JDEP
(Jurnal Dinamika Ekonomi Pembangunan)

ISSN (Online): 2614-2546
Volume 8 Nomor 2, Juli 2025
DOI: 10.33005/jdep.v8i2.775

Marine Resource Inventory and Mapping Strategy Based on Correlation Analysis to Support Sustainable Development Policies

Moh. Mudassir Ali, Ramla Ilham Darise
Universitas Madako Tolitoli, Indonesia

Diterima: 15 Mei 2025 | Revisi: 2 Agustus 2025 | Disetujui: 11 Agustus 2025 | Diterbitkan: 13 Agustus 2025

ABTSRAK

Penelitian ini mengintegrasikan inventarisasi dan pemetaan sumber daya kelautan di 119 desa pada 10 kecamatan di Kabupaten Tolitoli. Tujuannya adalah mengidentifikasi potensi kelautan secara spasial serta mengevaluasi kesesuaiannya dengan kebijakan pembangunan daerah. Metode campuran digunakan dengan teknik survei lapangan, wawancara, kuesioner, serta pemetaan geospasial berbasis Sistem Informasi Geografis (SIG). Sebanyak 120 responden dipilih melalui purposive sampling, dan data dianalisis secara deskriptif, korelasi, dan analisis faktor menggunakan SPSS. Hasil penelitian menunjukkan ketidakseimbangan alokasi sumber daya menjadi hambatan utama sektor kelautan. Potensi energi laut belum dimanfaatkan secara optimal, sementara posisi strategis Tolitoli membuka peluang kerja sama internasional yang belum tergarap. Temuan ini menegaskan pentingnya penerapan konsep Ekonomi Biru dan integrasi SDG 14 dalam perencanaan daerah. Penelitian ini memberikan kontribusi terhadap kebijakan pembangunan pesisir yang berbasis data, adaptif, dan kolaboratif.

Kata Kunci: Sumber Daya Kelautan, Potensi, Kebijakan Pemerintah, Ekonomi Biru.

ABSTRACT

This study integrated marine resource inventory and mapping in 119 villages across 10 sub-districts in Tolitoli Regency. The objective was to identify marine potential spatially and evaluate its suitability with regional development policies. A mixed method approach was employed, employing field surveys, interviews, questionnaires, and Geographic Information System (GIS)-based geospatial mapping. A total of 120 respondents were selected through purposive sampling, and the data were analyzed descriptively, using correlational analysis, and using factor analysis using SPSS. The results indicate that imbalanced resource allocation is a major obstacle in the marine sector. Marine energy potential has not been optimally utilized, while Tolitoli's strategic location opens up untapped opportunities for international cooperation. These findings underscore the importance of implementing the Blue Economy concept and integrating SDG14 into regional planning. This research contributes to data-driven, adaptive, and collaborative coastal development policies.

Keywords: *Marine Resources, Potential, Government Policy, Blue Economy.*

How to Cite:
Ali, M. M. & Darise, R. I., (2025). Marine Resource Inventory and Mapping Strategy Based on Correlation Analysis to Support Sustainable Development, *JDEP (Jurnal Dinamika Ekonomi Pembangunan), 8*(2), 146-159.

***Corresponding Author:**
Email : mohmudassirali@umada.ac.id
Alamat : Tolitoli, Sulawesi Tengah

INTRODUCTION

Maritime security is a shared responsibility in dealing with maritime issues, often related to national security (Arif dan Yanto, 2022). Indonesia has abundant marine resources, including various types of fish which have contributed significantly to increasing fishery commodity exports (Rifai, 2024). The main problem in this research lies in the suboptimal utilization of marine resources in Tolitoli Regency by coastal communities, which results in the low contribution of the marine sector to improving community welfare.This is exacerbated by the lack of integrated and accurate data from the Regional Government, especially Regional institutions, regarding the potential of available marine resources, thus complicating the planning process and making policies that are on target. Global Maritime Fulcrum (GMF) is part of President Ir's vision and mission. Hi. Jokowi Dodo (Kartiko dan Mursitama, 2023).

