

Addressing mangrove degradation in Littoral Bintan, Indonesia by applying the common consent principle: an education for Littoral states

Atika Thahira^{1*}, Oksep Adhayanto², Irman³, Hendra Arjuna¹

¹Law lecturer, Raja Ali Haji Maritime University, Indonesia

²Dean of Law, Raja Ali Haji Maritime University, Indonesia

³Head of Legal Science Study Program, Raja Ali Haji Maritime University, Indonesia

Abstract. Mangroves, referred to as green belts, have the potential to minimize environmental damage. Mangrove degradation causes marine environmental degradation, such as coastal erosion, which impacts both the coastal conditions and its users. This research employs empirical research methods and it is discovered that national data indicates that in the Kepulauan Riau Province, the mangrove forest is spread across an area of 68,417 hectares. However, approximately 37,000 hectares of the forest have been damaged or destroyed. The amount of damage inflicted is undoubtedly staggering, with the destruction of the mangrove forest region in the Riau Archipelagic Province exceeding half 55% of the total spread of mangrove forests. One of the locations most heavily impacted by damage to mangrove forests can be found on Bintan Island. Should this situation persist, it will lead to degradation of the marine environment, adversely affecting not only the coastal nation but also the end user. Thus, it is imperative to implement the principle of mutual agreement. Ramsar Convention 1971, UNCED 1992 which is part of the World Heritage Convention.

Keyword: Addressing, mangrove, degradation, Littoral, RAMSAR.

1 Introduction

As early as Stockholm Conference 1972. Indicated that environmental degradation impedes the fulfilment of internationally guaranteed human rights [1]. The sustainability of human life depends on the quality of a decent and healthy environment. To prevent pollution, humans must maintain and preserve their environment. Anthropocentric human thinking has a detrimental impact, or causes environmental pollution. [2]. Anthropocentrism has overlooked environmental justice. Environmental contamination includes sea pollution. The Millennium Ecosystem Assessment - the biggest assembly of experts in natural and social sciences ever dedicated to appraising the environment's condition - determined that

* Corresponding author: atikathahiraswim@gmail.com

roughly 60% of the ecosystem services scrutinized in the evaluation are being utilized in an unsustainable manner or have suffered substantial decline. A vast amount of funds are being spent as a consequence of these services' deterioration and loss, and this sum is increasing rapidly. Human impact on ecosystems has accelerated significantly and at a greater scale in the past 50 years, resulting in a significant and nearly inevitable loss of biodiversity on Earth.[3] One of the regions affected by environmental deterioration is mangrove land.

Wetlands, such as mangrove, are ecosystems that cover only 9% of the Earth's land surface. However, human development poses the greatest threat to wetlands. The first global agreement for safeguarding ecosystems, RAMSAR Convention was signed in Iran in 1971. The agreement employs a "listing" method where signatories designate wetland areas of global significance in ecology, botany, zoology, limnology, or hydrology.[3]

Mangrove reduction forest due to the impact of substantial development, notably in the coastal area of Riau Islands Province, which is becoming an increasingly pressing danger to these forests. This hazard is exacerbated by deforestation and the filling of mangrove regions, both of which are predominantly carried out by property developers for land clearance objectives. Mangrove are granted legal recognition under international law to preserve and supervise their ecosystem. This legislative safeguard strives to secure the long-term survival of mangrove forests and their crucial ecological services. They are governed by the Ramsar Convention and codified in other treaties RAMSAR, including the United Nations Conference on Environment and Development 1992, and the MAB Convention, Indonesia Legal Number 27 of 2007, revised by Indonesia Legal Number 1 of 2014, governs the administration of coastal regions and small islands in Indonesia. Mangrove forests encompass 16,530,000 hectares worldwide, with Indonesia accounting for 21% of the total, accounting 3,49% of the world's mangrove forests [4].

