Lex Scientia Law Review
Vol. 9 Issue 2 (2025) 1408–1445
DOI: https://doi.org/10.15294/lslr.v9i2.12719
Online since: November 17, 2025

LEX SCIENTIA LAW REVIEW
https://journal.unnes.ac.id/journals/lslr

International Legal Regulations on Coastal Conservation of Coastal Boundary Lands Across National Borders in the Digital Era

Dolot Alhasni Bakung [a]✉, Zainal Abdul A. Hadju [b], Yassine Chami [c], Sri Nanang Meiske [d], Ramadhan Usman [e].

[a] Faculty of Law, Universitas Negeri Gorontalo, Indonesia, dolot.bakung@ung.ac.id, 0000-0002-7137-8030
[b] Faculty of Law, Universitas Negeri Gorontalo, Indonesia, zainalhadju@ung.ac.id, 0000-0003-0185-4035
[c] College of Law, Abu Dhabi University, United Arab Emirates, yassine.chami@adu.ac.ae, 0000-0003-0065-3936
[d] Faculty of Law, Universitas Negeri Gorontalo, Indonesia, srinanangmeiskekamba@ung.ac.id, 0000-0003-3916-8209
[e] Faculty of Law, Universitas Negeri Gorontalo, Indonesia, ramadhanu_dosen@ung.ac.id, 0009-0002-1173-1362

✉ Corresponding email: dolot.bakung@ung.ac.id

Abstract

The United Nations Convention on the Law of the Sea (UNCLOS) provides a comprehensive legal framework for protecting and preserving the marine environment, including coastal areas. This study examines the application of international legal regulations regarding coastal conservation and jurisdictional management of coastal lands between Indonesia and Malaysia in the digital era. Employing a normative and qualitative approach, the research

analyzes secondary data from legal materials of both countries, using a comparative method to identify similarities, differences, and points of convergence between their legal systems. In Indonesia, digital transformation by the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency has enhanced transparency and efficiency in land management; however, policy adjustments are still needed for effective coastal ecosystem protection. Meanwhile, Malaysia, with its long and erosion-prone coastline, has implemented various laws and policies, including Coastal Zone Management (CZM), to address issues such as erosion and pollution. Although both countries face similar challenges and opportunities, their approaches differ. Indonesia needs to optimize its policies to effectively protect coastal ecosystems, while Malaysia requires adjustments in implementing its existing laws and policies. Challenges such as overlapping jurisdictional authority, funding limitations, and the need for stakeholder involvement remain significant obstacles. Therefore, successful coastal land management in both countries requires better integration of legal policies, environmental conservation efforts, and digital technology to achieve sustainable outcomes.

KEYWORDS *Legal Regulations, Boundary Lands, Digital Era*

Introduction

The Qur'an, as a foundation for environmental conservation, obligates Muslims to observe the rules related to the environment and to implement individual and social laws to preserve, protect, and maintain the potential of marine and coastal environments.[1] The global coastline is estimated to have a total length of approximately 356,000 kilometers.[2] It is essential to mention that the measurement of coastlines can differ significantly depending on the method used, as coastlines have fractal characteristics that result in longer measurements when examined in greater detail. The length of a coastline is determined by various primary elements, including ocean tides, which can cause the shoreline to shift forward or

[1] Lala Latifah and Yuni Marhayuni, "Bioremediasi Sebagai Implementasi Q.s Al-A'raf Ayat 56 Dalam Menangani Pencemaran Tanah," *Kaunia: Integration and Interconnection Islam and Science Journal* 19, no. 1 (May 2023): 23–28, https://doi.org/10.14421/kaunia.3780.

[2] Amadu Jacky Kaba, "A Survey of the Geographic Area, Altitude, Coastline, and Climate of African Countries and Regions: Implications for Africa's Development," *Journal of Sustainable Development* 17, no. 3 (May 2024): 57, https://doi.org/10.5539/jsd.v17n3p57.

backward, impacting the overall length of the coastline. The study of physical features and rock formations in coastal areas is also significant; topographical and geological characteristics, such as the presence of cliffs, dunes, and rock formations, can influence the configuration and extent of the coastline. Ocean currents and waves contribute to continuous erosion or sediment deposition, leading to changes in coastline length. Coastal erosion, driven by natural forces or human activities, can reduce the overall length of the coastline, while accretion processes involving sediment addition can increase it. Additionally, sea level rise due to climate change can cause coastal migration inland, altering the coastline's length. Human activities, including coastal infrastructure development, land reclamation, and sediment extraction, can significantly impact the size and configuration of coastlines. These aspects highlight the dynamic nature of coastlines and various ways in which natural and human elements can affect them.[3]

Coastal vegetation is crucial for influencing and maintaining the stability of the shoreline.[4] Coastal vegetation, such as mangroves and seagrasses, fortifies the soil and reduces erosion caused by water and wind. The plant roots function to stabilize sediments and minimize soil erosion. Attenuating Wave Effects. Coastal vegetation has the ability to reduce the energy of waves hitting the shore, thereby reducing erosion and minimizing damage. For example, mangrove trees have the capacity to absorb and mitigate the force of ocean waves. Coastal vegetation serves as a natural filtration system that assimilates excess nutrients and waste from the land before they reach the sea. This helps maintain water purity and the health of coastal habitats. Coastal Animal Habitat. Coastal vegetation supports a diverse range of fauna, including bird species, fish, and invertebrates. The presence of this vegetation is crucial for the biodiversity of coastal areas—Carbon Dioxide Absorption. Coastal vegetation, particularly mangroves, has a significant capacity to absorb carbon dioxide from the atmosphere, helping mitigate climate change.[5] Coastal vegetation plays a crucial role in maintaining shoreline stability and enhancing the health and

[3] Puji Lestari, "Disaster Communication: An Important Aspect of Disaster Risk Reduction," *Yogyakarta: PT Kanisius*, 2018.

[4] M. Boechat Albernaz et al., "Vegetation Reconfigures Barrier Coasts and Affects Tidal Basin Infilling Under Sea Level Rise," *Journal of Geophysical Research: Earth Surface* 128, no. 4 (April 2023): e2022JF006703, https://doi.org/10.1029/2022JF006703.

[5] Carlos Eduardo Quintana-Alcantara, *Carbon Sequestration in Tidal Salt Marshes and Mangrove Ecosystems*, 2014, https://repository.usfca.edu/capstone/19/.

sustainability of coastal ecosystems.

In the rapidly evolving digital era, conserving coastal areas and their surrounding lands faces increasingly complex challenges. Coastal areas are crucial ecosystems for environmental sustainability and the global economy. However, these regions are vulnerable to various threats,[6] including climate change, pollution, and overexploitation of natural resources. Applying international legal frameworks is essential for effective coastal conservation management, especially in areas spanning multiple countries. International agreements such as the United Nations Convention on the Law of the Sea (UNCLOS) have established structures for the governance and protection of coastal areas. Nevertheless, implementing and enforcing these regulations often encounter several obstacles, such as gaps in national policies, inadequate cooperation among countries, and technological complexities.

The correlation between international legal protection and coastal conservation across multiple countries in the digital era can be explained by considering the following factors. The 1982 United Nations Convention on the Law of the Sea (UNCLOS) established a comprehensive legal framework for protecting and conserving the marine environment, including coastal areas. UNCLOS imposes responsibilities on countries to safeguard and preserve marine ecosystems, which include minimizing pollution and managing renewable resources effectively. International cooperation promotes adherence to international law and encourages collaboration among countries to preserve coastal areas. Collaboration is crucial for addressing transnational issues such as marine pollution and climate change, which impact coastlines. Digital technology enables the transmission of information and synchronization of activities among countries, thus enhancing the efficiency of conservation initiatives. Digital technology, including satellites and drones, allows for more accurate monitoring of coastal environmental conditions through improved surveillance and law enforcement. Data obtained can be used to enforce international law and ensure that countries meet their responsibilities in maintaining coastal areas. Geographic Information Systems (GIS) assist in examining and mapping environmental data. International law governs the sustainable management of coastal resources to prevent overexploitation. Digital technology facilitates this management by providing tools for

[6] Dolot Alhasni Bakung, Thanh Nga Pham, and Mohamad Hidayat Muhtar, "Disparity in the Doctrine of Promissory Estoppel between Indonesia, the Philippines and the United Kingdom," *Journal of Law and Legal Reform* 5, no. 1 (January 2024): 267–304, https://doi.org/10.15294/jllr.vol5i1.2122.

better monitoring and analysis. Using AI-based tools to identify mangrove species benefits restoration and conservation efforts. The digital era offers many prospects for conservation but also brings challenges in the form of data security and uneven access to technology. International legal protection must be flexible to address these challenges and ensure equitable and efficient use of technology. Therefore, the preservation of coastal land across international borders is reinforced by the protection provided by international law and the support of digital technology. The international legal framework provides a strong foundation for collaboration and enforcement, while digital technology facilitates better monitoring and administration.

In addition, the conservation of coastal areas in neighboring countries is safeguarded by international law in the digital era. The preservation of biodiversity in coastal regions is mandated by international law, particularly the Convention on Biological Diversity (CBD).[7] Digital technology assists in cartography and monitoring of at-risk species and critical habitats in coastal areas. This data is crucial for formulating effective and empirically supported conservation programs. Addressing the impacts of climate change, which pose significant risks to coastal regions, is essential. International law, such as the Paris Agreement, encourages governments to actively address and respond to climate change by implementing measures to mitigate and adapt to its impacts. Utilizing digital technology, such as climate models and weather monitoring systems, enables countries to design and implement efficient adaptation programs to protect coastal areas. Coastal locations, which are often vulnerable to natural disasters such as tsunamis, hurricanes, and floods, require effective management strategies for disaster mitigation. International laws promote collaboration in disaster risk management.[8]

Early warning systems and disaster modelling, which are digital technologies, provide rapid identification and response to disasters,

---

[7] Ikhsan Setiawan, "Regulation of Access and Benefit Sharing Principles in the Convention on Biological Diversity (CBD) and Its Implementation in Indonesia," 2022, http://digilib.unila.ac.id/63147/3/SKRIPSI%20TANPA%20BAB%20PEMBAHASAN.pdf, https://dataindonesia.id/sektor-riil/detail/angka-konsumsi-ikan-ri-naik-jadi-5648-kgkapita-pada-2022.

