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Mangrove tourism management strategies and policies towards sustainable mangrove tourism: a comparison study between Mexico and Indonesia

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ABSTRACT
Background: Sustainable mangrove tourism is important to maintain mangrove ecosystems and ecosystem services that are vital to people's livelihoods, especially in the face of economic development pressures from the tourism sector. Mexico and Indonesia have significant mangrove cover and face rapid mangrove loss due to anthropogenic activities, including tourism. **Methods**: This research used a literature review method, reviewing literature and reliable sources, especially those published in 2023. Policies related to sustainable mangrove tourism in Mexico and Indonesia were analyzed to identify and compare current policies, and evaluate differences, similarities, and lessons learned that can be applied in Indonesia to support sustainable tourism. **Results**: The study found that the two countries are similar in terms of government control of mangroves, conflicting policies involving multiple interests, and awareness of the importance of involving local communities in mangrove management. Significant differences were found in the history of mangrove area utilization, coordination between government agencies, and the effectiveness of the monitoring system in Mexico, which is more advanced compared to Indonesia. **Conclusion**: Indonesia can learn lessons from Mexico regarding increased community participation in mangrove management, development of a more integrated monitoring system, and improved coordination between government agencies. Adopting these practices can improve the effectiveness of sustainable mangrove tourism management policies in Indonesia, ensuring the preservation of mangrove ecosystems while supporting economic growth through the tourism sector.

KEYWORDS: comparison; environmental monitoring; mangrove conservation; sustainable; tourist.

1. Introduction

There are at least 93 countries with mangrove tourism worldwide, with most mangrove attractions concentrated in the Americas and the Caribbean (Spalding & Parrett, 2019). Mangroves or mangrove forests are one form of coastal ecosystem that has benefits for the coastal ecosystem itself and humans in particular through its various environmental services. For example, in the regulatory function as a protector of coastal areas, supporting functions as a provider of spawning habitat for fishery commodities, to cultural functions as a provider of recreational rides (Kuenzer, et al., 2011). Mangrove tourism is a form of nature-based tourism, namely tourism that has nature as its main attraction or as a context for activities whose main attraction is still natural or not much modified (Silva, Silva & Vieira, 2023). Therefore, the preservation of mangroves is important for the existence of tourism itself. The protection and maintenance of

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mangroves is promoted as one of the activities that need to be increasingly carried out, given the importance of the various benefits of mangroves and the high rate of mangrove reduction to date due to anthropogenic and natural threats (Goldberg, et al., 2020; United Nations Environment Programme, 2023).

The mangrove tourism industry has been identified globally as causing adverse social and environmental impacts, including lack of empowerment of coastal communities, mangrove conversion and deforestation, and pollution from sewage and eutrophication (Ferreira, et al., 2022). However, tourism is also an increasingly popular use of mangroves and has been observed to generate high monetary value among the various ecosystem services that mangroves provide (Spalding & Parrott, 2019). There is an increasing trend in the popularity of mangrove tourism, which is expected to coincide with the increasing trend towards nature-based tourism for nature protection. This relates to its potential to support the sustainable improvement of people's livelihoods while conserving mangrove ecosystems and their environmental services by maintaining the sustainability and functionality of mangrove ecosystems (Spalding & Parrott, 2019; Silva, Silva & Vieira, 2023; Susilo, Koestoer & Takarina, 2023).

Research on nature-based tourism, especially in protected areas, is increasing because it is considered a way to protect the natural environment and its ecosystem services while improving the socio-economic conditions of local communities (Silva, Silva & Vieira, 2023). The function of tourism is in line with the concept of sustainable development, which is defined by the United Nations as development that is able to meet the needs of the present without compromising the ability of future generations to meet their needs, consisting of three pillars: economic, environmental and social (United Nations, 2023). Furthermore, the literature explains that sustainable development in the tourism sector can include efforts to manage resources, especially natural resources, aspirationally and pragmatically, and can cover individual business interests to sustainable development in the wider socio-ecological system (Espiner, Orchiston, & Higham, 2017). If done correctly, the development of natural tourism, including mangrove tourism, can generate positive reciprocity on environmental, economic, and social aspects (Ahmad & Suratman, 2021; Silva, Silva & Vieira, 2023).

Mexico and Indonesia are among the countries with a number of mangrove recreation destinations, with Mexico outnumbering Indonesia with at least 318 attractions and Indonesia with at least 79 (Spalding & Parrett, 2019). One mangrove attraction in Mexico that still has mangroves as its dominant attraction was even recorded as bringing in up to 41,000 visitors in 2001, the 11th highest number of visitors among the world's mangrove attractions until 2016 (Spalding & Parrett, 2019). Indonesia and Mexico are also among the countries with the most mangrove area and mangrove area loss in the world, although Indonesia still has a higher rate of mangrove loss than Mexico. Based on 1996-2020 data, Indonesia has the world's first largest mangrove cover area loss of -5.56% compared to Mexico, which has the world's fourth largest mangrove cover area loss of -4.26% (United Nations Environment Programme, 2023).