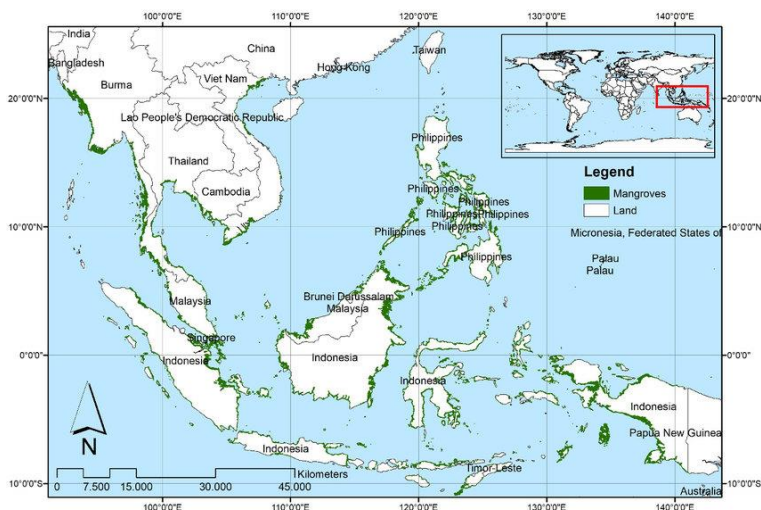


Fig. 1. The forest distribution is in accordance with the Mangrove Forest of the World (MFW) [5].

Official figures show that the entire area of mangrove forests in Riau Islands Province[6]. 37 thousand hectares of mangrove forests have been damaged in Riau Islands Province, representing 55% existing mangrove. This damage data is indeed alarming. Bintan Island is among the most affected areas [7].

The consequence of mangrove damage is that it increases the level of coastal degradation and decreases the catch volume of coastal, affecting the revenue of fishermen along the littoral [8]. Consequence of the degradation of mangrove forests in coastal Bintan, Indonesia, is the gradual shallowing of the water. As a result, research is being conducted to

find solutions, and the concept of shared agreement is being implemented as a component of a green belt to avoid maritime environmental deterioration and to provide education to the Littoral State.

2 Emperical Methodology

Methodology are specialised means of gathering and data analysing [9]. To collect the data in this research using empirical methods [10]. The objective of this research is to explore effective measures for addressing the degradation of the mangrove forest in the coastal area of Bintan, Indonesia. The study will comply with applicable standards and protocols, collecting information from different facets of the problem at hand. [11]. The study provides a descriptive formulation of current issues and proposes solutions and concepts to address the challenges investigated [10].

3 Result and Discussion

Geographically, nearly two-thirds of Bintan Island is encompassed by littoral. The mangrove while the landscape comprises highlands, lowlands, swamps, and watersheds. These lowlands, swamps, and watersheds are abundant in lush mangrove forests. [14]. Mangrove [15]. Bintan's mangroves are a unique ecosystem with steep slopes and bauxite resources. Because the island is two-thirds shoreline, development space is limited. As a result, land usage is migrating towards coastal areas, endangering mangroves. The endangered mangrove habitat is a plant that has several advantages for human existence[16].

Mangroves may resist saltwater intrusion through a number of mechanisms. decreasing CaCO_3 through root exudate, decreasing through organic matter breakdown in litter, managing tidal water flow through mangrove root, and enhancing land physical and chemical characteristics are among these ways. Mangrove density has an impact on sediment dispersion, sea level rise, and accretion levels. Mangrove trees have an essential role in coastal communities, particularly on Bintan Island. They provide physical, economic, socio-cultural, and environmental benefits to both humans and coastal ecosystems [17]. Mangrove forests are essential as a coastal green belt. Particularly on the island of Bintan.

Mangroves are an essential part of the ecosystem. They serve as silt traps, preventing coral reef degradation. Fish breeding is good in mangrove habitat. The mangrove woods provide food, timber, and charcoal to the people. Mangrove ecosystem degradation and fragmentation have been documented. This damage is the result of heavy cutting, pollution, and human activities [18]. Bintan littoral forms part of Indonesia's maritime territory and the Singapore Strait Littoral State. Other states also have access across the Strait. The Malacca and Singapore Straits facilitate international trade between West and East Asia and are a vital international sea lane, resulting in significant congestion in the region. The Straits of Malacca and Singapore (SOMS) are now one of the world's busiest maritime channels, accounting for a third of all global trade [11, 12]. Indicate a notable rise in maritime commerce in the area, which has emerged as a key driver of economic progress. Indonesia is a constituent of the Singapore, Johor, Riau development triangle, encompassing Singapore, Johor, and Riau/Riau Islands, with high potential for coastal expansion and development [21]. As seen below.