[8] Michael Howes et al., "Towards Networked Governance: Improving Interagency Communication and Collaboration for Disaster Risk Management and Climate Change Adaptation in Australia," *Journal of Environmental Planning and Management* 58, no. 5 (May 2015): 757–76, https://doi.org/10.1080/09640568.2014.891974.

thereby reducing adverse consequences in coastal areas. Education and public awareness about international law further highlight the importance of education and public awareness in conservation efforts. Digital technology, including social media and e-learning platforms,[9] is utilized to distribute information and enhance public understanding of the need to preserve coastal areas. Digital campaigns have the ability to reach a broader demographic and encourage community involvement in conservation efforts. Funding and economic incentives involve providing financial instruments and economic rewards to promote coastal area preservation. Digital technology facilitates transparency and accountability in the management of conservation funds. Additionally, digital technology can facilitate implementing Payment for Ecosystem Services (PES) schemes and blue carbon trading,[10] thus offering economic incentives to encourage conservation efforts. Therefore, the synergy between international law and digital technology is crucial in preserving multiple countries' coastal areas. A global legal framework supports Cooperation efforts and enforcement, which provides a strong foundation. Additionally, digital technology enables more efficient monitoring, management, and participation.

However, implementing digital technology also presents new challenges. Concerns regarding data security, privacy, and the disparity in technology access between industrialized and developing countries are significant. Therefore, it is crucial to implement comprehensive and adaptable regulations to ensure the efficient and equitable use of digital technology in coastal conservation efforts.

This research aims to explore how international legal norms can facilitate the preservation of coastal landscapes in the digital era. By analyzing case studies and best practices from various

---

[9] Nor Ashikin Mohammad, *The Relationship Between Acceptance And Usage of Social Media With Learning Styles Among Secondary Students in The Gombak District*, May 1, 2017, https://www.academia.edu/90364651/Hubungan_antara_penerimaan_dan_penggunaan_media_sosial_dengan_gaya_pembelajaran_dalam_kalangan_murid_sekolah_menengah_daerah_Gombak.

[10] Abdul Malik and Abd Rahim, *Mangrove Blue Carbon in Support of Ecosystem Service Payment Initiative in Barru Regency South Sulawesi*, n.d., accessed November 20, 2025, https://www.researchgate.net/profile/Abdul-Malik-51/publication/374617855_Policy_Brief_Karbon_Biru_Mangrove_Mangrove_Blue_Carbon_Dalam_Mendukung_Inisiatif_Pembayaran_Jasa_Ekosistem_di_Kabupaten_Barru_Sulawesi_Selatan/links/6526ec2b61c4044c404cc6b1/Policy-Brief-Karbon-Biru-Mangrove-Mangrove-Blue-Carbon-Dalam-Mendukung-Inisiatif-Pembayaran-Jasa-Ekosistem-di-Kabupaten-Barru-Sulawesi-Selatan.pdf.

countries, this study seeks to offer policy recommendations to enhance the efficiency of cross-border coastal conservation's efficiency. The research focuses on two main issues: how international law regulates the management of cross-border coastal boundary land in the digital era concerning coastal conservation, and the jurisdictional management of coastal boundary land between Indonesia and Malaysia in the digital era relating to coastal conservation.

This research employs a normative research method to assess and interpret the norms, principles, or rules that apply within legal, social, or ethical systems, focusing on what "should" occur according to established standards or regulations. The approaches used include a descriptive approach to identify and detail international legal regulations concerning coastal boundary land, including analysis of international conventions such as UNCLOS 1982 and related legal instruments, integrating information technology for accessing and analyzing legal texts and electronic documentation. A comparative law approach is used to compare the implementation of international regulations by various countries in the conservation of coastal boundary land, supported by electronically integrated international legal databases for in-depth comparative analysis. The case study approach provides insights into the application of international legal regulations in specific cases of cross-border coastal conservation, with case studies from coastal areas facing unique challenges and the use of Geographic Information Systems (GIS) for mapping and visualizing data. This combination of methods aims to significantly contribute to developing more effective policies and practices for maintaining global environmental and marine resource sustainability.

Result & Discussion

A. International Legal Regulation of Cross-Border Coastal Boundary Land Management in the Digital Era Concerning Coastal Conservation

Territorial claims and borders between countries play a crucial role in developing international law. These issues involve physical land ownership conflicts and encompass a nation's sovereignty.[11]

[11] Lexis Nexis Butterworths, *Parts Of This Chapter Build Upon And Update Materials Previously Chapter 5* (G. Triggs, International Law: Contemporary Principles And Practices, 2006).

Borders are a fundamental element in human life and are part of the relationship between individuals and society. Different parts of humanity are always separate but simultaneously connected through a network of borders at all territory levels of territory.[12] The awareness that borders represent complex social and territorial phenomena has had a profound impact on the study of specific boundaries.

The concept of national borders forms the foundation for regulation and is, in fact, a necessary condition for both domestic and international legal and political systems.[13] Domestically, borders are integral to the conventional concept of sovereignty and internal authority, as reflected in Max Weber's paradigmatic definition of the state as a community of people that successfully claims the monopoly on the legitimate use of force within a specific territory. In the international realm, national borders enable the principle of territorial integrity, as mandated by Article 2, Paragraph 4 of the United Nations (UN) Charter. Since the end of World War II, this principle has served as a cornerstone for regulatory ideals such as the existence of law and the equality of all states before international law; protection against the promotion of separatism by some states within the territory of other states; and the independence and preservation of territorial integrity.[14]

Traditionally, borders are the international boundaries between nation-states. These borders can be natural (such as seas, mountains, rivers, etc.) or artificial. Still, in all cases, they are always artificial or result from consensus, agreements, conquests, and peace treaties. According to O'Dowd, borders are "places of economic and political opportunity for nations and states, as well as various other interest groups and institutions, both legal and illegal."[15]

1. UNCLOS 1982

Adopting the United Nations Convention on the Law of the Sea encourages countries to cooperate across political boundaries. Article 63 requires states that share fish stocks in the Exclusive

---

[12] V Kolossov, "Euroborderscapes: State of the Debate," *Report for the 7th Framework Programme of the European Commission*, 2012.

[13] Nick Vaughan-Williams, *Border Politics: The Limits of Sovereign Power* (Edinburgh University Press, 2009), https://www.jstor.org/stable/10.3366/j.ctt1r29sk.

[14] Vaughan-Williams.

[15] L. J. L. Anderson And T. Wilson (Eds.). The Changing Significance Of European Borders. London: Frank Cass Dowd 200, *O'Dowd, L. J. L. Anderson And T. Wilson (Eds.). The Changing Significance Of European Borders. London: Frank Cass, 2003*.

Economic Zone to "seek, either directly or through appropriate sub-regional or regional organizations, to agree on measures necessary to coordinate and ensure conservation and development." The same article requires parties to "seek to agree" through joint management organizations on measures to conserve stocks that cross the boundaries between the Exclusive Economic Zone and the High Seas.[16] In the High Seas, countries are expected to cooperate in conserving and managing living resources by establishing sub-regional or regional fisheries organizations. Countries have sought to coordinate the management of resources across boundaries through Regional Fisheries Management Organizations and Regional Ocean Programs.

The 1982 UNCLOS represents a comprehensive codification and development of contemporary international law governing the seas in peacetime.[17] UNCLOS, also known as the Law of the Sea Convention, is a global treaty resulting from the Third United Nations Conference on the Law of the Sea (UNCLOS III), which took place from 1973 to 1982. The treaty is considered the "constitution for the oceans" and represents the outcome of an unprecedented and, so far, unmatched effort in the codification and progressive development of international law.[18] Maritime jurisdiction is now primarily governed by the 1982 United Nations Convention on the Law of the Sea. The comprehensive 1982 Convention, which replaced the four 1958 conventions on the law of the sea, consists of 320 articles and nine annexes, concluded in 1982.

UNCLOS is intended to regulate the use of the oceans for fishing, shipping, exploration, navigation, and mining and is the most comprehensive treaty in public international law covering a range of maritime topics, such as maritime boundary delimitation, maritime zones, marine environmental protection, marine scientific research, piracy, and more. The Convention represents the most significant development in the entire history of international legal rules regarding the high seas.[19] Most conventions, which contain more

---

[16] O. P. Sharma, “India and the United Nations Convention on the Law of the Sea,” *Ocean Development & International Law* 26, no. 4 (January 1995): 391–412, https://doi.org/10.1080/00908329509546068.

[17] Stefan Kirchner, “The Subjects of Public International Law in a Globalized World,” *Baltic Journal of Law & Politics* 2, no. 1 (January 2009), https://doi.org/10.2478/v10076-009-0005-9.

[18] Arif Ahmed, “International Law of the Sea: An Overlook and Case Study,” *Beijing Law Review* 08, no. 01 (2017): 21–40, https://doi.org/10.4236/blr.2017.81003.

[19] J. G. Starke, *Introduction to International Law*, 10th ed (New Delhi: Butterworths/Aditya Books, 1994).

significant rules, incorporate many of the previous laws they replace; they now seem to command broad consensus within the global community.

Based on the 1958 Geneva Convention on the Territorial Sea and the 1982 United Nations Convention on the Law of the Sea, seven maritime zones can fall under the jurisdiction of states, including:

A country's maritime zones are measured from what is known as the baseline or low-water line.[20] The baseline can consist of two types: a) a normal baseline and b) a straight baseline. The normal baseline is the low-water line along the coast. The low-water line after the tide has receded is considered the normal baseline. This is the line that hugs the coast. Article 5 contains provisions on normal baselines and states that, unless otherwise specified in this Convention, the normal baseline for measuring the breadth of the territorial sea is the low-water line along the coast as marked on large-scale charts officially recognized by the coastal State. On the other hand, the straight baseline deviates from the physical coastline due to certain distinctive features of a country's coast.[21]

Article 12 (1) and (2) of the 1958 Convention contain provisions regarding the establishment of the baseline and state that, if the coasts of two States are opposite or adjacent to each other,[22] neither of the two States has the right, unless otherwise agreed between them, to extend its territorial sea beyond the median line every point of which is equidistant from the nearest points on the baselines from which the territorial sea breadth of each of the two States is measured. The provisions of this paragraph do not apply if it is necessary, based on historic rights or other exceptional circumstances, to determine the territorial sea boundaries of the two States in a manner different from these provisions. The boundary line between the territorial seas of two States that are opposite or adjacent to each other must be marked on large-scale charts officially recognized by the States concerned. The globally recognized principle for determining the straight baseline was accepted in 1951 from the judgment in the case of the United Kingdom vs. Norway, ICJ. In this case, the Norwegian government

---

[20] Dr Mizanur Rahman, *International Law in a Changing World* (Dhaka: Palal prokashoni, 2008).

[21] Arif Khan, *Contemporary Issues on International Law and Human Rights: Bangladesh Perspective*, 2nd ed (Dhaka, Bangladesh: CCB Foundation, 2007).