Mangrove ecosystems in Indonesia and Mexico face the greatest threat from anthropogenic influences, including a major influence from aquaculture due to its high economic value. In addition, Mexico also faces major threats from urbanization and settlement, including tourism settlements and infrastructure as cruise ship ports are built (Goldberg, et al., 2020; Bhowmik, et al., 2022; United Nations Environment Programme, 2023). However, mangrove areas in Mexico and Indonesia have the potential to be restored to mangrove ecosystems, particularly in former aquaculture and disaster areas but may also include areas of mangrove clearance due to tourism activities, in line with global goals related to mangrove areas (Leal & Spalding, 2022; Castro, 2023). In line with global goals, increased mangrove conservation efforts are thought to be one of the reasons for the downward trend in mangrove degradation due to anthropogenic threats (Goldberg, et al., 2020).

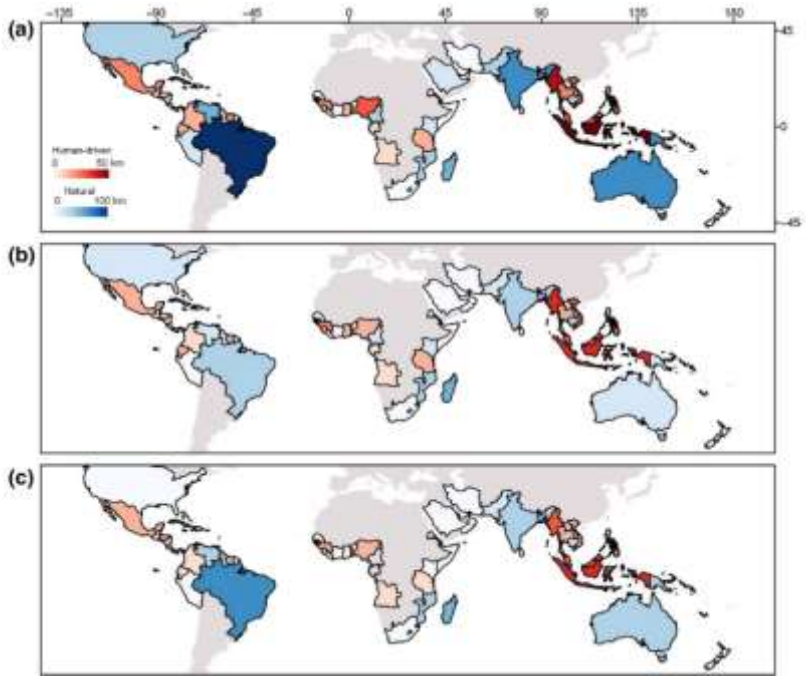

Fig. 1 Map of countries with mangroves and their greatest threats. Based on 16 years of data, the condition of mangroves in Mexico is similar to that of Indonesia, with the greatest threat from anthropogenic influences. (a) 2000-2005 map, (b) 2005-2010 map, (c) 2010-2016 map. (Source: Goldberg, et al., 2020)

Policymaking is still considered one of the ways that need to be developed to further prevent the degradation and loss of mangrove ecosystems (Leal & Spalding, 2022). Public policy is one of the important tools to be researched and developed in order to better manage mangroves to preserve and maximize their functions and benefits. Mangrove governance that supports mangrove sustainability can involve science-based implementation and utilization of networks (Leal & Spalding, 2022). Policies from global knowledge and circumstances also still need to be regularly adapted to local contexts to achieve adequate mangrove conservation that can actually be implemented according to the objectives of policy implementation, including tourism (Goldberg, et al., 2020; Leal & Spalding, 2022; United Nations Environment Programme, 2023; Acosta-Velázquez, et al., 2023).Few previous studies have addressed the impact of institutions or policies on social issues or other drivers of mangrove destruction specifically, but existing studies on mangrove management can reveal existing policies that have been examined in other studies (Susilo, Koestoer & Takarina, 2023).

Previous research on policies related to mangrove management and protection in Southeast Asia shows similarities between policies in these countries, such as the importance of involving consideration of the roles of various stakeholders, the contradiction of mandates between some policies, and the need for enforceable policies for implementation, as well as the need for research on the relationship between institutions or policies as drivers of mangrove land management and protection (Susilo, Koestoer & Takarina, 2023). The literature shows that the use of mangrove land for economic activities is driven by policy-reinforced land use plans, including for development in the tourism sector (Acosta-Velázquez, et al., 2023; Susilo, Koestoer & Takarina, 2023). In addition, in line with the other pillars of sustainable development, namely social and environmental, it is also necessary to consider the role of local communities because the role and involvement of these local communities will better ensure the sustainability of mangroves (Espiner, Orchiston, & Higham, 2017; United Nations, 2023; Susilo, Koestoer & Takarina, 2023).

