic and legal perspectives. Ecologically, lobster seed cannot yet be fully reproduced through artificial means, making the protection of natural stocks essential for species sustainability. Economically, lobster seed holds high value in international markets, yet without effective Access and Benefit Sharing mechanisms, most benefits tend to accrue to external actors that control technology and supply chains.

International legal frameworks, including the CBD, the Nagoya Protocol and the 1982 UNCLOS, provide a strong normative basis for protecting marine genetic resources. The principles of Prior Informed Consent and Mutually Agreed Terms are key to ensuring fair and sustainable access and utilisation. However, implementation in Indonesia remains limited due to weak oversight, regulatory inconsistencies and the relatively weak bargaining position of local cultivators.

Within the Indonesia-Vietnam lobster supply chain, value distribution remains uneven, with Indonesia largely supplying raw genetic resources while value-added production occurs abroad. Addressing this imbalance requires stronger implementation of ABS principles, improved cross-border policy coordination, investment in domestic aquaculture capacity, community-based monitoring and the integration of local knowledge with scientific innovation to support fair and sustainable lobster resource governance.

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