[22] Adi F Sumardiman, "Some Basics About State Borders," *Indonesian Journal of International Law* 1, no. 3 (August 2021), https://doi.org/10.17304/ijil.vol1.3.560.

defined its fishing zone (territorial sea) by decree dated July 12, 1935.[23] This delimitation area is approximately one thousand miles from the coast at 66.28.2 North Latitude. Norway's boundary of four miles of territorial waters was established by Royal Decree in 1812, and the United Kingdom also recognized this. However, it was not measured from the low-water mark at every point, connecting the outermost points of land and sometimes drying rocks only at high tide. The United Kingdom, which recognized Norway's claim of four miles, challenged the validity of the newly established baseline and filed its complaint with the ICJ for adjudication. The issue in this case before the Court was whether the baseline established by the decree using the Norwegian method contradicted international law. The Court decided by a vote of 10 to 2 in favor of Norway, approving Norway's practice of drawing an outer line for its territorial sea based on a straight baseline that followed the general direction of the coast but not its indented coast. According to the Court, the following reasons were considered in reaching this decision: 1) Regarding the determination of maritime boundaries with other States, the ICJ observed that boundary delimitation is always an international aspect, and such actions cannot rely solely on the will of the coastal State as stated in national law. 2) The Norwegian coastline is not ordinary but rather a discontinuous coastline. The Court decided that the baseline method used by Norway did not contradict international law, taking into account the specific geographical facts and the special economic interests of the area.

Internal waters, which extend from the baseline to the landward side of the coastal State, are referred to as internal waters. Article 8 (1) of the 1982 Convention states that the waters on the landward side of the baseline of the territorial sea are part of the internal waters of the State. Additionally, Article 5 (1) of the 1958 Convention establishes that the waters on the landward side of the baseline of the territorial sea are part of the internal waters of the State.[24]

2. Territorial Sea

The doctrine of territorial sea has traditionally been based on the principle established by Dutch jurist Bynkershoek in his 1702 dissertation de dominion maris, which asserted that a nation's sovereignty extends over the sea up to the distance that can be reached by ordinary cannon fire. The traditional three-mile limit was considered equivalent to the maximum range of cannon fire in the 18th century.[25] The territorial sea is the maritime zone closest to a

[23] Ahmed, “International Law of the Sea.”
[24] Sharma, “India and the United Nations Convention on the Law of the Sea.”
[25] Muhammad Jamiruddin Sircar, *Glimpses of International Law* (Form

country's land territory.[26] The territorial sea is an undeniable part of the land territory it borders, so the cession of land will automatically include any adjacent territorial waters.[27]

3. Adjacent Zone

The concept of the contiguous zone was essentially formulated as an authoritative and consistent doctrine in the 1930s by French scholar Gidel. It was included in the 1958 Convention on the Territorial Sea.[28] The contiguous zone is the maritime area that lies beyond and adjacent to a country's territorial sea. This zone cannot extend more than 24 nautical miles from the baseline from which the breadth of the territorial sea is measured.[29] Using the contiguous zone grants coastal states additional jurisdictional authority for specific purposes.[30] Article 33 of the 1982 Convention addresses the contiguous zone and states in its subsection (1) that, in the contiguous zone adjacent to its territorial sea, which is called the contiguous zone, the coastal State may exercise the control necessary to: (a) prevent infringements of customs, fiscal, immigration, or sanitary laws and regulations within its territory or territorial sea; (b) punish infringements of the above laws and regulations committed within its territory or territorial sea. The contiguous zone may not extend beyond 24 nautical miles from the baseline from which the breadth of the territorial sea is measured (Article 33 (2)). Similarly, Article 24 (1) of the 1958 Convention also states that, in the high seas zone adjacent to its territorial sea, the coastal State may exercise the control necessary to: (a) prevent infringements of customs, fiscal, immigration, or sanitary laws and regulations within its territory or territorial sea; (b) punish infringements of the above laws and regulations committed within its territory or territorial sea.[31]

4. Exclusive Economic Zone (EEZ) or Maritime Domain

The concept of the Exclusive Economic Zone (EEZ) or Maritime Domain was first proposed by Kenya in the Asian-African Legal

---

International, 1997).

[26] Khan, *Contemporary Issues on International Law and Human Rights*.

[27] Edward Duncan Brown, "The International Law of the Sea," *(No Title)*, 1994, https://cir.nii.ac.jp/crid/1130000797753458816.

[28] A. Vaughan Lowe, "The Development of the Concept of the Contiguous Zone," *British Yearbook of International Law* 52, no. 1 (1981): 109–69, https://academic.oup.com/bybil/article-abstract/52/1/109/581574.

[29] S.K Kapoor, "International Law and Human Rights [A Nutshell] (12th Ed.). India Central Law Agency. - References - Scientific Research Publishing," 2008, https://www.scirp.org/reference/referencespapers?referenceid=1989855.

[30] Martin Dixon, *Textbook on International Law* (OUP Oxford, 2013).

[31] Sharma, "India and the United Nations Convention on the Law of the Sea."

Consultative Committee at the Colombo Session held in January 1971.[32] Article 55 of the 1982 Convention establishes that the Exclusive Economic Zone (EEZ) is an area beyond and adjacent to the territorial sea, subject to a specific legal regime established in this Part, where the rights and jurisdiction of the coastal State and the rights and freedoms of other States are governed by the relevant provisions of this Convention. The EEZ is a maritime belt adjacent to the coast, extending up to 200 nautical miles from the baseline of the territorial sea. Within this zone, the coastal State is granted "sovereign rights" to explore and exploit the sea's living and non-living natural resources.[33] Article 57 regulates the breadth of the Exclusive Economic Zone. It states that the EEZ shall not extend beyond 200 nautical miles from the baseline from which the breadth of the territorial sea is measured.

5. High Seas

The primary current of Grotius' theory is that the high seas are res communis because it is physically impossible to own them. Scelle argued that the nature of the high seas can be compared to a public park, beach, or public place open for general use based on domestic law.[34] The high seas, or open seas, refer to the waters beyond territorial waters. The high seas are defined in Article 1 of the 1958 Geneva Convention on the High Seas as all parts of the sea that are not included in the territorial sea or internal waters of a state. Given recent developments, this definition has become very absolute and inadequate. This provision mainly replicates customary international law, though,#. as a result of developments, the definition in Article 86 of the 1982 Convention includes: “all parts of the sea that are not included in the Exclusive Economic Zone, the territorial sea or internal waters of a State, or in the waters of an archipelagic State.” Article 87 of the 1982 Convention establishes that the high seas are open to all states and that freedoms of the high seas are exercised under the provisions set out in the Convention and other rules of international law.[35]

6. Continental Shelf

The term "continental shelf" typically refers to the portion of the continental margin between the continental slope and the coastline, where there is no clear slope between the coastline and the point

---

[32] Kapoor, “International Law and Human Rights [A Nutshell] (12th Ed.). India Central Law Agency. - References - Scientific Research Publishing.”
[33] Dixon, *Textbook on International Law*.
[34] Khan, *Contemporary Issues on International Law and Human Rights*.
[35] Sharma, “India and the United Nations Convention on the Law of the Sea.”

where the water depth is approximately 100 to 200 meters.[36] The continental shelf is a geological term referring to the extension of the landmass of a continent into the sea, covered only by relatively shallow water, which eventually descends into deeper ocean depths. The underwater land extends from the continent, creating a relatively shallow water area known as the continental shelf sea and the region adjacent to the continental coastline, where the sea depth does not exceed a few hundred feet.

The concept of continental shelf law began to receive attention following the Truman Proclamation of 1945, which declared that the United States regarded the continental shelf resources adjacent to it as its own, subject to its jurisdiction and control.[37] Article 76(1) of the 1982 United Nations Convention defines the "continental shelf" as follows: "The continental shelf of a coastal State comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baseline from which the breadth of the territorial sea is measured, where the outer edge of the continental margin does not reach that distance."[38]

Suppose the continental shelf extends beyond 200 nautical miles. In that case, the Convention stipulates that the continental shelf shall not exceed 350 nautical miles from the baseline or 100 nautical miles from a depth of 2500 meters. Additionally, the Convention on the Continental Shelf (1958) defines the "continental shelf" with the following terms: “The continental shelf is (a) the seabed and subsoil of the submarine areas that extend beyond the territorial sea but up to a depth of 200 meters or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the area; (b) the seabed and subsoil of the submarine areas adjacent to the coast of islands.”[39]

7. Coral Triangle Initiative (CTI) cooperation

In addition to the international legal instruments outlined in UNCLOS 1982, there is another instrument, the Coral Triangle Initiative (CTI). The Coral Triangle Initiative-Coral Triangle Fishers Forum (CTI-CFF) is a multilateral partnership of six countries

---

[36] Commission On The Limits Of The Continental Shelf (CLCS). Division For Ocean, *UN. Commission On The Limits Of The Continental Shelf (CLCS). Division For Ocean, 2012*.

[37] Kapoor, “International Law and Human Rights [A Nutshell] (12th Ed.). India Central Law Agency. - References - Scientific Research Publishing.”

[38] Sharma, “India and the United Nations Convention on the Law of the Sea.”

[39] Sharma.

working to conserve the extraordinary marine and coastal resources by addressing critical issues such as food security, climate change, and marine biodiversity. This initiative is the first to focus on food security through sustainable marine resource management while considering the impacts of climate change. Established in 2009, CTI-CFF includes the governments of Indonesia, Malaysia, Papua New Guinea, the Philippines, Solomon Islands, and Timor-Leste ('CT6'), representing the guardians of the Coral Triangle region.[40]

At the Leaders' Summit in 2009, these governments agreed to adopt the Coral Triangle Initiative-Coral Triangle Fishers Forum (CTI-CFF) Regional Plan of Action (RPOA), a 10-year plan to protect coastal and marine biodiversity in the region. The RPOA has five goals: strengthening seascape management; promoting an ecosystem-based approach to fisheries management; establishing and enhancing effective marine protected area management; increasing coastal community resilience to climate change; and protecting threatened species. Through CTI-CFF, the parties have committed to implementing community-centered biodiversity conservation, sustainable development, poverty alleviation, and equitable benefit-sharing. CTI-CFF aims to address poverty alleviation through economic development, food security, sustainable livelihoods for coastal communities, and biodiversity conservation by protecting species, habitats, and ecosystems.

CTI-CFF to become a leading organization in food security and marine resource management, sustained support and commitment from the Member Parties are crucial. This collaboration demonstrates the ability of governments to work together at the highest political levels, despite the challenges inherent in cooperating with countries with different institutional arrangements. The Coral Triangle countries are committed to continuing their efforts, but they require substantial support from the international community to effect real change.

