

Legal Appropriation and Geopolitics of Madagascar's Continental Shelf for Sustainable Development

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Abstract

This study examines the legal appropriation and territoriality of Madagascar's continental shelf as strategic instruments for sustainable development in southern Madagascar within the contemporary geopolitical context of the Indian Ocean. Grounded in the legal framework established by the United Nations Convention on the Law of the Sea (UNCLOS), the research explores how sovereign rights over marine resources may contribute to economic development, environmental protection, and maritime governance. Adopting a qualitative and interdisciplinary approach, the study combines doctrinal legal analysis, documentary research, and semi-structured interviews with stakeholders involved in maritime governance. The findings highlight that the Malagasy continental shelf constitutes both a legal and geopolitical asset capable of strengthening maritime sovereignty, promoting the sustainable exploitation of fisheries, energy, and marine resources, and enhancing regional cooperation. However, the effectiveness of legal appropriation remains closely linked to institutional capacities, integrated maritime governance, and ecosystem-based resource management. The study further demonstrates that sustainable development objectives can only be achieved through the articulation of functional sovereignty, environmental stewardship, maritime security, and the equitable inclusion of coastal communities. Madagascar's continental shelf therefore represents a strategic lever for fostering inclusive and sustainable maritime development in southern Madagascar.

Keywords: *territoriality; geopolitics; governance; sustainability; Madagascar.*

Introduction

The continental shelf has become one of the most strategic maritime spaces of the twenty-first century. No longer perceived solely as a geological extension of terrestrial territory, it now constitutes a legal, economic, environmental, and geopolitical space through which coastal States exercise sovereign rights over the exploration and exploitation of the natural resources of the seabed and subsoil (Tanaka, 2019). Unlike territorial sovereignty exercised over land territory or the territorial sea, the legal regime governing the continental shelf is based on a functional conception of territoriality that grants coastal States specific rights without requiring effective occupation or formal proclamation. This original legal framework, established by the United Nations Convention on the Law of the Sea (UNCLOS), reflects the evolution of international law toward a jurisdiction-based approach to maritime governance that seeks to reconcile sovereign rights, freedom of the seas, and sustainable resource management (UNCLOS, 1982).

The growing strategic significance of maritime spaces has profoundly transformed contemporary international relations. Oceans are increasingly viewed as spaces of economic development, geopolitical competition, and environmental responsibility. More than 80 percent of world trade by volume is transported by sea, while marine resources have become essential components of national development strategies and the global transition toward sustainable economies (UNCTAD, 2024). In this context, the blue economy has emerged as an important paradigm for promoting inclusive economic growth, environmental sustainability, and social development in coastal and island States. The sustainable exploitation of marine resources is now recognized as a fundamental pillar of the United

Nations 2030 Agenda for Sustainable Development, particularly Sustainable Development Goal 14, which calls for the conservation and sustainable use of oceans, seas, and marine resources (United Nations, 2015).

Madagascar occupies a particularly strategic position in the Western Indian Ocean. With an area of approximately 587,000 km² and a coastline extending over 5,600 kilometers, the country possesses one of the largest maritime domains in the region, offering considerable opportunities for economic development, maritime security, and biodiversity conservation (Bouchard & Crumplin, 2010). Situated at the center of the Mozambique Channel, one of the world's most important maritime corridors connecting Eastern Africa, the Middle East, and Asia, Madagascar constitutes a strategic gateway for international maritime traffic and regional maritime governance (World Bank, 2022). Its geographical configuration provides the Malagasy continental shelf with considerable economic, environmental, and geopolitical importance.

The southern regions of Madagascar, namely Anosy, Androy, and Atsimo-Andrefana, are particularly concerned by these strategic challenges. Their marine and coastal ecosystems are characterized by exceptional biodiversity, including coral reefs, seagrass beds, mangroves, and productive fisheries resources that support the livelihoods and food security of local communities (UNESCO, 2020; WWF Madagascar, 2022). These ecosystems, however, are increasingly threatened by illegal, unreported, and unregulated fishing, marine pollution, climate change, and the intensification of anthropogenic pressures on coastal environments. Rising sea levels, ocean acidification, coastal erosion, and the increasing frequency of extreme climatic events continue to affect both marine biodiversity and the socio-economic resilience of coastal populations (IPCC, 2022; FAO, 2024).