To address this issue, an approach was used through the Sustainable Development Theory, introduced in the Brundtland Report (1987). This theory emphasizes the importance of utilizing natural resources to meet current needs without compromising the capabilities of future generations (Häyry dan Laihonen, 2022). The current movement of maritime power is in the Indo-Pacific region, which makes Indonesia the primary current with a vast sea area coverage or "sea power" strategy (Muarief, 2022). Fisheries have been an essential part of human life since the beginning of human evolution; this phenomenon has driven the development of fishing technology and excessive exploitation (Hendrik, Wahyuni dan Saputra, 2024). This research has fundamental differences compared to previous research which generally only focused on identifying potential marine resources without integrating aspects of development policy as a whole.

The marine and fisheries industry in Indonesia refers to the concept of blue economy that has been proposed in the Medium-Term Development Plan for the Marine and Fisheries Sector 2013-2025 (Puspitasari, Chasanah dan Masitha, 2022). The concept of a blue economy broadly includes economic growth and development based on marine activities involving all aspects to achieve the regional stability of a country (Arum, 2023), (Banu, 2020). This condition can be formed by various aquaculture companies through cooperation between medium-sized companies and MSMEs so that aquaculture productivity can be increased and lead to the desired economic and social improvements (Nugroho *et al.*, 2022). In the context of utilization, fisheries management is based on biology and economy; if it can be utilized, it will not be limited to capturing the aquaculture sector directly in rivers or with inland fisheries and biofloc methods (Bharata dan Arifin, 2023).

Long-term availability, ocean conservation, and sustainable use of marine biodiversity must be integrated into social and economic development while implementing sustainable development goals, such as SDG14, can help protect the oceans In 2019, a global study by the Intergovernmental Platform on Biodiversity and Ecosystem Services concluded that exploitation has resulted in a decline in the diversity of marine organisms (A'yunin *et al.*, 2021). This study aims to complete one of the national research master plans (Puspaputri dan Ramdhani, 2024).

RESEARCH METHOD

This study used a mixed methods approach, combining quantitative and qualitative methods (Asyrofi *et al.*, 2024), The study was conducted from May to September 2024 in Tolitoli Regency, Central Sulawesi Province, Indonesia. This location was chosen because of its coastal area encompassing various important marine ecosystems, such as mangroves, coral reefs, and seagrass beds. These three ecosystems play a crucial role in maintaining the balance of the marine environment and supporting the socio-economic life of coastal communities (Ali, Yusuf dan Darise, 2023).

Primary data were collected through direct field surveys, in-depth interviews, a closed-ended questionnaire with a Likert scale, and community participation. The sample size was 120 respondents, consisting of fishermen, officials from relevant agencies (the Marine and Fisheries Agency, BAPPEDA), and local community leaders. The sampling technique used purposive sampling.

Table 1. Marine Resources Inventory

Variable (Coastal Area)		**Indicator**					Nominal & Ordinal **Scale**	**Data Source,** Questionnaire, Interview, Village/Department Data
NO	**Sub Variable**	P1	P2	P3	P4	P5		
1								
2								
3								
dst								

Source: Researcher Data Processing (2024)

Quantitative data were analyzed using the latest version of Statistical Product and Service Solutions (SPSS). The analysis includes: Descriptive statistical analysis to explain respondent characteristics and the distribution of assessments, Correlation analysis to examine relationships between variables, Factor analysis to identify key dimensions in marine resource utilization.

Measuring public perception using a Likert scale of 1–5, where a score of 1 indicates a very bad assessment and a score of 5 indicates a very good assessment (Suasapha, 2020). The data is then tabulated and visualized in the form of tables and graphs.

To support marine resource mapping, this research utilized geospatial mapping technology and Geographic Information Systems (GIS). The steps included coordinate data collection, spatial analysis, thematic map creation, and geographic data integration using software such as ArcGIS/QGIS. Secondary data was collected from documentation studies, literature, and regulations issued by relevant agencies, including the Maritime Affairs and Fisheries Agency and the Tolitoli Regency Development Planning Agency (BAPPEDA).