The law of coastal boundary areas is a significant issue in the context of international maritime law, regulated explicitly by the United Nations Convention on the Law of the Sea (UNCLOS) of 1982. UNCLOS 1982 establishes clear principles regarding the maritime zones of coastal states, including the coastal boundary areas or coastal zones. According to UNCLOS, coastal boundary areas are part of the territorial sea under the state's sovereignty, which grants exclusive rights to manage natural resources in the region. This principle governs the jurisdictional limits of coastal states over their

[40] Coral Triangle Initiative, “History of CTI-CFF,” June 4, 2010, https://www.coraltriangleinitiative.org/About.

coastal areas and mandates environmental protection and sustainable resource use.

The Coral Triangle Initiative (CTI) is a regional initiative involving countries in the Coral Triangle area. It aims to promote sustainable marine ecosystem management in the region, part of the coastal boundary areas regulated by UNCLOS 1982. This initiative includes the development of joint policies for natural resource conservation, marine ecosystem monitoring, and capacity building in marine environmental management. Through this cooperation, CTI member countries strive to implement the principles of UNCLOS in managing their coastal boundary areas, focusing on sustainability and marine environmental protection.

Thus, UNCLOS 1982 and cooperation through CTI provide a crucial legal foundation and framework for coastal states in the Coral Triangle region to effectively manage their coastal boundary areas. The legal provisions of UNCLOS affirm the sovereignty rights of coastal states over their coastal areas. At the same time, CTI offers a platform for regional collaboration in maintaining the sustainability of marine ecosystems and natural resources in this vulnerable region. This demonstrates that integrating international laws governing and protecting coastal areas with regional initiatives like CTI is essential in supporting sustainable management and environmental protection across the region.

8. Convention on Biological Diversity, 1992, international law

The UN Convention on Biological Diversity (CBD) provides a regulatory framework for the conservation of biological resources at the international level. It is distinguished as the first multilateral instrument to consider the potential risks posed by Living Modified Organisms (LMOs) to biodiversity conservation.[41] For some, it represents a different type of agreement than standard treaty obligations, as it outlines objectives rather than obligations.[42] It also recognizes that most genetic resources are located in developing countries and affirms these countries' rights over the resources within their territories.[43]

---

[41] Lee A Kimball, "Is a United Nations Convention the Most Appropriate Means To Pursue the Goal of Biological Diversity?," 28 (1995).

[42] Kimball.

[43] June 5 ited Nations Convention on Biological Diversity 1992, 31 ILM 818, entered into force Dec. 29, 1993. Mexico ratified the CBD on March 11, 1993, online: http://www.cbd.int/doc/legal/cbd-un-en.pdf (accessed June 4, 200, *United Nations Convention on Biological Diversity, June 5, 1992, 31 ILM 818, Entered into Force Dec. 29, 1993. Mexico Ratified the CBD on March 11, 1993, Online: Http://Www.Cbd.Int/Doc/Legal/Cbd-Un-En.Pdf (Accessed June 4, 2007*, June 4, 2007.

The CBD is a highly significant international legal instrument in efforts to conserve and sustainably use biological resources, emphasizing the protection of global biodiversity. Its approach, which prioritizes objectives rather than binding obligations, reflects flexibility in implementing conservation principles that can be adapted to the needs and conditions of each country. One of the most critical aspects of the CBD is its recognition of developing countries' rights over genetic resources within their territories, acknowledging their dependence on biodiversity conservation and utilization. However, by introducing regulations related to Living Modified Organisms (LMOs), the CBD also addresses the potential risks posed by biotechnology to biodiversity conservation, creating new challenges in balancing scientific progress with environmental protection. This highlights the importance of a holistic and rights-based approach in regulating cross-border natural resource issues.

The CBD also supports environmental principles such as the precautionary principle and Environmental Impact Assessment (EIA) as essential tools for protecting biodiversity. At the same time, it has been criticized for being unclear and failing to provide implementation guidelines for member states, making its practical observation challenging.[44] The objectives of the CBD can be summarized as follows: the conservation of biodiversity; the sustainable use of its components; and the fair and equitable sharing of genetic resources.[45]

Biodiversity is defined as "the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems, as well as the ecological complexes of which they are a part."[46] Additionally, the Convention requires states to ensure that their activities involving the exploitation of resources within their territories do not cause harm beyond their national jurisdiction.[47]

The CBD seeks to conserve biological resources within their natural environment and habitat (in situ) and outside their original habitat (ex-situ). In situ conservation strategies include establishing protected areas, preserving ecosystems, and rehabilitating degraded

---

[44] Chris Id "The Futility, Utility, and Future of the Biodiversity Conventi, *The Futility, Utility, and Future of the Biodiversity Convention,* 1998.

[45] Biosafety Unit, "Convention Text," Secretariat of the Convention on Biological Diversity, March 30, 2007, https://www.cbd.int/convention/articles/default.shtml?a=cbd-08.

[46] Unit.

[47] Unit.

areas.[48] Additionally, the Convention encourages states to regulate and manage risks associated with using and controlling LMOs and to incorporate respect for traditional knowledge and practices into their policies. Article 8(j) of the CBD, concerning states' obligation to preserve in-situ biodiversity, stipulates that Parties shall, as far as possible.[49]

"Subject to its national laws, respect, preserve, and maintain the knowledge, innovations, and practices of indigenous[50] and local communities that embody traditional lifestyles relevant to the conservation and sustainable use of biodiversity, and promote their wider application with the approval and involvement of the holders of such knowledge, innovations, and practices, while encouraging the fair and equitable sharing of benefits arising from their utilization."

It is understood that the CBD provides a relevant legal framework for biodiversity conservation, including in transboundary coastal areas, by emphasizing the importance of regulating states' rights over natural resources within their territories. In the context of transboundary coastal areas, the CBD recognizes that biological resources in coastal ecosystems often extend beyond national borders, requiring international cooperation for their conservation. This Convention, with its goal-based approach, allows flexibility for countries to adapt conservation principles to local conditions while maintaining collective responsibility for biodiversity protection. Furthermore, the CBD reaffirms the importance of a rights-based approach, particularly the rights of developing countries over genetic resources within their territories, including coastal biodiversity, given their dependence on natural resources for survival.

Significant challenges arise in regulating transboundary coastal areas globally, particularly concerning the potential dangers of Living Modified Organisms (LMOs) and the risks associated with using biotechnology in coastal ecosystems. The CBD introduces the precautionary principle and the need for Environmental Impact Assessments (EIA) to protect biodiversity, yet it has been criticized for lacking clear implementation guidelines for member states. In transboundary coastal areas, the presence of ecosystems that are highly vulnerable to external impacts can create difficulties in

---

[48] Unit.
[49] Unit.
[50] Resty Shelya Pujiani, "Land Acquisition for Customary Law Communities: A Review of the Book Perlindungan Hak Atas Tanah Masyarakat Hukum Adat Dalam Pengadaan Tanah Untuk Kepentingan Umum," *Lex Scientia Law Review* 5, no. 1 (May 2021), https://doi.org/10.15294/lesrev.v5i1.46903.

ensuring that activities in one country do not harm ecosystems in another. In this context, fostering collaboration among nations is crucial, with respect for traditional knowledge and relevant local practices, as stipulated in Article 8(j) of the CBD, to achieve sustainable conservation and fair benefit-sharing in managing coastal areas of mutual interest.

9. Ramsar Convention on Wetlands 1971

The 1971 International Convention on Wetlands provides a framework for national and international cooperation for wetland conservation and wise use. Wetlands are among the most diverse and productive ecosystems. They provide essential ecosystem services, including water purification, water storage, carbon and nutrient processing, shoreline stabilization, and habitat for plants and animals. However, they continue to be degraded and converted for other uses.[51]

The purpose and jurisdiction of the Ramsar Convention are unique, as it is the only global convention aimed at protecting and conserving a specific type of ecosystem along with the flora and fauna that depend on it. Wetlands are defined in Article 1 of the Convention as areas of marsh, peatland, or water, whether natural or artificial, permanent or temporary, with static or flowing water, including marine water areas with a depth of no more than six meters at low tide.

The Ramsar Convention generally does not specify particular methods for its implementation, except for certain obligations under Article 2(4), which require the designation of at least one site for inclusion in the List of Wetlands of International Importance. States must ensure that their implementation of national laws respects the international legal obligations contained in the Convention (10a).

The Convention also emphasizes the "wise use" principle of all wetlands. Article 3 states that member states must work towards the wise use of all their wetlands. This principle can have implications for the joint management of wetlands located along national borders, especially when these wetlands form an ecosystem that spans two or more countries. This indicates that neighboring countries must ensure that their management policies are aligned to prevent damage caused by the activities of one country that could affect another.

Articles 2(1) and 2(4) state that countries that sign the Ramsar Convention must designate wetlands of significance for inclusion in

[51] "Ramsar Convention on Wetlands," IISD Earth Negotiations Bulletin, accessed November 20, 2025, https://enb.iisd.org/negotiations/ramsar-convention-wetlands.

the List of Wetlands of International Importance (Ramsar List). In the context of land border conservation, if wetlands located along national borders share interdependent ecosystems, these countries are expected to jointly manage and conserve these wetlands, either by planning shared management strategies or by exchanging information and resources to maintain the integrity of the ecosystem.

Furthermore, Articles 5 and 6(2) of the Ramsar Convention emphasize the importance of international cooperation in managing transboundary wetlands. Bordering countries can collaborate to protect and manage wetland ecosystems that cross their borders, particularly in terms of natural resource management, flora and fauna protection, and pollution control. Such cooperation is essential for achieving effective conservation goals, as wetland ecosystems often do not adhere to administrative boundaries and require a cross-border approach to maintain ecological balance.

Based on Article 4, the Ramsar Convention recommends that countries consider the importance of broader ecosystem systems, including watersheds that cross national borders. This means that countries sharing the same wetland ecosystem must cooperate in regulating policies related to water management, pollution, climate change, and other threats that may affect the health of these ecosystems. For example, suppose one country engages in activities that may reduce water quality or alter water flow patterns, affecting transboundary wetlands. In that case, these countries must coordinate to ensure that such activities do not harm the cross -border ecosystem.

In practice, bilateral or multilateral agreements between countries are often necessary to support the conservation of wetlands that extend across national borders. Countries sharing wetland ecosystems may need to develop protocols or formal agreements governing the management of natural resources and conservation in alignment with their obligations under the Ramsar Convention. This also includes regulations concerning transboundary pollution, water management, and measures to mitigate the impacts of climate change.