Beyond environmental considerations, the continental shelf of southern Madagascar possesses considerable strategic potential. Offshore hydrocarbons, fisheries resources, marine biotechnology, deep-sea minerals, and renewable marine energies represent significant opportunities for economic diversification and sustainable development (Michel et al., 2026). Recent international studies have highlighted the increasing importance of marine renewable energies and offshore resources within the broader framework of blue economic transformation and global energy transitions (International Energy Agency, 2023; International Renewable Energy Agency, 2023). Consequently, the sustainable management of the Malagasy continental shelf extends beyond economic considerations and increasingly encompasses questions of maritime security, environmental protection, and regional cooperation.

From a legal perspective, the adoption of the United Nations Convention on the Law of the Sea in Montego Bay on 10 December 1982 profoundly transformed the governance of maritime spaces. Articles 76 and 77 recognize the sovereign rights of coastal States over their continental shelf for the purposes of exploring and exploiting natural resources, irrespective of effective occupation or formal declaration. Under specific geological conditions, these rights may extend beyond 200 nautical miles following the procedures established by the Commission on the Limits of the Continental Shelf (UNCLOS, 1982). This legal recognition provides Madagascar with an important opportunity to strengthen its maritime jurisdiction and to consolidate its strategic position within the Indian Ocean.

Nevertheless, legal appropriation of the continental shelf cannot be reduced to the mere affirmation of sovereign rights. Its effectiveness depends upon the State's capacity to implement integrated maritime governance capable of balancing economic development, environmental conservation, maritime security, and regional cooperation. Contemporary approaches to environmental law and maritime governance emphasize that sovereign rights imply corresponding responsibilities regarding ecosystem protection, intergenerational equity, and the sustainable management of natural resources (Prieur, 2019; Ost, 2003; Eric et al., 2025). Legal appropriation must therefore be understood as both an expression of State authority and an instrument for promoting sustainable development.

The geopolitical context of the Indian Ocean further reinforces these challenges. The growing strategic interests of regional and international powers, increasing competition over maritime resources, and the development of regional security architectures have transformed the Indian Ocean into one of the world's principal geopolitical spaces (Till, 2018; Emynorane et al., 2026). Madagascar's position within the Mozambique Channel places the country at the intersection of economic, diplomatic, environmental, and security interests that necessitate strengthened institutional capacities and regional cooperation mechanisms (Brewster, 2018).

Against this background, this research seeks to examine how the legal appropriation and territoriality of Madagascar's continental shelf may be mobilized as strategic instruments for sustainable development benefiting the populations of southern Madagascar. The central research question may therefore be formulated as follows: How can the legal appropriation and territoriality of Madagascar's continental shelf, in a context of increasing geopolitical tensions in the Indian Ocean, constitute an effective lever for sustainable development benefiting the populations of southern Madagascar?

This study advances the argument that the legal recognition of Madagascar's continental shelf can constitute a strategic instrument of sustainable development only when accompanied by integrated maritime governance founded upon strengthened institutional capacities, effective maritime security mechanisms, sustainable resource management, regional cooperation, and the meaningful participation of coastal communities and local authorities in decision-making processes. By adopting an interdisciplinary approach combining legal analysis, geopolitical perspectives, and sustainable development considerations, this research contributes to contemporary debates on maritime territoriality and the governance of marine resources in developing coastal States.

Methodology

This study adopts a qualitative and interdisciplinary research design combining legal analysis, geopolitical approaches, and documentary research to examine the legal appropriation and territoriality of Madagascar's continental shelf as instruments for sustainable development in southern Madagascar. The research is grounded in a doctrinal analysis of international and national legal frameworks governing maritime spaces and their implications for maritime governance, resource management, and regional security. The population targeted by this research comprises the legal and institutional mechanisms involved in the governance of Madagascar's continental shelf, with particular attention given to the southern regions of Anosy, Androy, and Atsimo-Andrefana. A purposive sampling strategy was employed to identify the principal sources of information, including international legal instruments, national legislation, strategic policy documents, and institutional stakeholders directly involved in maritime governance. These sources include the United Nations Convention on the Law of the Sea (UNCLOS), reports of the Commission on the Limits of the Continental Shelf, national policies relating to the blue economy and environmental protection, and publications produced by international organizations such as the Food and Agriculture Organization (FAO), the United Nations, the World Bank, and the Indian Ocean Commission.