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management can reveal existing policies that have been examined in other studies (Susilo, Koestoer & Takarina, 2023). The absence of literature reviews that specifically discuss policies related to sustainable mangrove management for mangrove tourism activities can hinder the achievement of sustainable mangrove tourism. Therefore, this study aims to identify and compare policies related to mangrove tourism management in Mexico and Indonesia, and present lessons learned for the development of more effective policies in Indonesia. Thus, this research is expected to contribute to mangrove conservation efforts and support economic development through sustainable tourism.

2. Methods

In This research uses the literature study method, especially the latest literature and reliable internet sources (organization, United Nations, government web pages) especially those published in 2023 to enable the identification and comparison of current policies that are closely related to sustainable mangrove tourism activities in Mexico and Indonesia. Then, a comparison and analysis of the policies was conducted to obtain information on the differences, similarities, and lessons learned from policies related to sustainable mangrove tourism in Mexico that can be developed for implementation in Indonesia to further support sustainable tourism. Results are presented descriptively.

Mexico has the eighth largest mangrove area in the world, covering 3.685% of the world's mangroves (Bibi et al., 2019). These mangroves are spread across several municipalities of Mexico's coastal areas (Figure 2). Mangroves in Mexico are legally owned by the government, but are located on land with government, private, and public ownership (Kumagai et al., 2020). Mangrove policies in Mexico are generally top-down and include one of the best long-term mangrove monitoring systems in the world, with data collected every 5 years (Kumagai et al., 2020). Regulations can be managed through coordination from municipal to national levels (Rivera-Arriaga et al., 2019). However, in Mexico, coastal area management has also been common using a community participation approach to improve the quality of life as well as nature conservation (United Nations Environment Programme, 2023). Other programs that have been implemented related to mangrove management include research on property rights, resource management institutions, access to credit and resources, and ways to support the livelihoods of vulnerable communities without destroying nature, as well as mangrove restoration initiatives around tourism areas (United Nations Environment Programme, 2023; Castro, 2023).

Tourism is one of the biggest drivers, alongside general urbanization, agriculture and aquaculture, of mangrove land conversion in some areas, for example in the Yucatan Peninsula, following rapid economic growth in the tourism sector (Figure 3), for the construction of hotels and roads (Bhowmik, et al. 2022; United Nations Environment Programme, 2023; Castro, 2023). The tourism sector has contributed to 6% of Mexico's Gross Domestic Product (GDP) in 2020, with the services sub-sector (hotel and accommodation provision) accounting for 90% of that proportion, followed by package travel and other activities (UNESCO, 2023).

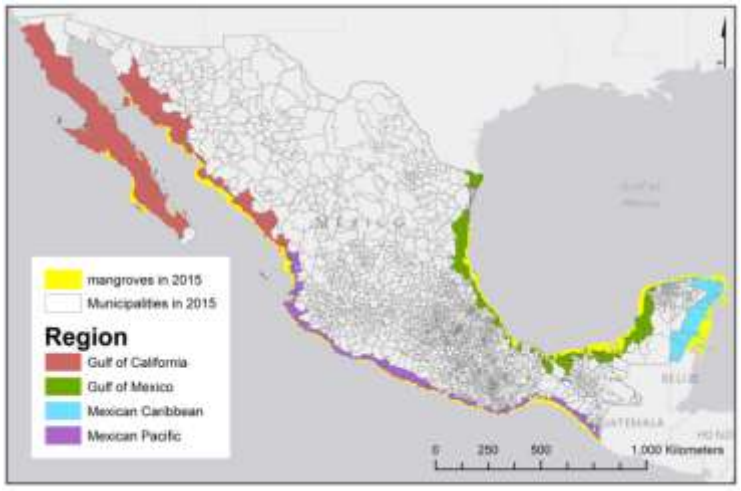

Fig. 2 Map of mangrove area and cover in Mexico
(Source: Kumagai et al., 2020)