10. The Use of Geographic Information Systems (GIS), Remote Sensing, and Artificial Intelligence (AI)

International Legal Framework on Coastal Conservation and Transboundary Coastal Boundaries in the Digital Era, Utilizing Technologies such as Geographic Information Systems (GIS), Remote Sensing, and Artificial Intelligence (AI). The international legal framework on coastal conservation and transboundary coastal

boundaries in the digital era, using technologies such as Geographic Information Systems (GIS), Remote Sensing, and Artificial Intelligence (AI), requires a clear legal foundation to address emerging challenges in coastal area management. As the primary instrument, the United Nations Convention on the Law of the Sea (UNCLOS) provides guidelines on state sovereignty over coastal areas, exclusive economic zones (EEZ), and continental shelves. Article 56 of UNCLOS regulates a state's rights over its EEZ, including managing marine resources and conserving coastal ecosystems. Although UNCLOS does not explicitly restrict the use of new technologies in coastal conservation, the integration of GIS and Remote Sensing technologies can support the implementation of principles outlined in UNCLOS, such as the state's responsibility to protect and manage the coastal environment sustainably.

The application of technologies like GIS and Remote Sensing in monitoring transboundary coastal areas can enhance the implementation of the Precautionary Principle in environmental protection, as reflected in the 1992 Rio Declaration, particularly in Principle 15, which requires states to adopt a preventive approach to environmental damage that may cause significant harm. Remote Sensing enables accurate and continuous monitoring of shoreline changes, erosion, and coastal ecosystem degradation. This aligns with states' obligations to prevent damage to other states, under the Joint Management Principle outlined in UNCLOS, which requires coastal states sharing a boundary to cooperate in managing transboundary coastal resources.

Using geospatial technology and AI also raises questions regarding data sovereignty and the accessibility of generated data. Article 2(1) of the UN Charter states that every nation has full sovereignty over its territory, including regulating and using geospatial data. Therefore, applying GIS and Remote Sensing in transboundary coastal monitoring must be based on agreements between coastal states, outlining how data is collected, accessed, and utilized. This is crucial to prevent data misuse and ensure that states maintain full control over data related to their coastal areas, while also upholding transparency in data-sharing for conservation purposes and dispute resolution.

The Principle of International Cooperation in Article 123 of UNCLOS must be applied to address potential conflicts and ensure the effectiveness of transboundary coastal conservation. This article encourages coastal states to cooperate in managing shared marine resources. In this context, AI technology can assist in data analysis to develop more accurate, evidence-based policies for

transboundary coastal management. Therefore, international agreements governing the use of these technologies—such as the Convention on the Protection and Management of the Marine and Coastal Environment initiated by the UN—should incorporate provisions on the use of GIS, Remote Sensing, and AI to facilitate interstate collaboration in conserving and managing coastal ecosystems that are vulnerable to climate change and uncontrolled exploitation.

B. Jurisdiction of Coastal Boundary Management Between Indonesia and Malaysia in the Digital Era for Coastal Conservation

1. Coastal Boundary Management in Indonesia in the Digital Era for Coastal Conservation

Coastal boundary zones and coastal areas are vulnerable to damage from human activities related to resource utilization or natural disasters. Additionally, the aggregation of various exploitative efforts limited to specific sectors within the coastal boundary and coastal areas, or the consequences of other activities upstream of the coastal areas sanctioned by current laws, often damages coastal ecosystems and boundaries. Existing laws are primarily focused on resource utilization. However, there is a notable lack of awareness regarding the strategic importance of sustainable, integrated, and community-based management of coastal boundaries and coastal areas. Therefore, managing the unique aspects of coastal areas prone to conflict effectively is crucial to regulating the impacts of human actions and preserving certain coastal areas as conservation zones. The community needs to promote responsible coastal management. Thriving communities should be rewarded with incentives, while those causing damage should be penalized, as outlined in laws related to coastal areas and their boundaries. Vulnerable coastal areas must be safeguarded through effective administration to ensure these areas can be utilized to meet the essential needs for the existence and survival of the community. Therefore, it is crucial to establish policies to manage coastal resources effectively. These policies should aim to achieve a harmonious balance between utilizing these resources for commercial purposes and preserving the needs of future generations.[52]

[52] Shofie Rudhy Aghazsi, “Land Tenure in Coastal Border Areas and Coastal

This can be achieved by creating conservation areas and delineating coastal boundaries. Implementing Law No. 23 of 2014 on Regional Government, which replaced Law No. 32 of 2004, significantly impacts local governance's autonomy in managing coastal and small island areas. According to Article 27, Paragraph (1) of Law No. 23 of 2014 on Regional Government, provincial areas are granted the authority to oversee maritime resources within their boundaries.[53] This article supersedes Article 18, Paragraph (1) of Law No. 32 of 2004 on Regional Government, which granted regions with water areas the authority to oversee the utilization of resources within their waters. The explanatory section of Law No. 32 of 2004 on Regional Government designates regions as provincial and district/city governments. Consequently, Article 27, Paragraph (1) of Law No. 23 of 2014 on Regional Government removes the authority of districts/cities to manage marine resources. According to Article 27, Paragraph (2) of Law No. 23 of 2014 on Regional Government, provinces have the authority to oversee the management of resources in their maritime jurisdiction, as regulated in Article 27, particularly in Paragraph (1), which grants provinces the authority to manage natural resources in the sea. (2) The provincial authority to regulate natural resources in the sea,[54] as referred to in Paragraph (1), includes: a. investigation, utilization, preservation, and control of marine resources other than oil and gas; b. administrative agreements; c. spatial planning; d. ensuring peace at sea; and e. contributing to maintaining national sovereignty. The legal jurisdiction of provincial areas to regulate natural resources in the sea, as defined in Paragraph (1), extends up to a maximum of 12 nautical miles from the shore to the open sea and/or archipelagic waters. (4) In cases where the distance between two provincial areas within a maritime region is less than 24 miles,[55] the authority

---

Regions," *Lentera Hukum* 2 (2015): 117, https://heinonline.org/hol-cgi-bin/get_pdf.cgi?handle=hein.journals/lenth2&section=12.

[53] Oksep Adhayanto and Yudhanto Satyagraha Adiputra, "Impact of Law No. 23 of 2014 on Local Regulations in Bintan Regency in 2015 (Study on Authority Transfer in the Field of Marine and Mining)," *Jurnal Selat* 2, no. 2 (2015): 296–314, https://ojs.umrah.ac.id/index.php/selat/article/download/93/92.

[54] Mawardi Khairi, "The Authority of the Provincial Government in Granting Permits for Water Management in Coastal Areas and Small Islands," *JATISWARA* 35, no. 3 (November 2020), https://doi.org/10.29303/jtsw.v35i3.262.

[55] Rainhard Sumarto Simatupang, "Determination of Marine Area Management Boundary between East Java Province and Bali Province Based on Law of the Republic of Indonesia Number 23 Year 2014," *Jurnal Teknik ITS* 5, no. 2 (December 2016): G199–205, https://doi.org/10.12962/j23373539.v5i2.17392.

to manage natural resources in the maritime area is either divided equally among provinces or determined based on the principle of the median line between the two provinces.

Regulations regarding the protection of coastal areas, including prohibitions, are outlined in Article 35 of Law No. 1 of 2014, which amends Law No. 27 of 2007 on the management of coastal areas and small islands. One of the restrictions is the prohibition of physical development, which results in environmental damage and/or has a negative impact on local communities. Article 100 of Government Regulation No. 13 of 2017, which amends Government Regulation No. 26 of 2008 on the National Spatial Planning, addresses these aspects.[56] It explicitly states that construction in coastal border areas may only be carried out to support beach recreational activities, ports, airports, and power plants. Additionally, it prohibits activities that could diminish the area's size, ecological significance, or visual appeal. Coastal management, as defined in Article 1, Number 1 of Law No. 1 of 2014,[57] refers to the coordination, planning, utilization, supervision, and control of Coastal Resources by the government and local governments. This management aims to enhance the welfare of communities by emphasizing collaboration across sectors, land and marine ecosystems, and science and management.

Coastal management is regulated under Article 3 of Law No. 1 of 2014, which amends Law No. 27 of 2007. This management is based on principles such as sustainability, consistency, integration, legal certainty, partnership, equality, community participation, openness, decentralization, accountability, and fairness. The objectives of coastal management, as outlined in Article 4, are: (1) To protect, conserve, rehabilitate, utilize, and enhance coastal resources and their ecological systems sustainably, (2) To foster harmony and synergy between the central government and local governments in managing coastal resources, (3) To strengthen community participation and involvement from government agencies, (4) To increase the social, economic, and cultural values of communities through their involvement in utilizing coastal resources. Coastal management involves strategic planning,

---

[56] Cut Sabina Anasya Zulkarnain and Maret Priyanta, "Local Government Authority In Spatial Planning Of Rural Areas: Implications Of Post-Employment Law Changes," *Bina Hukum Lingkungan* 5, no. 3 (2021): 416–31, http://www.bhl-jurnal.or.id/index.php/bhl/article/view/166.

[57] Dedeng Dedeng, Asuan Asuan, and Ricky Saputra, "Management Arrangements And Reclamation Of Coastal Areas And Small Islands," *Solusi* 22, no. 2 (May 2024): 184–96, https://doi.org/10.36546/solusi.v22i2.1137.

efficient exploitation,[58] effective supervision, and strict control over human activities using Coastal Resources and natural processes.[59] The main objective is to ensure the sustainable utilization of these resources, improve the community's welfare, and maintain the integrity of the Unitary State of the Republic of Indonesia. This management is achieved through the integration of activities, including coordination between the central government and local governments, cooperation among different local governments, collaboration across various sectors, involvement between the government, businesses, and the broader community, coordination between terrestrial and marine ecosystems, and the application of scientific principles and management principles as outlined in Article 6 of Law No. 1 of 2014, which amends Law No. 27 of 2007 on the management of coastal areas and small islands.

Presidential Decree No. 51 of 2016 on coastal boundaries is intended to protect coastal habitats and prevent environmentally damaging development. Below are some key aspects of this regulation. The primary objective is to preserve coastal habitats, including mangrove forests, coral reefs, and seagrass beds, which play a crucial role in maintaining environmental balance.[60]

Various regulations issued by the Indonesian government to regulate the use of coastal boundary land related to coastal area conservation must adapt to the times. In the current era of digital technology, these regulations must be adjusted accordingly to ensure their effective implementation. The goal of digital transformation at the Ministry of Agrarian[61] Affairs and Spatial Planning/National Land Agency is to accelerate and enhance transparency in Land Management. This is a key component of this transformation. The process of digitizing land documents and

---

[58] Nurul Fajri Chikmawati, "Management of Coastal Areas and Small Islands in Indonesia (in the Perspective of Legal Protection for the Economic Rights of Traditional Communities)," *ADIL: Jurnal Hukum* 4, no. 2 (May 2019): 396–417, https://doi.org/10.33476/ajl.v4i2.808.