Data collection relied on documentary analysis supplemented by semi-structured interviews conducted with selected experts and representatives of institutions involved in maritime affairs. The documentary corpus included international conventions, Malagasy legal texts, scientific publications, institutional reports, and strategic documents addressing maritime governance, fisheries management, environmental conservation, maritime security, and sustainable development. Semi-structured interviews were designed to collect institutional perspectives concerning the opportunities and challenges associated with the legal appropriation of the continental shelf and its contribution to sustainable development policies. The research targets included experts from the fields of Foreign Affairs, Fisheries and the Blue Economy, Environmental Governance, Fisheries Surveillance, Hydrography,

and maritime administration. The principal research instrument consisted of an analytical framework developed to examine the relationships between sovereign rights, functional territoriality, geopolitical dynamics, and sustainable resource management. Interview guides were structured around themes relating to maritime governance, institutional capacities, regional cooperation, and the sustainable exploitation of marine resources. The materials used in this study comprise legal documents, policy instruments, scientific literature, and institutional reports published between 2015 and 2025 to ensure both the relevance and contemporary significance of the findings. No specialized laboratory or experimental equipment was required, as the study primarily employed qualitative analytical tools for legal and policy interpretation.

The data collected were analyzed using qualitative content analysis and doctrinal legal interpretation. International and national legal texts were subjected to normative analysis to identify the scope and limitations of the sovereign rights exercised by Madagascar over its continental shelf and their implications for sustainable maritime governance. Documentary sources and interview data were comparatively examined to identify convergences and divergences between legal frameworks, institutional practices, and contemporary geopolitical challenges affecting southern Madagascar. Attention was devoted to assessing how legal appropriation contributes to strengthening maritime security, environmental protection, and the equitable distribution of benefits derived from marine resources. The analytical process further incorporated geopolitical perspectives to evaluate the influence of regional dynamics within the Indian Ocean on Madagascar's maritime policies and sustainable development objectives. By triangulating legal, institutional, and geopolitical evidence, this methodological approach provides a comprehensive understanding of the conditions under which the Malagasy continental shelf may constitute an effective lever for sustainable and inclusive development in southern Madagascar.

Results and Discussion

The findings of this study demonstrate that the legal appropriation of Madagascar's continental shelf extends beyond the mere exercise of sovereign rights recognized under international law and constitutes a strategic instrument for sustainable development, maritime governance, and geopolitical positioning in the Indian Ocean. The legal regime established by the United Nations Convention on the Law of the Sea (UNCLOS) grants coastal States sovereign rights over the exploration and exploitation of the natural resources of the seabed and subsoil, irrespective of effective occupation or formal proclamation (United Nations, 1982; Tanaka, 2019). Consequently, Madagascar possesses significant legal opportunities to consolidate its maritime jurisdiction while promoting the sustainable management of marine resources for the benefit of coastal populations. Nevertheless, the realization of these opportunities remains highly dependent upon the country's institutional capacities, the effectiveness of maritime governance mechanisms, and its ability to address contemporary geopolitical and environmental challenges (World Bank, 2022).

One of the principal findings of this study concerns the emergence of a functional form of maritime territoriality that strengthens Madagascar's legal and institutional presence at sea. Contemporary approaches to territoriality emphasize that territorial control is not limited to physical occupation but also encompasses the exercise of legal, political, and economic powers over strategic spaces (Raffestin, 1980; Sack, 1986). In the case of the continental shelf, Madagascar exercises sovereign rights that are functional rather than territorial in nature, thereby allowing the State to regulate economic activities, support scientific research, and implement environmental protection measures without compromising the freedoms granted to other States under international maritime law (United Nations, 1982; Tanaka, 2019). The findings therefore suggest that legal appropriation should be understood not merely as an expression of State authority but also as a strategic instrument for strengthening maritime governance and sustainable development policies.