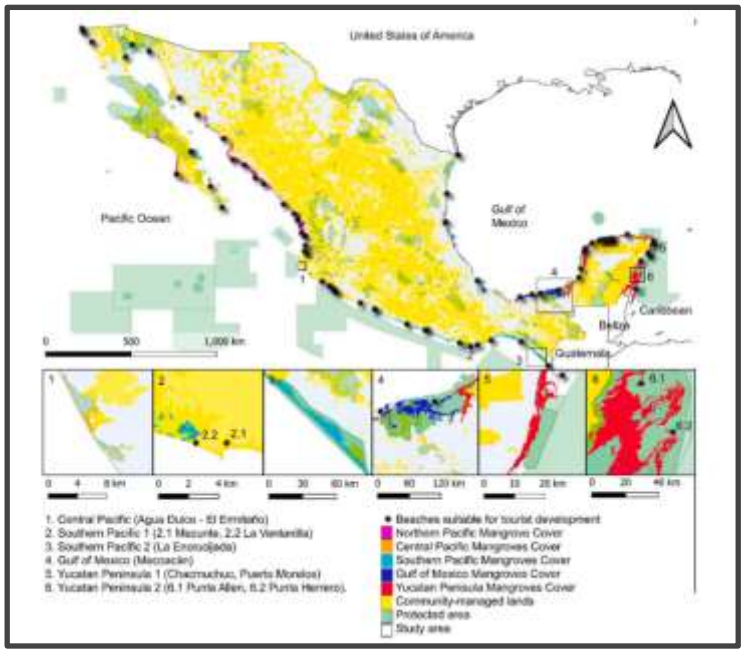

Fig. 3 Map of mangrove areas, protected areas, and potential beaches for tourism activities in Mexico
(Source: Vargas-del-Río & Brenner, 2023)

Indonesia is the country with the largest mangrove cover in the world, with a mangrove cover of 42,278 km2 or 25.79% of the world's mangrove area (Bibi et al., 2019). Mangroves in Indonesia are scattered in various coastal areas of Indonesia (Figure 4). The regulation of mangroves in Indonesia includes a top-down mechanism with regulations at the national level to the municipal/district level (Quevedo, et al., 2022). In general, mangrove management in Indonesia can include protecting and improving mangrove functions and values, integrating mangrove ecosystem management, strengthening political commitment and law enforcement through the involvement of all stakeholders and promoting research and innovation (Arifanti, et al., 2022).

Pariwisata telah menyumbang hingga 15% dari GDP Indonesia pada tahun 2015, dengan pariwisata pesisir diperkirakan menyusun 6-22% dari persentase GDP tersebut (OECD, 2021). Dengan demikian, Indonesia memiliki potensi pemanfaatan pengembangan

pariwisata mangrove (Yusuf, & Kurniasih, 2023). Namun demikian, mangrove di Indonesia belum banyak dimanfaatkan untuk kegiatan pariwisata karena terbatasnya kemampuan mengelolanya (Quevedo, et al., 2022). Pariwisata dan pembangunan area pesisir secara umum telah diidentifikasi sebagai salah satu pendorong terbesar degradasi dan deforestasi mangrove hingga area pesisir di Indonesia (Quevedo, et al., 2022).

Fig. 4 Map of mangrove areas in Indonesia (2021)
(Source: Nurhati & Murdiyarso, 2023)

3. Results and Discussion

Based on the literature study, several public policies that have been enacted and can be related to sustainable mangrove tourism were found. These policies are compared in terms of similarities and differences. The results of the analysis of these policies resulted in several lessons that can be taken from Mexico to be applied in Indonesia.

3.1 Similarities between public policies on sustainable mangrove tourism in Mexico and Indonesia

In general, mangrove areas in Mexico are officially controlled by the government (Kumagai et al., 2020). However, Mexico's 1917 constitution establishing communal lands in 50% of Mexico's forests has protected forest areas but also under-empowered local communities, making the issue of community welfare in mangrove forests vulnerable to external influences. As the post-World War II agrarian constitution changed, particularly in favor of economic growth and allowing activities in areas surrounding communal lands, such as the "sun-and-sand" tourism policy, mangrove management by local communities shifted to cooperative activities or sales to companies for land uses that support

industrialization and extractive activities caused by tourism development. Meanwhile, there were further developments in neoliberal Mexico due to international treaties adopted by Mexico into its national legislation for mangrove conservation, which led to the creation of protected areas and management that was more nature-based than extractive. This has led to conflicting policies, which encourage economic growth on the one hand, and conservation on the other (Vargas-del-Río & Brenner, 2023). These conflicting policy directives are driven from several sectors that deal with mangrove areas, coastal areas, and the tourism sector. Weak environmental authority institutions further undermine the situation as they require a lot of resources to be able to exercise their powers related to mangrove area protection such as monitoring and sanctioning. As such, tourism business practices that disregard environmental permits can also go unchecked. Policy conflicts are common in developing countries (Vargas-del-Río & Brenner, 2023).

Similarly, policy direction for mangrove area management in Indonesia has not focused on sustainable mangrove tourism in particular (Arifanti, et al. 2022; Yusuf & Kurniasih, 2023). Mangrove management in general can have conflicting policy directives because it is managed by several government agencies (Arifanti, et al. 2022). In addition, implementation on the ground has not been able to prevent mangrove deforestation and degradation as stipulated in Indonesian legislation, possibly due to agency capabilities as well as low public awareness of mangrove conservation (Arifanti, et al. 2022; Quevedo, et al., 2022).

This balance between economic development and conservation has been accompanied by efforts to empower local communities to manage their own mangrove areas with tourism practices such as community-based tourism and nature-based tourism that seek to minimize environmental impacts (United Nations Environment Programme, 2023; Vargas-del-Río & Brenner, 2023). Mexico is also among the countries that have successfully implemented co-management in mangrove management in general (Arifanti, et al. 2022).