[59] Tianlin Zhai et al., "Assessing Ecological Risks Caused by Human Activities in Rapid Urbanization Coastal Areas: Towards an Integrated Approach to Determining Key Areas of Terrestrial-Oceanic Ecosystems Preservation and Restoration," *Science of The Total Environment* 708 (March 2020): 135153, https://doi.org/10.1016/j.scitotenv.2019.135153.

[60] Hasim Hasim, "Mangrove Ecosystem, Seagrass, Coral Reef: Its Role in Self-Purification and Carrying Capacity in Coastal Areas," *International Journal Papier Advance and Scientific Review* 2, no. 1 (June 2021): 37–49, https://doi.org/10.47667/ijpasr.v2i1.93.

[61] Dolot Alhasni Bakung et al., "Hukum Agraria (Teori Dan Praktek)," *Yayasan Drestanta Pelita Indonesia*, September 9, 2024, https://publisher.yayasandpi.or.id/index.php/dpipress/article/view/1610.

certificates (e-Certificate) involves converting physical land certificates into an electronic format.[62] This increases the efficiency and security of the process while minimizing the risk of loss or forgery. The digitization of "Warkah" refers to the process of converting significant land documents into a digital format, making them easily accessible and storable. Additionally, Electronic Land Services include the use of electronic mortgages. The mortgage registration procedure is conducted electronically, which speeds up processing and enhances transparency. An online platform for verifying electronic land certificates has been developed, allowing individuals to easily check the authenticity of land certificates. This system simplifies the verification process and minimizes administrative bureaucracy. The digital information and mapping system includes land value zone data[63] and land value.

2. Coastal Boundary Management in Malaysia in the Digital Era for Coastal Conservation

Malaysia's coastline is vulnerable to coastal erosion and rising sea levels. According to the National Coastal Erosion Study 2015, 15% of the 8,840 km coastline is now experiencing erosion. Of this, one-third is classified as critical or significant, requiring structural protection. A study in Malaysia in 2017 revealed an average annual sea level rise of 0.67-0.74 mm. This study examined specific coastal protection structures along Malaysia's coastline that serve as erosion control and adaptation measures for sea-level rise, which align with coastal management methods. Rock revetments and breakwaters are frequently used as erosion control measures in the "hold the line" technique. Implementing advanced offshore platforms and land-based dikes, categorized as "adaptation" strategies, has proven highly effective in preventing erosion.

Malaysia has a total land area of 329,758 square kilometers and a coastline of 4,809 km. The length of the coastline in Peninsular Malaysia is approximately 2,902 km, with more than 90 percent consisting of easily erodible alluvial rocks. Malaysia's annual per capita fish consumption exceeds 50 kilograms, representing more than a quarter of the country's per capita production. The fisheries

---

[62] Ratih Widyastuti, "Community Legal Protection and the Legal Position of Electronic Land Certificate in Land Registration Based on Notarial Assets," *International Journal of Multicultural and Multireligious Understanding* 8, no. 5 (May 2021): 207, https://doi.org/10.18415/ijmmu.v8i5.2642.

[63] Pasek Budi Sastrawan, Citra Dewi, and Fauzan Murdapa, "Land Value Zone Map Making With Web-Based Geographic Information System (Case Study: Desa Kota Gajah Timur, Lampung Tengah)," *Datum: Journal of Geodesy and Geomatics* 1, no. 01 (April 2021): 55–61, https://doi.org/10.23960/datum.v1i01.1922.

sector in Malaysia produced approximately 1.98 million tons of fish worth RM 12.76 billion in 2014, contributing 1.3% to the country's gross domestic product. Malaysia ranks sixteenth in the world regarding fish production, accounting for about 1.1% of global output. However, global fish production is expected to increase with the growing human population, with traditional capture fisheries remaining a primary source of fish supply. Sarawak has identified around 564 fishery resource species, including those in 32 orders and 123 families. In the 1980s, the Department of Fisheries Malaysia[64] established Marine Protected Areas.[65] Malaysia's initial goal was to reduce overfishing and enhance fishery resources in coastal areas. The designation of Malaysia's marine parks was established in 1994 after a comprehensive review of the Fisheries Act of 1963, and it was later enshrined in the country's legislation in 1995. Marine Protected Areas were specifically created to preserve marine habitats and resources, serving as an effective tool for improving fishery sustainability. Peninsular Malaysia has been designated the Occupational Safety and Health Standards by the Fisheries Law 1989.

Malaysia's great potential is closely related to its challenges. Several state and federal authorities enforce the Environmental Quality Act and Environmental Impact Assessment, the Town and Country Planning Act (TCP) of 1976, and the Fisheries Act of 1985 to protect the environment and natural resources in coastal cities. As a result, many organizations and stakeholders monitor the coastal areas. State governments have full authority over coastal development, with limited intervention from the federal government.

Malaysia faces significant environmental challenges, including deforestation, pollution of inland and coastal waters, soil and coastal erosion, overfishing, coral reef degradation, air and water pollution, and improper waste disposal. Land development and cultivation activities, such as urban expansion, coastal road construction, airport runway creation, and shrimp farming, have led to significant environmental losses. One of the impacts is the loss

---

[64] Mohammad Zaki Ahmad, "17 Malaysia's Offshore Fisheries," *Port, Maritime and Hinterland Development in Southeast Asia (UUM Press)*, UUM Press, 2014, 416, https://books.google.com/books?hl=id&lr=&id=tjwlCwAAQBAJ&oi=fnd&pg=PA416&dq=Ahmad,+Mohammad+Zaki.+Malaysia%E2%80%99s+Offshore+Fisheries.+Port,+Maritime+And+Hinterland+Development+In+Southeast+Asia&ots=1B-FKSstXC&sig=LUmRMbHHhtXXaWcJs61rdGL7L9o.

[65] Helen E. Fox et al., "Explaining Global Patterns and Trends in Marine Protected Area (MPA) Development," *Marine Policy* 36, no. 5 (September 2012): 1131–38, https://doi.org/10.1016/j.marpol.2012.02.007.

of at least 100,000 hectares of mangrove areas, which are crucial for maintaining the balance of coastal ecosystems. Malaysia has adopted Coastal Zone Management (CZM) through a federal system established in 1957.[66] Malaysia's unique government structure, consisting of three federal, state, and local tiers, enables more coordinated management. The federal government directly manages Kuala Lumpur, Putrajaya, and Labuan through the Federal Territories Ministry, while states have full authority over coastal development with limited federal intervention.

Coastal Zone Management (CZM) in Malaysia is promoted as part of the Ninth Malaysia Plan (2006-2010). This plan emphasizes the preservation of pure and resilient ecosystems while meeting economic growth requirements. Implementing CZM involves various supporting elements, including increased stakeholder engagement and collaboration between planning and implementation entities. The top priorities are the conservation and sustainability of natural resources, such as forest rehabilitation and the protection of flora and fauna. CZM requires the reduction of pollution, particularly from solid waste disposal, toxic substances, and hazardous compounds. Strict environmental regulations, especially for industries, are expected to reduce pollution effectively. Additionally, land use planning, zoning, and stormwater management are crucial for minimizing the adverse effects of flooding and formulating effective emergency responses.[67] The establishment of CZM in Malaysia is a response to coastal challenges, including coastal erosion, pollution, overfishing, and the loss of mangrove forests.

Although implementing Integrated Coastal Zone Management (ICZM) in Malaysia appears promising, it faces challenges and conflicts in forming and enforcing a coherent regulatory framework. The delivery process becomes ambiguous due to inappropriate policy options. There are overlapping functions among various federal ministries and state governments in coastal land management. There is no agency with comprehensive jurisdiction to address marine pollution effectively. Additionally, the Environmental Agency cannot effectively manage incidents in the Exclusive

---

[66] Yahya Ahmad Zein, Aditia Syaprillah, and Rafiq Idris, "The Regulations for Management of Coastal Natural Resource Conflicts in Indonesia-Malaysia Border," *BESTUUR* 11, no. 2 (October 2023): 192, https://doi.org/10.20961/bestuur.v11i2.69205.

[67] Yee Jian Chew et al., "A Review of Forest Fire Combating Efforts, Challenges and Future Directions in Peninsular Malaysia, Sabah, and Sarawak," *Forests* 13, no. 9 (September 2022): 1405, https://doi.org/10.3390/f13091405.

Economic Zone (EEZ).[68] Securing adequate funding is a barrier to implementing Malaysia's coastal management methods and achieving its goals. The Malaysian government allocates only 1 percent of its Gross Domestic Product (GDP) to environmental management.[69] Moreover, there is a stark disparity in government revenue distribution, with the Federal Government contributing about 84 to 88 percent, while the thirteen states contribute only 12 percent. Four departments oversee fisheries management: The Department of Fisheries (DOF),[70] the Malaysian Fisheries Development Authority (FDAM),[71] the Royal Malaysian Navy, and the maritime police. The DOF is the primary regulatory body responsible for planning and implementing comprehensive management strategies, including establishing and maintaining marine parks. FDAM is tasked with improving the livelihoods of fishermen, as well as enhancing processing and value-added marketing. The other two agencies collaborate in overseeing and enforcing activities, particularly related to offshore fishing.

However, the Fisheries Act must comply with the provisions of the Fisheries Act 1985, which specifically governs and supervises fisheries management, including the preservation and growth of fisheries in Malaysian waters and the protection of marine mammals and turtles. Additionally, the act addresses the creation of marine parks and marine reserves. The National Agriculture Plan from 1992 to 2010 aimed to promote deep-sea fishing, aquaculture, and freshwater fishing. Malaysia implements various policies to manage and regulate fisheries development, encouraging offshore fishing activities, imposing temporary bans on coastal fishing licenses, enhancing monitoring and research of stocks approaching maximum exploitation levels, and centralizing enforcement efforts

---

[68] Wan Nur Ayuni Wan Ab Rashid, Junainah Mohamad, and Mohd Azhar Hamzah, "Total Economic Value of Marine Ecosystem Service in Malaysia: A Review," *Built Environment Journal* 21, no. 2 (July 2024), https://doi.org/10.24191/bej.v21i2.938.

[69] B. A. Hamzah and Jenny L. P. Wong, *Current Issues of Marine and Coastal Affairs in Malaysia*, Brill, January 1, 1997, https://doi.org/10.1163/157180897X00077.