The study further demonstrates that the Malagasy continental shelf possesses considerable economic potential capable of contributing to national development strategies and the blue economy agenda. Offshore hydrocarbons, fisheries resources, marine biotechnology, deep-sea mineral deposits, and renewable marine energies represent important opportunities for economic diversification and employment creation, particularly within southern Madagascar. Geological explorations undertaken within the Mozambique Channel continue to reveal promising offshore hydrocarbon potential, while marine renewable energies are increasingly recognized as important components of contemporary energy transition policies (International Energy Agency, 2023; International Renewable Energy Agency, 2023). Moreover, fisheries resources remain fundamental to both national exports and the food security of coastal communities throughout the Anosy, Androy, and Atsimo-Andrefana regions (FAO, 2024). The sustainable development of these resources could therefore contribute significantly to achieving the objectives of the United Nations 2030 Agenda for Sustainable Development, particularly Sustainable Development Goal 14 relating to the conservation and sustainable use of marine resources (United Nations, 2015).

Despite these opportunities, the results highlight the persistence of significant vulnerabilities affecting the sustainable exploitation of Madagascar's continental shelf. Illegal, unreported, and unregulated (IUU) fishing remains one of the principal challenges confronting maritime governance throughout the Western Indian Ocean. The extensive geographical scope of Madagascar's maritime domain considerably complicates surveillance operations and facilitates unauthorized incursions by foreign vessels into maritime areas under national jurisdiction, thereby contributing to both economic losses and the progressive depletion of fisheries resources (FAO, 2024). Similarly, maritime trafficking, marine pollution, and the unauthorized exploitation of marine resources continue to challenge the effectiveness of existing institutional mechanisms. Recent regional maritime security initiatives have consequently emphasized the strategic importance of strengthening surveillance capacities through satellite technologies, Automatic Identification Systems (AIS), and enhanced regional cooperation mechanisms (Indian Ocean Commission, 2023; Indian Ocean Rim Association, 2022). The findings therefore demonstrate that legal recognition alone remains insufficient unless accompanied by effective institutional and technological capacities capable of ensuring the practical implementation of sovereign rights.

Environmental challenges constitute another major finding of this study. Southern Madagascar's marine ecosystems are increasingly threatened by climate change, marine pollution, and anthropogenic pressures associated with growing maritime activities. Rising sea levels, ocean acidification, increasing ocean temperatures, and the intensification of extreme climatic events continue to affect both marine biodiversity and the socio-economic resilience of coastal communities dependent upon artisanal fisheries (IPCC, 2022). Coral reefs, mangroves, and seagrass ecosystems perform essential ecological functions by supporting fisheries productivity and contributing to coastal protection, yet they remain particularly vulnerable to environmental degradation (UNESCO, 2020). Furthermore, future offshore mining and hydrocarbon projects present additional environmental challenges that necessitate precautionary approaches founded upon international environmental law principles, including sustainable resource management and intergenerational equity (Prieur, 2019; Ost, 2003). Consequently, the findings reinforce the necessity of adopting ecosystem-based approaches capable of simultaneously reconciling economic development and environmental protection objectives.

Another important result concerns the growing diversification of maritime activities occurring within the continental shelf. Fisheries, maritime transportation, hydrocarbon exploration, biodiversity conservation initiatives, marine protected areas, coastal tourism, and prospective renewable energy projects increasingly compete for access to limited marine spaces. In the absence of coherent maritime spatial planning mechanisms, such diversification is likely to intensify conflicts among stakeholders while undermining both

environmental sustainability and economic efficiency. Marine Spatial Planning (MSP) has progressively emerged as an internationally recognized instrument capable of reducing conflicts among maritime users and promoting integrated ecosystem-based management approaches (UNESCO-IOC, 2021). For Madagascar, the implementation of marine spatial planning would provide an effective framework for integrating blue economy objectives into broader national sustainable development policies while preserving the ecological integrity of southern coastal ecosystems.