Table 2. Interpretation Criteria Score Percentage

Interval		**Criteria**	
Percentage	**Score**	Regional Potential (+)	Vulnerability Context (-)
0% - 19,99%	0.00 – 0.99	Very Bad	No Influence
20% - 39,99%	1.00 – 1.99	Bad	Less Influence
40% - 59,99%	2.00 – 2.99	Quite Bad	Quite Influence
60% - 79,99%	3.00 – 3.99	Good	Influence
80% - 100%	4.00 – 5.00	Very Good	Very Influence

Source: Researcher Data Processing (2024)

To support the validity and depth of the analysis, consultations were also conducted with experts in the fields of fisheries, maritime affairs, and economic law to assess the relationship between marine resource potential and sustainable coastal development policy directions.

RESULT AND DISCUSSION

Marine Resources Inventory

The inventory results in Figure 1 Radar Graph show that Central Sulawesi has the potential to be a research object supported by the longest coastline on Sulawesi Island, 7.010.60 (km). Therefore, this study specifically selected Central Sulawesi and determined Tolitoli Regency as the research location to study and conduct mapping through the results of the marine resource inventory to support sustainable development policies in coastal areas of Indonesia.

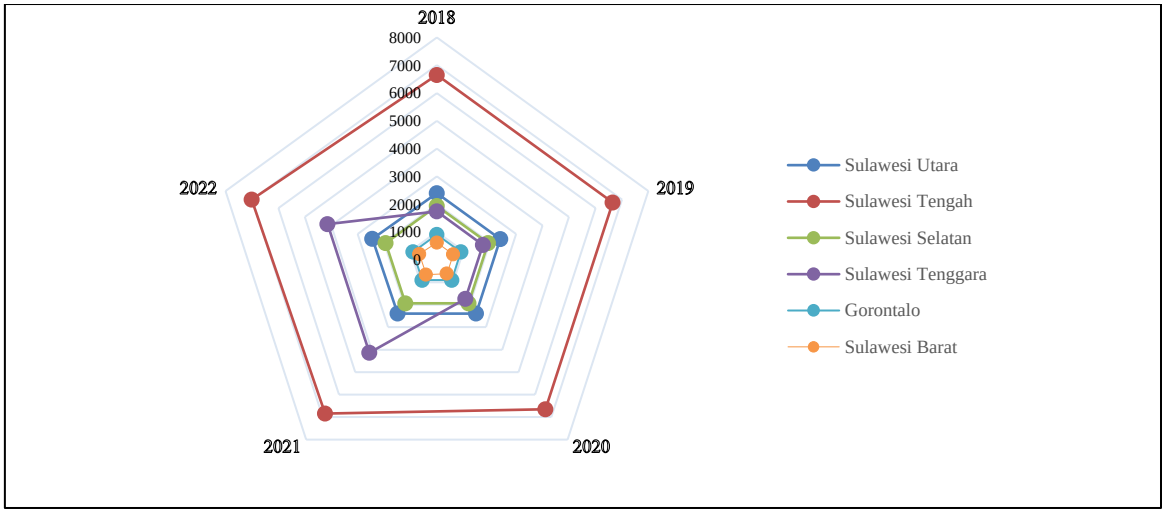

Figure 1. Radar Chart of Coastline Length of Sulawesi Island Region, Indonesia
Source: Data Analysis Results (2024)

The area's characteristics are dominated along the coast and are broad in almost every sub-district. This coastal area includes various important marine ecosystems, such as mangroves, coral reefs, and seagrass beds, which have an important role in supporting the balance of marine ecosystems and the welfare of local communities

(Wahyuni Putri *et al.*, 2023). The existence of abundant marine resources in Tolitoli Regency makes this area relevant as a research object to support sustainable development policies in coastal areas of Indonesia.