[70] Mohd Hairil Mohd et al., "Commercial Fishery Assessment of Malaysian Water Offshore Structure," *Fisheries and Aquatic Sciences* 25, no. 9 (September 2022): 473–88, https://doi.org/10.47853/FAS.2022.e43.

[71] Siti Zulaiha Zolkaply, Thanakkumaran Supramaniam, and Muhamad Afiq Faisal Yahaya, "Growth Patterns, Status of Well-Being and Trend Analysis of Three Commercially Important Clupeid Species from Selangor Landing Port," *Semarak International Journal of Agriculture, Forestry and Fisheries* 1, no. 1 (May 2024): 19–29, https://doi.org/10.37934/sijaff.1.1.1929.

in coastal areas. They also undertake joint efforts to regulate unconventional fishing gear within designated areas to protect spawning habitats.[72]

Furthermore, the Malaysian government actively encourages stakeholder involvement in fisheries management. Recent programs focus on community-based management and its application in poverty alleviation methods in Malaysia. However, the government urges the public to enhance their involvement in enforcement, monitoring, control, and surveillance (MCS)[73] activities. The result is a strong centralist approach within CZM and a lack of agency capacity to provide support and facilitate collaboration.[74] Two departments are responsible for enhancing marine productivity and restoring coastal conservation and ecosystems. The Department of Fisheries (DOF) has initiated the deployment of artificial reefs and fish aggregating devices.[75]

Conclusion

Cross-border coastal land management in the digital era requires strong cooperation between nations and international institutions to protect vital marine ecosystems. The United Nations Convention on the Law of the Sea (UNCLOS) 1982 provides a critical legal framework for coastal states' sovereign rights and the protection of natural resources, while initiatives like the Coral Triangle Initiative (CTI) reflect collaborative efforts to implement UNCLOS principles with a focus on biodiversity conservation. However, several challenges remain in the management of coastal

---

[72] David McCann et al., "The Shortfin Devilray (Mobula Kuhlii) Aggregates at Pulau Si Amil, Sabah, Malaysia," *Pacific Conservation Biology* 28, no. 6 (2021): 532–37, https://www.publish.csiro.au/pc/pc21017.

[73] Klaudija Cremers, Glen Wright, and Julien Rochette, "Strengthening Monitoring, Control and Surveillance of Human Activities in Marine Areas beyond National Jurisdiction: Challenges and Opportunities for an International Legally Binding Instrument," *Marine Policy* 122 (December 2020): 103976, https://doi.org/10.1016/j.marpol.2020.103976.

[74] Carolina Bracho-Villavicencio, Helena Matthews-Cascon, and Sergio Rossi, "Artificial Reefs around the World: A Review of the State of the Art and a Meta-Analysis of Its Effectiveness for the Restoration of Marine Ecosystems," *Environments* 10, no. 7 (July 2023): 121, https://doi.org/10.3390/environments10070121.

[75] Rita Maulinda, Eddy Purnama, and Suhaimi Suhaimi, "Issuing Licence Procedure in Fixing Fisherman Fish Aggregating Device (FAD) (A Case Study in East Aceh District)," *International Journal of Multicultural and Multireligious Understanding* 11, no. 1 (January 2024): 346–53, https://doi.org/10.18415/ijmmu.v11i1.5317.

boundary lands.

Indonesia and Malaysia face similar challenges and opportunities, albeit with different approaches. In Indonesia, the digital transformation by the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) has increased transparency and efficiency in land management. However, policy adjustments are still needed to ensure effective coastal ecosystem protection. On the other hand, Malaysia, with its long coastline vulnerable to erosion, has implemented various laws and policies, including Coastal Zone Management (CZM), to address issues such as erosion and pollution. Despite both countries implementing stringent policies and advanced technology, challenges such as overlapping institutional authority, limited funding, and the need for stakeholder engagement remain obstacles. Therefore, the success of coastal boundary land management in both countries requires better integration of legal policies, environmental conservation, and digital technology to achieve sustainable outcomes.

References

Adhayanto, Oksep, and Yudhanto Satyagraha Adiputra. "Impact of Law No. 23 of 2014 on Local Regulations in Bintan Regency in 2015 (Study on Authority Transfer in the Field of Marine and Mining)." *Jurnal Selat* 2, no. 2 (2015): 296–314. https://ojs.umrah.ac.id/index.php/selat/article/download/93/92.

Aghazsi, Shofie Rudhy. "Land Tenure in Coastal Border Areas and Coastal Regions." *Lentera Hukum* 2 (2015): 117. https://heinonline.org/hol-cgi-bin/get_pdf.cgi?handle=hein.journals/lenth2&section=12.

Ahmad, Mohammad Zaki. "17 Malaysia's Offshore Fisheries." *Port, Maritime and Hinterland Development in Southeast Asia (UUM Press)*, UUM Press, 2014, 416. https://books.google.com/books?hl=id&lr=&id=tjwlCwAAQBAJ&oi=fnd&pg=PA416&dq=Ahmad,+Mohammad+Zaki.+Malaysia%E2%80%99s+Offshore+Fisheries.+Port,+Maritime+And+Hinterland+Development+In+Southeast+Asia&ots=1B-FKSstXC&sig=LUmRMbHHhtXXaWcJs61rdGL7L9o.

Ahmed, Arif. "International Law of the Sea: An Overlook and Case Study." *Beijing Law Review* 08, no. 01 (2017): 21–40. https://doi.org/10.4236/blr.2017.81003.

Bakung, Dolot Alhasni, Thanh Nga Pham, and Mohamad Hidayat Muhtar. "Disparity in the Doctrine of Promissory Estoppel between Indonesia, the Philippines and the United Kingdom."

Journal of Law and Legal Reform 5, no. 1 (January 2024): 267–304. https://doi.org/10.15294/jllr.vol5i1.2122.

Bakung, Dolot Alhasni, Muhammad Hero Soepeno, Herlyanty Yuliana Angraeny Bawole, Nirwan Junus, and Mohamad Taufiq Zulfikar Sarson. "Hukum Agraria (Teori Dan Praktek)." *Yayasan Drestanta Pelita Indonesia*, September 9, 2024. https://publisher.yayasandpi.or.id/index.php/dpipress/article/view/1610.

Boechat Albernaz, M., M. Z. M. Brückner, B. Van Maanen, A. J. F. Van Der Spek, and M. G. Kleinhans. "Vegetation Reconfigures Barrier Coasts and Affects Tidal Basin Infilling Under Sea Level Rise." *Journal of Geophysical Research: Earth Surface* 128, no. 4 (April 2023): e2022JF006703. https://doi.org/10.1029/2022JF006703.

Bracho-Villavicencio, Carolina, Helena Matthews-Cascon, and Sergio Rossi. "Artificial Reefs around the World: A Review of the State of the Art and a Meta-Analysis of Its Effectiveness for the Restoration of Marine Ecosystems." *Environments* 10, no. 7 (July 2023): 121. https://doi.org/10.3390/environments10070121.

Brown, Edward Duncan. "The International Law of the Sea." *(No Title)*, 1994. https://cir.nii.ac.jp/crid/1130000797753458816.

Butterworths, Lexis Nexis. *Parts Of This Chapter Build Upon And Update Materials Previously Chapter 5*. G. Triggs, International Law: Contemporary Principles And Practices, 2006.

Chew, Yee Jian, Shih Yin Ooi, Ying Han Pang, and Kok-Seng Wong. "A Review of Forest Fire Combating Efforts, Challenges and Future Directions in Peninsular Malaysia, Sabah, and Sarawak." *Forests* 13, no. 9 (September 2022): 1405. https://doi.org/10.3390/f13091405.

Cremers, Klaudija, Glen Wright, and Julien Rochette. "Strengthening Monitoring, Control and Surveillance of Human Activities in Marine Areas beyond National Jurisdiction: Challenges and Opportunities for an International Legally Binding Instrument." *Marine Policy* 122 (December 2020): 103976. https://doi.org/10.1016/j.marpol.2020.103976.

Commission On The Limits Of The Continental Shelf (CLCS). Division For Ocean, 201. *UN. Commission On The Limits Of The Continental Shelf (CLCS). Division For Ocean, 2012*.

Dedeng, Dedeng, Asuan Asuan, and Ricky Saputra. "Management Arrangements And Reclamation Of Coastal Areas And Small Islands." *Solusi* 22, no. 2 (May 2024): 184–96. https://doi.org/10.36546/solusi.v22i2.1137.

Dixon, Martin. *Textbook on International Law*. OUP Oxford, 2013.

Dowd, L. J. L. Anderson And T. Wilson (Eds.). The Changing Significance Of European Borders. London: Frank Cass, 200. *O'Dowd, L. J. L. Anderson And T. Wilson (Eds.). The Changing Significance Of European Borders. London: Frank Cass, 2003*.

Fajri Chikmawati, Nurul. "Management of Coastal Areas and Small Islands in Indonesia (in the Perspective of Legal Protection for the Economic Rights of Traditional Communities)." *ADIL: Jurnal Hukum* 4, no. 2 (May 2019): 396–417. https://doi.org/10.33476/ajl.v4i2.808.

Fox, Helen E., Carrie S. Soltanoff, Michael B. Mascia, Kelly M. Haisfield, Alfonso V. Lombana, Christopher R. Pyke, and Louisa Wood. "Explaining Global Patterns and Trends in Marine Protected Area (MPA) Development." *Marine Policy* 36, no. 5 (September 2012): 1131–38. https://doi.org/10.1016/j.marpol.2012.02.007.

Hamzah, B. A., and Jenny L. P. Wong. *Current Issues of Marine and Coastal Affairs in Malaysia*. Brill, January 1, 1997. https://doi.org/10.1163/157180897X00077.

Hasim, Hasim. "Mangrove Ecosystem, Seagrass, Coral Reef: Its Role in Self-Purification and Carrying Capacity in Coastal Areas." *International Journal Papier Advance and Scientific Review* 2, no. 1 (June 2021): 37–49. https://doi.org/10.47667/ijpasr.v2i1.93.

Howes, Michael, Peter Tangney, Kimberley Reis, Deanna Grant-Smith, Michael Heazle, Karyn Bosomworth, and Paul Burton. "Towards Networked Governance: Improving Interagency Communication and Collaboration for Disaster Risk Management and Climate Change Adaptation in Australia." *Journal of Environmental Planning and Management* 58, no. 5 (May 2015): 757–76. https://doi.org/10.1080/09640568.2014.891974.

IISD Earth Negotiations Bulletin. "Ramsar Convention on Wetlands." Accessed November 20, 2025. https://enb.iisd.org/negotiations/ramsar-convention-wetlands.

Initiative, Coral Triangle. "History of CTI-CFF." June 4, 2010. https://www.coraltriangleinitiative.org/About.