Due to the increased awareness of protecting mangrove areas, there has also been an increase in tourism research and implementation in Indonesia related to ecotourism principles, for example the establishment of the Ministry of Environment and Forestry regulation P.13/MENLHK/SETJEN/KUM.1/5/2020 on the development of tourism infrastructure and facilities in forest areas which continues several policies related to ecotourism in general from 2009 (Quevedo, et al., 2022; Yusuf & Kurniasih, 2023). Indonesia has also implemented strategies that have been found to increase the capacity of communities to realize the importance of and be able to manage mangrove tourism sustainably. Such mangrove tourism management includes the establishment of co-management, through the formation of specialized management bodies in the regions and ongoing coordination based on mutual trust in the common need to manage mangroves in a certain way. Some other forms of management similar to the implementation in Mexico include community-based management (Turisno, et al. 2021; Yusuf & Kurniasih, 2023; Hikmawan & Iqbal, 2023). It has been shown that local communities are potentially knowledgeable about how to properly utilize mangroves in their local area and have a long-term desire to reap these benefits in both Mexico and Indonesia (Arifanti, et al. 2022; del Carmen Peña-Puch et al., 2023). However, empowering and increasing community participation still requires a lot of collaboration with parties other than the government (NGOs, academia) in its implementation due to the limited capacity of the government (Rivera-Arriaga et al., 2019; Arifanti, et al. 2022; Cordon et al., 2023). It is estimated by Vargas-del-Río & Brenner (2023) that regulation by the government in Mexico is still a challenge for empowering communities in mangrove areas because it is related to ownership and utilization rights by these communities so it needs to be reconsidered in the development of further mangrove management policies.

3.2 Differences between public policies on sustainable mangrove tourism in Mexico and Indonesia

When compared between policies in Mexico and Indonesia, there are several differences that can be seen from several aspects. The first difference is the protection of mangrove areas and the recognition of their importance for community use through Mexico's 1917 Constitution on the establishment of communal lands in 50% of Mexico's forests (Vargas-del-Río & Brenner, 2023). It is thought that this policy has influenced Mexican society's perception of mangrove area use to be more supportive of mangrove area maintenance. This is because in the communal lands system, local communities traditionally manage land because it is closely related to the livelihoods and identity of local communities and land management can have a flexible and pragmatic nature that accommodates the local natural, socio-political and demographic environment (Antonio & Griffith-Charles, 2019). Meanwhile, in Indonesia, community participation in mangrove area management has not yet introduced mechanisms that have fully allowed community management (Friess et al., 2016; Arifanti, et al. 2022). This is thought to contribute to the reason for utilization without attention to sustainable use by the community for tourism and other activities.

Second, the mangrove monitoring system. The mangrove monitoring system implemented in Mexico, the Mexican Mangrove Monitoring System (SMMM) managed by the National Commission for the Knowledge and Use of Biodiversity (CONABIO), is the best long-term monitoring system in the world because it uses data updates every 5 years and uses remote sensing monitoring systems to inform more effective mangrove management policies (Kumagai et al., 2020; Rodríguez-Zúñiga, 2022). This system has integrated not only data on the loss and gain of mangrove areas from an ecological aspect, but also data on local socio-economic characteristics as well (Rodríguez-Zúñiga, 2022). Meanwhile, Indonesia has a monitoring system that is still not integrated with socio-economic aspects with ecological aspects or updated regularly. Indonesia's monitoring system was only established in 2022 by the National Research and Innovation Agency and still includes monitoring of mangrove cover areas only (National Research and Innovation Agency, 2023).

Finally, there is the regulation by government agencies in mangrove area management. Government agencies as the main authority in mangrove area management are thought to be more effective than in Indonesia. The nature of mangrove tourism, which intersects land, sea, social development, economic growth, and conservation, means that mangrove tourism can be managed with the interests of various sectors. Meanwhile, regulations that reside in several agencies and overlap can be an obstacle for prospective mangrove tourism destination managers to fulfill the rules of sustainable mangrove tourism as intended by existing laws (Evans, 2017; Malik, Rahim & Sideng, 2019).