Table 3. Inventory of Coastline Length of Sulawesi Island Region

Province	Coastline Length (km)				
	2018	2019	2020	2021	2022
Sulawesi Utara	2.395,99	2.395,99	2.395,99	2.395,99	2.442,00
Sulawesi Tengah	6.653,31	6.653,31	6.653,00	6.841,86	7.010,60
Sulawesi Selatan	1.937,00	1.937,00	1.937,00	1.937,00	1.937,00
Sulawesi Tenggara	1.740,00	1.740,00	1.740,00	4.136,24	4.136,24
Gorontalo	903,70	903,70	903,70	903,70	903,70
Sulawesi Barat	617,52	617,52	617,52	663,02	663,02

Source, BPS, Marine and Coastal Resources Statistics (2019-2023)

Based on Table 3. Results of the Sulawesi Island inventory show that Central Sulawesi Province has the longest coastline of 7,010.60 (km) in 2022 from all the provinces on the island of Sulawesi. In addition, Central Sulawesi is a Regional Marine Conservation Area (KKDP), in KEPMENKP NOMOR 54/TAHUN 2019, covering 3 areas with a coverage area of 60,042.71 hectares. One of the areas is Tolitoli Regency, which is called KKPD Doboto. Coral reefs, seagrass beds, mangroves, turtles, rabbitfish, yellowtail fish, groupers, sharks, and red shrimp are the targets of this conservation (Gerard, 2023). Marine conservation and biodiversity are important because they maintain the ecological balance of the Indonesian sea and everything in it.

Anemone

Seagrass Fields

Coral reefs

Figure 2. Marine Resources Entering the Waters of Tolitoli Regency
Source, Primary Data Inventory Results (2024)

Optimizing economic growth comes from utilising marine and coastal resources inclusively and sustainably through "Sustainable Marine Economy and Coastal Area Management Challenges" as a form of support in welcoming the vision of Golden Indonesia 2045. The theme is also a support for the Sustainable Development Goals (SDGs), Environmental Development Pillar, Goal 14: "Conserve and Sustainably Use Marine and Ocean Resources" (Kuo *et al.*, 2021), (Aprilia dan Mulyanie, 2023).

Mangrove Forest

Red Shrimp

Green Algae

Figure 3. Marine Resources in the Coastal Area of Tolitoli Regency
Source, Primary Data Inventory Results (2024)

Marine Resource Mapping Analysis

Where marine resource mapping is divided into three zones, Zone A (High/perfect), Zone B (moderate/suitable), and Zone C (low/less good) (Ambarsari *et al.*, 2023). These zones describe the level of sustainability and potential for marine resource management in the coastal area. Zone A is the most optimal for development. Zone B supports Zone A, while Zone C may require restoration efforts first so that law enforcement efforts can improve and protect the environment from illegal fishing activities, coral reef destruction, and marine pollution in this area.

Figure 4. Results of Mapping and Development of Marine Resource Zones in Tolitoli Regency, Central Sulawesi, Indonesia
Source: BIG Geoportal, Geospatial Mapping Technology, Geographic Information System (GIS), Data Processing Results (2024)

The coastal area is nominated Zone A (High/Very Good), so the wealth and biodiversity of the sea in this zone are very high, with many species of flora and fauna that have economic and conservation value. In addition, this zone has very high marine tourism potential, with beautiful natural marine scenery, healthy coral reefs, and great ecological tourism potential. Hence, the function of the marine ecosystem in this zone is very good in supporting marine life and providing benefits to humans, such as coastal protection and local climate regulation (Yanto *et al.*, 2023).

The genetic diversity in this zone offers excellent potential for biotechnology research and development. Water conditions with high productivity support marine cultivation, such as fish, shellfish, and seaweed. This zone is very suitable for educational activities and scientific research related to the sea because of the abundance of resources and suitable environmental conditions. In addition, this zone has a high potential for renewable energy, such as wave energy, tides, and sea winds.