Kaba, Amadu Jacky. "A Survey of the Geographic Area, Altitude, Coastline, and Climate of African Countries and Regions: Implications for Africa's Development." *Journal of Sustainable Development* 17, no. 3 (May 2024): 57. https://doi.org/10.5539/jsd.v17n3p57.

Kapoor, S.K. "International Law and Human Rights [A Nutshell] (12th Ed.). India Central Law Agency. - References - Scientific

Research Publishing." 2008. https://www.scirp.org/reference/referencespapers?referenceid=1989855.

Khairi, Mawardi. "The Authority of the Provincial Government in Granting Permits for Water Management in Coastal Areas and Small Islands." *JATISWARA* 35, no. 3 (November 2020). https://doi.org/10.29303/jtsw.v35i3.262.

Khan, Arif. *Contemporary Issues on International Law and Human Rights: Bangladesh Perspective*. 2nd ed. Dhaka, Bangladesh: CCB Foundation, 2007.

Kirchner, Stefan. "The Subjects of Public International Law in a Globalized World." *Baltic Journal of Law & Politics* 2, no. 1 (January 2009). https://doi.org/10.2478/v10076-009-0005-9.

Kolossov, V. "Euroborderscapes: State of the Debate." *Report for the 7th Framework Programme of the European Commission*, 2012.

Latifah, Lala, and Yuni Marhayuni. "Bioremediasi Sebagai Implementasi Q.s Al-A'raf Ayat 56 Dalam Menangani Pencemaran Tanah." *Kaunia: Integration and Interconnection Islam and Science Journal* 19, no. 1 (May 2023): 23–28. https://doi.org/10.14421/kaunia.3780.

ld, Chris, "The Futility, Utility, and Future of the Biodiversity Conventi. *The Futility, Utility, and Future of the Biodiversity Convention,*. 1998.

Lestari, Puji. "Disaster Communication: An Important Aspect of Disaster Risk Reduction." *Yogyakarta: PT Kanisius*, 2018.

Lowe, A. Vaughan. "The Development of the Concept of the Contiguous Zone." *British Yearbook of International Law* 52, no. 1 (1981): 109–69. https://academic.oup.com/bybil/article-abstract/52/1/109/581574.

Malik, Abdul, and Abd Rahim. *Mangrove Blue Carbon in Support of Ecosystem Service Payment Initiative in Barru Regency South Sulawesi*. n.d. Accessed November 20, 2025. https://www.researchgate.net/profile/Abdul-Malik-51/publication/374617855_Policy_Brief_Karbon_Biru_Mangrove_Mangrove_Blue_Carbon_Dalam_Mendukung_Inisiatif_Pembayaran_Jasa_Ekosistem_di_Kabupaten_Barru_Sulawesi_Selatan/links/6526ec2b61c4044c404cc6b1/Policy-Brief-Karbon-Biru-Mangrove-Mangrove-Blue-Carbon-Dalam-Mendukung-Inisiatif-Pembayaran-Jasa-Ekosistem-di-Kabupaten-Barru-Sulawesi-Selatan.pdf.

Maulinda, Rita, Eddy Purnama, and Suhaimi Suhaimi. "Issuing Licence Procedure in Fixing Fisherman Fish Aggregating Device (FAD) (A Case Study in East Aceh District)." *International*

Journal of Multicultural and Multireligious Understanding 11, no. 1 (January 2024): 346–53. https://doi.org/10.18415/ijmmu.v11i1.5317.

McCann, David, Catherine McCann, C. M. Yew, Gonzalo Araujo, and B. Mabel Manjaji-Matsumoto. "The Shortfin Devilray (Mobula Kuhlii) Aggregates at Pulau Si Amil, Sabah, Malaysia." *Pacific Conservation Biology* 28, no. 6 (2021): 532–37. https://www.publish.csiro.au/pc/pc21017.

Mohammad, Nor Ashikin. *The Relationship Between Acceptance And Usage of Social Media With Learning Styles Among Secondary Students in The Gombak District*. May 1, 2017. https://www.academia.edu/90364651/Hubungan_antara_penerimaan_dan_penggunaan_media_sosial_dengan_gaya_pembelajaran_dalam_kalangan_murid_sekolah_menengah_daerah_Gombak.

Mohd, Mohd Hairil, Mohd Izzat Mohd Thiyahuddin, Mohd Asamudin A Rahman, Tan Chun Hong, Hii Yii Siang, Nor Adlina Othman, Azam Abdul Rahman, Ahmad Rizal Abdul Rahman, and Ahmad Fitriadhy. "Commercial Fishery Assessment of Malaysian Water Offshore Structure." *Fisheries and Aquatic Sciences* 25, no. 9 (September 2022): 473–88. https://doi.org/10.47853/FAS.2022.e43.

Nations Convention on Biological Diversity, June 5 ited, 1992, 31 ILM 818, entered into force Dec. 29, 1993. Mexico ratified the CBD on March 11, 1993, online: http://www.cbd.int/doc/legal/cbd-un-en.pdf (accessed June 4, 200. *United Nations Convention on Biological Diversity, June 5, 1992, 31 ILM 818, Entered into Force Dec. 29, 1993. Mexico Ratified the CBD on March 11, 1993, Online: Http://Www.Cbd.Int/Doc/Legal/Cbd-Un-En.Pdf (Accessed June 4, 2007*. June 4, 2007.

Pujiani, Resty Shelya. "Land Acquisition for Customary Law Communities: A Review of the Book Perlindungan Hak Atas Tanah Masyarakat Hukum Adat Dalam Pengadaan Tanah Untuk Kepentingan Umum." *Lex Scientia Law Review* 5, no. 1 (May 2021). https://doi.org/10.15294/lesrev.v5i1.46903.

Quintana-Alcantara, Carlos Eduardo. *Carbon Sequestration in Tidal Salt Marshes and Mangrove Ecosystems*. 2014. https://repository.usfca.edu/capstone/19/.

Rahman, Dr Mizanur. *International Law in a Changing World*. Dhaka: Palal prokashoni, 2008.

Sastrawan, Pasek Budi, Citra Dewi, and Fauzan Murdapa. "Land Value Zone Map Making With Web-Based Geographic Information System (Case Study: Desa Kota Gajah Timur,

Lampung Tengah)." *Datum: Journal of Geodesy and Geomatics* 1, no. 01 (April 2021): 55–61. https://doi.org/10.23960/datum.v1i01.1922.

Setiawan, Ikhsan. "Regulation of Access and Benefit Sharing Principles in the Convention on Biological Diversity (CBD) and Its Implementation in Indonesia." 2022. http://digilib.unila.ac.id/63147/3/SKRIPSI%20TANPA%20BAB%20PEMBAHASAN.pdf. https://dataindonesia.id/sektor-riil/detail/angka-konsumsi-ikan-ri-naik-jadi-5648-kgkapita-pada-2022.

Sharma, O. P. "India and the United Nations Convention on the Law of the Sea." *Ocean Development & International Law* 26, no. 4 (January 1995): 391–412. https://doi.org/10.1080/00908329509546068.

Simatupang, Rainhard Sumarto. "Determination of Marine Area Management Boundary between East Java Province and Bali Province Based on Law of the Republic of Indonesia Number 23 Year 2014." *Jurnal Teknik ITS* 5, no. 2 (December 2016): G199–205. https://doi.org/10.12962/j23373539.v5i2.17392.

Sircar, Muhammad Jamiruddin. *Glimpses of International Law*. Form International, 1997.

Starke, J. G. *Introduction to International Law*. 10th ed. New Delhi: Butterworths/Aditya Books, 1994.

Sumardiman, Adi F. "Some Basics About State Borders." *Indonesian Journal of International Law* 1, no. 3 (August 2021). https://doi.org/10.17304/ijil.vol1.3.560.

Unit, Biosafety. "Convention Text." Secretariat of the Convention on Biological Diversity, March 30, 2007. https://www.cbd.int/convention/articles/default.shtml?a=cbd-08.

Vaughan-Williams, Nick. *Border Politics: The Limits of Sovereign Power*. Edinburgh University Press, 2009. https://www.jstor.org/stable/10.3366/j.ctt1r29sk.

Wan Ab Rashid, Wan Nur Ayuni, Junainah Mohamad, and Mohd Azhar Hamzah. "Total Economic Value of Marine Ecosystem Service in Malaysia: A Review." *Built Environment Journal* 21, no. 2 (July 2024). https://doi.org/10.24191/bej.v21i2.938.

Widyastuti, Ratih. "Community Legal Protection and the Legal Position of Electronic Land Certificate in Land Registration Based on Notarial Assets." *International Journal of Multicultural and Multireligious Understanding* 8, no. 5 (May 2021): 207. https://doi.org/10.18415/ijmmu.v8i5.2642.

Zein, Yahya Ahmad, Aditia Syaprillah, and Rafiq Idris. "The

Regulations for Management of Coastal Natural Resource Conflicts in Indonesia-Malaysia Border." *BESTUUR* 11, no. 2 (October 2023): 192. https://doi.org/10.20961/bestuur.v11i2.69205.

Zhai, Tianlin, Jing Wang, Ying Fang, Yun Qin, Longyang Huang, and Ye Chen. "Assessing Ecological Risks Caused by Human Activities in Rapid Urbanization Coastal Areas: Towards an Integrated Approach to Determining Key Areas of Terrestrial-Oceanic Ecosystems Preservation and Restoration." *Science of The Total Environment* 708 (March 2020): 135153. https://doi.org/10.1016/j.scitotenv.2019.135153.

Zolkaply, Siti Zulaiha, Thanakkumaran Supramaniam, and Muhamad Afiq Faisal Yahaya. "Growth Patterns, Status of Well-Being and Trend Analysis of Three Commercially Important Clupeid Species from Selangor Landing Port." *Semarak International Journal of Agriculture, Forestry and Fisheries* 1, no. 1 (May 2024): 19–29. https://doi.org/10.37934/sijaff.1.1.1929.

Zulkarnain, Cut Sabina Anasya, and Maret Priyanta. "Local Government Authority In Spatial Planning Of Rural Areas: Implications Of Post-Employment Law Changes." *Bina Hukum Lingkungan* 5, no. 3 (2021): 416–31. http://www.bhl-jurnal.or.id/index.php/bhl/article/view/166.

***

Acknowledgment

Thank you to LP2M Gorontalo State University and the Faculty of Law for their support in preparing this research.

Funding Information

None

Conflicting Interest Statement

The authors state that there is no conflict of interest in the publication of this article.

History of Article

Submitted : August 26, 2025
Revised : May 12, 2025
Accepted : July 17, 2025
Published : November 17, 2025