Information on mangroves in Mexico is collected through the SMMM by the National Commission for the Knowledge and Use of Biodiversity (CONABIO), an organization established specifically by the Mexican government to recognize the importance of biodiversity and ecosystem conservation, including mangroves, and to empower communities to conserve mangroves in tourism sites (Rodríguez-Zúñiga, 2022). Despite the growing influence of the economic development sector, a monitoring system integrated with funding by several other government agencies for CONABIO programs is thought to have enabled better mangrove conservation to take place (Rodríguez-Zúñiga, 2022). In addition, the main government agency managing the development of coastal areas is housed in the inter-ministerial Commission for the Sustainable Management of Seas and Coasts (CIMARES) (United Nations, 2023). The agency functions to establish and coordinate and communicate with several agencies such as the Ministry of the Navy, SEMARNAT (Government) Ministry of Energy, SENER (Government) Ministry of Economy, SE (Government) Ministry of Agriculture and Rural Development, SEMAR (Government)

Ministry of the Environment and Natural Resources, SADER (Government) Ministry of Tourism, SEGOB (Government) Ministry of Agrarian, Territorial and Urban Development, SECTUR (Government) Ministry of Interior, and SEDAT (Government) in terms of compliance and updating of Mexico's established coastal management plan, the Mexican National Policy for Seas and Coasts (PNMC) (United Nations, 2023). Although still considered inefficient and ineffective, especially in enforcing non-conforming uses of coastal areas (Rivera-Arriaga et al., 2019), it is thought that coordination could potentially be better given the need for strong inter-stakeholder coordination and that a legal instrument could help improve coordination (Friess et al., 2016).

Indonesia has a sectoral approach to mangrove management. Policies on mangrove area management are accounted for by several different institutions and can overlap, especially if there is no good implementation and with the need to strengthen legal awareness by the people who use mangroves and the strength of the agency that is generally responsible for the conservation of mangrove areas, namely the Ministry of Environment and Forestry for the implementation of regulations in the field (Arifanti, et al. 2022). Meanwhile, coastal and marine management has overlapping interests between the Central Bureau of Statistics (BPS), Ministry of Defense, Ministry of Energy and Mineral Resources, Ministry of Forestry, Ministry of Finance, Ministry of Foreign Affairs, Ministry of Home Affairs, Ministry of Law and Human Rights, Ministry of Fisheries and Marine Affairs, National Planning and Development Agency, National Research and Innovation Agency, Ministry of Tourism and Creative Economy, and Ministry of Transportation (OECD, 2021; Turisno, et al. 2021). The only existing mangrove area management integration in Indonesia is through the coastal area management planning and zoning policy (RZWP3K), which consists of conservation, transportation, special national interest and public use designations (OECD, 2021).

3.3 Lessons from mangrove tourism public policy in Mexico for implementation in Indonesia

In general, policies on mangrove tourism in Mexico have several advantages over those in Indonesia that can be an input for regulation in Indonesia. Policies can be established for how tourism can be implemented, including with the involvement of stakeholders and community empowerment at the location, with regulations protecting mangrove areas according to their hydro-ecological characteristics (Arifanti, et al. 2022; Vargas-del-Río & Brenner, 2023). The regulatory umbrella of mangrove area protection can also ensure that mangrove area use is in line with other possible mangrove management developments, such as for blue carbon and restoration (Herrera-Silveira et al., 2020). Conflicting interests can be harmonized through the establishment of coordination channels between government agencies as the highest authority for mangrove area management (Vargas-del-Río & Brenner, 2023), although it can be implemented through various collaborations such as with non-governmental, private and international organizations to continue to increase the capacity and awareness of the community on the potential and importance of sustainable mangrove tourism management (Friess et al., 2016; Quevedo, et al., 2022), as well as diversification of tourism activities (Cordon et al., 2023). Apart from the regulation of sustainable mangrove tourism implementation, implementation monitoring also needs to be implemented more adequately which is indeed being developed in Indonesia and is a good step in making policy decisions more informed and in accordance with the conditions and capacities of each location.

4. Conclusions

Sustainable mangrove tourism is a concept that can be applied so that the tourism asset itself, the mangrove, as well as the important ecosystem services that benefit the people of a country, can be preserved in the face of economic development pressures from the tourism sector. This research has examined the policies of Mexico and Indonesia, countries with the largest mangrove cover and the fastest rate of mangrove loss due to anthropogenic pressures including the development of mangrove areas for tourism. There are several similarities between mangrove tourism management policies in Mexico and Indonesia, including government control, conflicting policy directives covering multiple interests, and awareness of the importance of local community involvement and management. There are also some differences that can then be lessons learned by Indonesia regarding mangrove tourism management policies from Mexico due to some of Mexico's advantages that are not present in Indonesia, especially related to the history behind the conditions of utilization of mangrove areas, the establishment of coordination between government agencies, effective implementation monitoring.

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Author Contribution

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Conflicts of Interest

The authors declare no conflict of interest.