The geopolitical dimension of Madagascar's continental shelf further reinforces its strategic significance. The Indian Ocean has become one of the world's principal geopolitical spaces owing to the increasing concentration of maritime trade, strategic resources, and regional security initiatives (Bouchard & Crumplin, 2010). Contemporary geopolitical rivalries involving regional and international powers have substantially increased the strategic importance of maritime spaces throughout the Indian Ocean, particularly within the Mozambique Channel (Brewster, 2018). Madagascar occupies a privileged geographical position at the crossroads of major maritime routes connecting Africa, Asia, and the Middle East, thereby conferring considerable diplomatic, economic, and security value upon its maritime domain. The legal appropriation of the continental shelf therefore constitutes not only an instrument for resource management but also an important mechanism through which Madagascar may strengthen its regional influence and maritime diplomacy (Till, 2018).

The effectiveness of legal appropriation ultimately depends upon the implementation of integrated maritime governance mechanisms capable of reconciling sovereign rights with sustainable development objectives (Prieur, 2019). Sovereign rights recognized under international maritime law necessarily imply corresponding obligations relating to ecosystem conservation, environmental protection, and the equitable distribution of the benefits derived from natural resources (Ost, 2003). Accordingly, the sustainable governance of Madagascar's continental shelf requires strengthened coordination among institutions responsible for fisheries management, environmental protection, hydrographic services, maritime affairs, and scientific research. Greater institutional coherence would facilitate the implementation of maritime policies while improving the State's capacity to address contemporary challenges relating to resource management, maritime security, and climate resilience. Institutional strengthening should therefore constitute a central component of national maritime strategies aimed at promoting both sustainable development and effective maritime governance.

Furthermore, regional cooperation represents an indispensable component of effective maritime governance within the Indian Ocean. Illegal fishing, maritime insecurity, environmental degradation, and transnational trafficking considerably exceed the capacities of any single coastal State acting independently. Madagascar would therefore substantially benefit from strengthening its participation in regional initiatives relating to maritime security, information sharing, fisheries management, and environmental protection implemented throughout the Western Indian Ocean (Indian Ocean Commission, 2023; Indian Ocean Rim Association, 2022). Enhanced regional cooperation would contribute not only to improving surveillance capacities but also to strengthening collective responses to emerging maritime challenges affecting both national and regional interests.

Finally, the findings demonstrate that sustainable development policies relating to Madagascar's continental shelf must remain fundamentally oriented toward improving the living conditions of coastal populations. Although the southern regions of Madagascar possess considerable maritime and economic potential, they continue to experience significant socio-economic vulnerabilities that limit their capacity to benefit fully from marine resources (World Bank, 2022). Consequently, revenues generated through the sustainable exploitation of fisheries, renewable energies, and other marine resources should contribute directly to financing education, healthcare, climate resilience initiatives,

employment creation, and local infrastructure development. Such an approach remains fully consistent with the principles of environmental justice, intergenerational equity, and the United Nations Sustainable Development Goals (United Nations, 2015). The Malagasy continental shelf may therefore constitute an effective instrument of sustainable development only when legal appropriation is accompanied by participatory governance mechanisms capable of simultaneously ensuring maritime security, environmental sustainability, and the equitable redistribution of socio-economic benefits among present and future generations.

Conclusion

This study demonstrates that the legal appropriation and territoriality of Madagascar's continental shelf constitute strategic dimensions of sustainable maritime development that extend beyond the mere exercise of sovereign rights recognized under international law. The continental shelf emerges as a space where legal, geopolitical, environmental, and socio-economic considerations converge, reinforcing Madagascar's capacity to assert its maritime presence while promoting the sustainable management of marine resources. Its contribution to sustainable development ultimately lies in the articulation between functional sovereignty, integrated maritime governance, environmental stewardship, and the inclusion of coastal populations within development processes. The strategic position of Madagascar in the Indian Ocean further enhances the importance of the continental shelf as an instrument for balancing resource exploitation, maritime security, and regional cooperation in a rapidly evolving geopolitical environment. The originality of this study lies in demonstrating that the effectiveness of legal appropriation cannot be understood solely through the legal recognition of sovereign rights but must be conceived as a dynamic process that integrates sustainable development objectives, institutional capacities, and the equitable governance of maritime spaces. The Malagasy continental shelf therefore constitutes not only a legal and geopolitical asset but also a fundamental component of an inclusive and sustainable maritime development strategy for southern Madagascar.

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