Fig. 2. Mangrove Logging (Mangrove logging that occurred in 2023 in Tokojo, East Bintan based on Batam Today.com, <http://m.batamtoday.com/berita187547-Izin-Belum-Keluar,-Mangrove-di-Tokojo-Bintan-Sudah-Dibabat.html>, diakses pada 27 Maret 2023, Pukul 00.01 WIB)

Siltation of marine habitats, especially the straits, can result from mangrove destruction. Environmentally, upstream and estuarine are linked. Coral reef, mangrove, and seaweed health are all intricately intertwined. Illegal fishing has the potential to damage coral reefs. The degradation of coral reefs and mangroves reduces fishing. Consultations between forestry and fisheries officials might pave the way forward by reducing littoral Use of techniques such as planting vegetation along rivers, imposing fishing limitations, or establishing buffer zones [22] Mangrove cutting and hoarding which destroys mangroves, promotes degradation.[23]

Shallowing will cause harm to the mangroves. Siltation significantly contributes to the degradation of mangrove ecosystems. Large particles become suspended and obstruct the roots, leading to oxygen deprivation and in severe instances the death of the trees. Siltation increases stress in terms of water and oxygen availability. Mangroves adapt to siltation through alterations in their morphology and physiology. Mangrove have unique anatomical features, such as fewer stomata and leaves. Certain adaptations are species-specific, leading to siltation-induced changes in the morphological and physiological characteristics of mangroves. This review paper investigates the morphological and physiological responses of mangrove vegetation to siltation. [18].

Mangroves are, as previously said, linked to the sea. Water siltation is obvious as a result of land degradation induced by mangrove logging. [1]. The human right to a decent and healthy environment is a topic of dispute. The declaration commits humankind to preserve their environment as much as possible for the benefit of future generations. The marine environment is an integral human resource that is susceptible to pollution. Pollution in the maritime environment has serious consequences for many elements of human existence. Maritime pollution has serious effects, most notably that governments must work together internationally and regionally to reduce the risk of environmental damage.

Due to the deforestation, many individuals in Indonesia and other developing nations have suggested implementing community-based forest management as a solution. [23]. Further, there common consent. The common consent thesis underlines basic binding authority of international law is built on the collective will of countries rather than the unilateral will of states. The notion of collective also known as common consent. When

countries follow international law, it shows that they are in accordance with it [24] as is Common Consent principle [25].

Mangroves are protected by Convention, RAMSAR, MAB [24]. The necessity to safeguard these ecosystems [25]. Mangroves are not only associated with terrestrial ecosystems, but also with aquatic environments. Therefore, their importance needs to be highlighted in mangrove regulation. States ought to collaborate to advance international regulation from activities within jurisdiction over areas outside their jurisdiction. The challenges of environmental conservation and augmentation at the international level should be tackled collectively by all, irrespective of size, on an equitable basis. Effective management, avoidance, mitigation, and elimination of detrimental environmental outcomes from all activities necessitate cooperation through bilateral or multilateral agreements that respect the sovereignty and interests of all nations. Therefore, implementing the principle of common consent, derived from international law, particularly through bilateral and multilateral agreements, can serve the interests and requirements of countries worldwide.

4 Conclusion

Mangrove forests, found in nearly two-thirds of Bintan Island, are vital for coastal ecosystems and provide numerous benefits such as sediment traps, coral reef protection, and fish breeding. However, mangrove deterioration, particularly cutting, affected marine siltation, impacting the Malacca and Singapore Strait, a major shipping lanes. The region has significant development potential, with projections showing a significant increase in marine trade. Mangrove logging, which destroys mangroves, promotes coastal erosion and contributes to the decline of mangrove ecosystems. The Stockholm Declaration of 1972 and emphasize the importance of preserving the environment for future generations. RAMSAR, MAB programme protect mangroves. Address this issue, mangrove conservation regulations should be implemented. States should work together to develop international legislation on pollution accountability and compensation. Effective management, avoidance, mitigation, and elimination of detrimental environmental outcomes necessitate cooperation through bilateral or multilateral agreements.