References

Ahmad, Y., & Suratman, M. N. (2021). The Roles of Mangroves in Sustainable Tourism Development. Mangroves: Ecology, Biodiversity and Management, hlm. 401-417. https://doi.org/10.1007/978-981-16-2494-0_17

Acosta-Velázquez, J., Ochoa-Gómez, J., Vázquez-Lule, A., & Guevara, M. (2023). Changes in mangrove coverage classification criteria could impact the conservation of mangroves in Mexico. Land Use Policy, 129, 106651. https://doi.org/10.1016/j.landusepol.2023.106651

Arifanti, V. B., Sidik, F., Mulyanto, B., Susilowati, A., Wahyuni, T., Yuniarti, N., Aminah, A., Suits, E., Karlina, E., Suharti, S., Pratiwi, Turjaman, M., Hidayat, A., Rachmat, H. H., Imanuddin, R., Yeny, I., Darwiati, W., Sari, N., Hakim, S. S., Slamet, W. Y. & Novita, N. (2022). Challenges and strategies for sustainable mangrove management in Indonesia: a review. Forests, 13(5), 695. https://doi.org/10.3390/f13050695

Antonio, W., & Griffith-Charles, C. (2019). Achieving land development benefits on customary/communal land. Land Use Policy, 83, 124-133. https://doi.org/10.1016/j.landusepol.2019.02.005

Badan Riset dan Inovasi Nasional. (2023). https://www.brin.go.id/news/115756/monmang-aplikasi-berbasis-ai-untuk-memantau-hutan-mangrove, 12 Desember 2023, pk. 23.03 WIB.

Bhowmik, A. K., Padmanaban, R., Cabral, P., & Romeiras, M. M. (2022). Global mangrove deforestation and its interacting social-ecological drivers: A systematic review and synthesis. Sustainability, 14(8), 4433. https://doi.org/10.3390/su14084433

Bibi, S. N., Fawzi, M. M., Gokhan, Z., Rajesh, J., Nadeem, N., Rengasamy, K. R. R., Albuquerque, R. D. D. G. & Pandian, S. K. (2019). Ethnopharmacology, Phytochemistry, and Global Distribution of Mangroves-A Comprehensive Review. Marine Drugs 17(4): 1–8. https://doi.org/10.3390/md17040231

Cordon, C., Carmena, B., Giménez, M. C., García, J. L., & Calderon-Guerrero, C. (2023). Evolution of Ecotourism in Coastal Indigenous Communities: Comparison of the Case Studies of La Ventanilla and La Escobilla in Oaxaca, Mexico. Sustainability, 15(3), 2207. https://doi.org/10.3390/su15032207

del Carmen Peña-Puch, A., Rivera-Arriaga, E., & Williams-Beck, L. (2023). Exploring governance challenges in coastal communities through key informant perceptions in Campeche, Mexico. Ocean & Coastal Management, 242, 106722. https://doi.org/10.1016/j.ocecoaman.2023.106722

Espiner, S., Orchiston, C., & Higham, J. (2017). Resilience and sustainability: A complementary relationship? Towards a practical conceptual model for the sustainability–resilience nexus in tourism. Journal of sustainable tourism, 25(10), 1385-1400. https://doi.org/10.1080/09669582.2017.1281929

Evans, K. (2017). Where the land meets the sea: Governing mangrove forests. Appropriate Technology, 44(2), 60-61.

Castro, A. (2023). Mexico: Women lead the way in saving the mangroves. https://courier.unesco.org/en/articles/mexico-women-lead-way-saving-mangroves, 11 Desember 2023, 08.47 WIB.

Ferreira, A. C., Borges, R., & de Lacerda, L. D. (2022). Can sustainable development save mangroves?. Sustainability, 14(3), 1263. https://doi.org/10.3390/su14031263

Friess, D. A., Thompson, B. S., Brown, B., Amir, A. A., Cameron, C., Koldewey, H. J., Sasmito, S. D. & Sidik, F. (2016). Policy challenges and approaches for the conservation of mangrove forests in Southeast Asia. Conservation Biology, 30(5), 933-949. https://doi.org/10.1111/cobi.12784

Goldberg, L., Lagomasino, D., Thomas, N., & Fatoyinbo, T. (2020). Global declines in human-driven mangrove loss. Global change biology, 26(10), 5844-5855. https://doi.org/10.1111/gcb.15275

Hikmawan, M. D., & Iqbal, M. (2023). Collaborative Governance Dalam Upaya Konservasi Hutan Mangrove Di Kota Serang Tahun 2017-2022. Jisipol| Jurnal Ilmu Sosial Dan Ilmu Politik, 7(3). Retrieved from https://www.ejournal.unibba.ac.id/index.php/jisipol/article/view/1269

Herrera-Silveira, J. A., Pech-Cardenas, M. A., Morales-Ojeda, M.A., Cinco-Castro, S., Camacho-Rico, A., Sosa, J. P. C., Mendoza-Martinez, J. E., Pech-Poot, E. Y., Montero, J., Teutli-Hernandez, C. (2020). Blue carbon of Mexico, carbon stocks and fluxes: a systematic review. Blue carbon of Mexico, carbon stocks and fluxes: a systematic review. PeerJ 8:e8790 https://doi.org/10.7717/peerj.8790

Kuenzer, C., Bluemel, A., Gebhardt, S., Quoc, T. V., & Dech, S. (2011). Remote sensing of mangrove ecosystems: A review. Remote Sensing, 3(5), 878-928. https://doi.org/10.3390/rs3050878

Kumagai, J. A., Costa, M. T., Ezcurra, E., & Aburto-Oropeza, O. (2020). Prioritizing mangrove conservation across Mexico to facilitate 2020 NDC ambition. Ambio, 49, 1992-2002. https://doi.org/10.1007/s13280-020-01334-8

Leal, M.& Spalding, M. D. (2022). The State of the World's Mangroves 2022. Global Mangrove Alliance.