Zone B (Moderate/Good) is almost entirely dominated by coastal areas with relatively high biodiversity, although not as diverse as in Zone A. However, it still has conservation and economic value. In addition, there are still non-biological resources but not as abundant as in Zone A, so exploitation needs to be done carefully. For marine tourism potential there, but it is not as beautiful or rich as Zone A, it will still be attractive to tourists, especially for certain types of tourism, such as red shrimp tourism on Sanjangan Island, Dondo (Sari *et al.*, 2023). Marine genetic diversity is good enough for research and development of biotechnology, supported by marine cultivation by several foreign companies and local communities. However, more intervention is required to achieve optimal productivity in this area. This zone still supports marine transportation and navigation for education and research, although environmental conditions may require adjustments in the latest methodology. Cultural ties to the sea still exist, but some challenges of modernization that threaten the sustainability of traditions in this area and the potential for renewable energy still exist. However, more sophisticated technology is required to reach the point of optimization.

Zone C (Low/Poor): This area is less dominated by coastal areas, so biodiversity is low, with high ecological pressure resulting in many species being threatened or extinct. Non-living resources in this area emerge because the conditions differ from those in zones A and B, giving rise to economic potential from exploiting new resources. Specifically, for marine tourism, the potential is still relatively low; problems such as pollution or environmental degradation due to mining activities in the upstream river flow reduce the attractiveness of marine resource conditions. This zone is not ideal for marine transportation and navigation, as it has high risks to safety or efficiency.

Marine Resources Factor Analysis

Based on the distribution data of marine resource factor analysis by region, the Dakopemean District area has the highest contribution with 100%. It forms three factors showing a very significant role in managing marine resources. The regional government can encourage decentralized management of marine resources, where the regional government is given greater authority and responsibility to manage local resources according to its region's potential and specific needs (Ridwan dan Natsir, 2023). Thus, this factor analysis shows that each region has different strengths and challenges in supporting sustainable development policies in coastal areas, and each requires a management approach tailored to its characteristics.

Correlation Analysis of Marine Resources

Correlation analysis is important to provide insight into which variables will contribute to the success or failure of policy decisions in the coastal areas of Tolitoli Regency.

Table 4. Distribution of Results of Pearson Bivariate Correlation Analysis of Marine Resources Management Based on Variables

Variable	Nilai Sig. Value (2-tailed)		r count value	
	Y	< 0.05	Y	> 0.632
X1	0,000	Significant	0.923**	Correlation
X2	0.889	X	0.051	X
X3	0.007	Significant	0.786**	Correlation
X4	0.122	X	0.522	X
X5	0.048	Significant	0.636*	Correlation
X6	0.026	Significant	0.694*	Correlation
X7	0.091	X	0.561	X
X8	0.190	X	0.452	X
X9	0.175	X	0.466	X
X10	0.006	Significant	0.793**	Correlation

Source: Researcher Data Processing (2024)

a Biological resources (X1), fish, coral reefs, and other marine biota have a powerful and significant relationship with marine resource management. Studies on marine resource management indicate that the condition and abundance of biological resources are significantly influenced by how well they are managed. The better management efforts, such as through the protection of important ecosystem areas, fishing regulations, and coral reef conservation, the greater the sustainability and productivity of biological resources.

b Non-biological resources (X2), minerals, oil, and gas do not significantly relate to marine resource management. Marine resource management in the study area focuses more on biological or fisheries aspects, while non-biological aspects have not received primary attention in current management policies or practices. Other mechanisms underlying this disconnect could be a lack of integration between sectors (e.g., the energy sector vs. the marine sector), or because non-biological resource exploitation data is not yet fully available or incorporated into cross-sectoral management.

c Tourism resources (X3), marine tourism, and ecotourism show a strong and significant relationship Studies on marine resource management demonstrate that tourism activities are highly dependent on the sustainability of marine ecosystems. Good management supports tourist attractions, while growing tourism also encourages the protection and sustainable use of marine resources.

d Marine ecosystem service resources (X4), such as carbon sequestration or coastal protection, do not significantly correlate with marine resource management. Studies on marine resource management indicate that the functions of these ecosystems have not been fully recognized or utilized in current management practices. This could be due to a lack of understanding, a lack of data, or the lack of integration of ecosystem service values into marine management policies.

e Marine genetic resources (X5) and marine species for biotechnology research have a strong and significant relationship with marine resource management. Studies on marine resource management demonstrate that preserving marine biodiversity is essential to support biotechnology research and utilization. Good management ensures the availability and sustainability of marine genetic resources as long-term scientific and economic assets (Wardhani, Hamrun dan Pratama Putra, 2021).