Reference

1. Alexandre Kiss & Dinah Shelton, *Guide To International Environmental Law* (Martinus Nijhoff Publisher, Leiden, 2007)
2. H. Kopnina, H. Washington, B. Taylor, and J. J Piccolo, *J. Agric. Environ. Ethics* **31**, 109 (2018)
3. N. Ved, *International Environmental Law and Policy for the 21st Century* (Martinus Nijhoff Publisher, Leiden-Boston, 2013)
4. Kementerian Kelautan dan Perikanan, (n.d.)
5. A. Fauzi, A. Sakti, L. Yayusman, A. Harto, L. Prasetyo, B. Irawan, M. Kamal, and K. Wikantika, *Forests* **10**, (2019)
6. Pemerintah Provinsi Kepulauan Riau, (n.d.)
7. Y. E. Sahputra, (2021)
8. Y. Rinika, A. R. Ras, B. A. Yulianto, P. Widodo, and H. J. R. Saragih, *Pendidikan XI*, 170 (2023)
9. A. A. R. dan K. Alharthi, *Int. J. Educ. Investig.* **3**, (2016)

10. H. Salim HS And Erlies Septiana Nurbani, *Penerapan Teori Hukum Pada Penelitian Tesis Dan Disertas* (PT Raja Grafindo Persadaersada, Jakarta, 2013)
11. Peter Mahmud Marzuki, *Penelitian Hukum* (Kencana, Jakarta, 2014)
12. M. L. cohen dan K. C. Olson, *Legal Research in a Nutshell* (West Academic, United States of America, 2021)
13. M. Mahpur, Repos. Univ. Islam Negeri Malang 1 (2017)
14. C. Karya, *Profil Provinsi Kepulauan Riau* (Kementerian Pekerjaan Umum Dan Perumahan Rakyat, Jakarta, 2010)
15. A. P. CAHYANINGSIH, A. K. DEANOVA, C. M. PRISTIAWATI, Y. I. ULUMUDDIN, L. KUSUMAWATI, and A. D. SETYAWAN, *Int. J. Bonorowo Wetl.* **12**, 12 (2022)
16. D. C. M. Beki Utomo, Sri Budiastuti, *J. Ilmu Lingkung.* **15**, (2017)
17. P. Panwar, G. Shukla, J. A. Bhat, and S. Chakravarty, *Land Degradation Neutrality: Achieving SDG 15 by Forest Management* (Springer, Germany, 2022)
18. N. Tahira Noor, Batool, R. Mazhar, and N. Ilyas, *Eur. Acad. Res.* **II**, Online document (2015)
19. Nurwahidin, *J. Marit. Indones.* **8**, 189 (2020)
20. M. S. Kementerian Perhubungan Direktorat Jenderal Perhubungan Laut Direktorat Kepelabuhanan, Jabatan Laut Malaysia, *Safe Passage the Straits of Malacca and Singapore* (Bimco, 2015)
21. X. Xiaodong, *J. Marit. Stud. Natl. Integr.* **3**, 1 (2019)
22. I. & M. A. Project-Indonesia, *Kebijakan Untuk Mangrove* (International Union for Conservation of Nature and Natural Resources & Mangrove Action Project Reproduksi, United Kingdom, 2014)
23. Y. Mazda, M. Magi, H. Nanao, M. Kogo, T. Miyagi, N. Kanazawa, and D. Kobashi, *Wetl. Ecol. Manag.* **10**, 1 (2002)
24. Iassa oppenheim, *International Law: A Treatise* (Longmans, Green & Co., New York, 1905)
25. H. Oguri, *SSRN Electron. J.* (2018)