Quevedo, J. M. D., Lukman, K. M., Ulumuddin, Y. I., Uchiyama, Y., & Kohsaka, R. (2023). Applying the DPSIR framework to qualitatively assess the globally important mangrove ecosystems of Indonesia: a review towards evidence-based policymaking approaches. Marine Policy, 147, 105354. https://doi.org/10.1016/j.marpol.2022.105354

Nurhati, I. S. & Murdiyarso, D. (2023). National Strategy for Mangrove Ecosystem Management: A reference for the conservation and rehabilitation of coastal areas to achieve Sustainable Development Goals and Low Carbon Development. Working Paper 14. Bogor, Indonesia: CIFOR. https://www.cifor-icraf.org/knowledge/publication/8954

Organisation for Economic Co-operation and Development (OECD). (2021). Sustainable Ocean Economy Country Diagnostics of Indonesia. https://one.oecd.org/document/DCD(2021)5/En/pdf, 18 Desember 2023, 13.00 WIB.

Perserikatan Bangsa-Bangsa. (2023). The Sustainable Development Agenda: 1 hlm. https://www.un.org/sustainabledevelopment/development-agenda/#:~:text=Sustainable%20development%20has%20been%20defined,to%20meet%20their%20own%20needs, 27 November 2023, pk. 12.00 WIB.

Rivera-Arriaga, E., Espejel, I., Gutiérrez-Mendieta, F. J., Vidal-Hernández, L. E., Espinoza-Tenorio, A., Nava-Fuentes, J.C., García-Chavarría, M. & Sosa-López, A. (2020). Global Review of ICZM in Mexico. Revista Costas vol esp., 1: 133-154. http://dx.doi.org/10.26359/costas.e109

Rodríguez-Zúñiga, M. T., Troche-Souza, C., Cruz-López, M. I., & Rivera-Monroy, V. H. (2022). Development and Structural Organization of Mexico's Mangrove Monitoring System (SMMM) as a Foundation for Conservation and Restoration Initiatives: A Hierarchical Approach. Forests, 13(4), 621. https://doi.org/10.3390/f13040621

Silva, S., Silva, L. F. & Vieira, A. (2023). Protected Areas and Nature-Based Tourism: A 30-Year Bibliometric Review. Sustainability, 15 (15). https://doi.org/10.3390/su151511698

Spalding, M., & Parrett, C. L. (2019). Global patterns in mangrove recreation and tourism. Marine Policy, 110, 103540. https://doi.org/10.1016/j.marpol.2019.103540

Susilo, N. B., Koestoer, R. H., & Takarina, N. D. (2023). Disclosure of mangrove conservation policies in SEA: Bibliometric content perspectives. Journal of Marine and Island Cultures, 12(2), 116-134. http://dx.doi.org/10.21463/jmic.2023.12.2.08

Turisno, B. E., Dewi, I. G. S., Mahmudah, S., & Soemarmi, A. (2021). Recovery policy and proper management of mangrove forests to preserve environmental sustainability and ecotourism in bangkalan Indonesia. Journal of Environmental Management & Tourism, 12(8), 2188-2193.

United Nations. (2023). Update of Mexico´s National Policy on Seas and Coast. https://sdgs.un.org/partnerships/update-mexicos-national-policy-seas-and-coast, 16 Desember 2023, pk. 22.19 WIB.

United Nations Educational, Scientific and Cultural Organization (UNESCO). (2023). Rural cooperatives from southeastern Mexico aim for reconciliatory tourism. https://www.unesco.org/en/articles/rural-cooperatives-southeastern-mexico-aim-reconciliatory-tourism, 16 Desember 2023, pk. 20.46 WIB.

United Nations Environment Programme. (2023). Decades of mangrove forest change: what does it mean for nature, people and the climate?. UNEP: Nairobi.

Vargas-del-Río, D., & Brenner, L. (2023). Mangroves in transition. Management of community spaces affected by conservation and tourism in Mexico. Ocean & Coastal Management, 232, 106439. https://doi.org/10.1016/j.ocecoaman.2022.106439

Yusuf, M., & Kurniasih, D. (2023). Mapping Ecotourism Policy Studies in Indonesia: The 3C Approach-Conservation, Community, and Control. Journal of Local Government Issues (LOGOS), 6(2), 119-132. https://doi.org/10.22219/logos.v6i2.27602

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