f Marine cultivation resources (X6) and aquaculture also have a strong and significant relationship with marine resource management. Studies on marine resource management demonstrate that aquaculture practices are strongly influenced by sustainable marine policies and governance. Effective management supports aquaculture productivity, maintains aquatic environmental quality, and prevents conflicts over marine space use.

g Marine transportation and navigation (X7), in the context of coastal area development, show that this variable has no significant relationship with marine resource management. Maritime transportation and navigation activities in coastal areas have not been directly integrated into marine resource management strategies. This may be due to the management focus being more on ecological and fisheries aspects, while transportation is more regulated by the infrastructure or transportation sectors separately.

h Education and Research (X8), marine does not show a significant relationship in marine resource management in this coastal area. The role of marine education and research is not yet optimal or directly linked to marine resource management policies and practices. This may be due to poor collaboration between research institutions, academics, and management, as well as limited use of research results in decision-making.

i In this study, social and cultural resources (X9) and coastal community traditions do not have a significant relationship with marine resource management. Marine resource management shows that local socio-cultural values have not been effectively integrated into management systems. Yet, local traditions can play a significant role in conservation and sustainable use if incorporated into policies or approaches based on local wisdom.

j Renewable energy resources (X10), wind energy, ocean waves, and tidal energy have a powerful and significant relationship with marine resource management. Marine resource management demonstrates that renewable energy development in coastal areas is highly dependent on sound marine governance. Effective

management supports sustainable energy use, prevents conflicts over marine space use, and maintains a balance between energy exploitation and ecosystem preservation.(Siregar *et al.*, 2023), (Trenggono, 2024).

The five variables that have a strong and significant relationship to marine resource management in coastal areas are key components that need to be considered in formulating sustainable coastal development policies. The significance of these relationships indicates that effective management of these resources has the potential to directly impact the sustainability of marine ecosystems and the well-being of coastal communities.

Table 5. Marine Resource Management Results (Direct Use Value)

NO	Parameter	Nilai / Jumlah	Keterangan
A	Central Sulawesi Provincial Budget marine resources	Rp. 90.910.000.000	Source: (Aryanti *et al.*, 2023)
B	Length of Central Sulawesi coastline	7.010,60 km	Source: (Aryanti *et al.*, 2023)
C	Reference value of marine resources	Rp. 90.910.000.000/ 7.010,60 km	Source: (Nurdin, Khumaera dan Mantu, 2021)
D	Production of Tolitoli marine resources 2023	22.572,57 tons	Source: (BPS Kabupaten Tolitoli, 2024)
E	Production value of Tolitoli marine resources 2023	Rp. 46.199.280.000	Source: (BPS Kabupaten Tolitoli, 2024)
F	Length of coastline	336,00 km	Source: (BPS Kabupaten Tolitoli, 2024)
G	Result value of coastline length	Rp.12.967.506,34/km/year	G = A / B
H	Result value of marine resources	Rp. 4.357.082.132,77/year	H = F x G
I	Reference value of marine tourism	Rp. 4.357.082.132,77/0.5%	Kontribusi Sektor Pariwisata
J	Number of marine tourism managed in 2023	10 marine tourism	Source: (BPS Kabupaten Tolitoli, 2024)
K	Number of marine tourism not yet managed in 2023	22 marine tourism	Source: (BPS Kabupaten Tolitoli, 2024)
L	Value of marine tourism managed	Rp. 217.854.106,63	L = I x J
M	Value of marine tourism not yet managed	Rp. 479.279.034,60	M = L - K

Source, Data Analysis Results (2024)

These five aspects are the main foundation for realizing sustainable marine management and must be prioritized in the formulation and implementation of coastal development policies in Tolitoli. Implementing policies that take into account the findings of this research will enable the region to align its coastal management with national and global blue economy principles.

Conversely, several other resources, such as non-living resources (X2), ecosystem services (X4), marine education and research (X8), and socio-cultural values (X9), do not show significant relationships in the current management context. This indicates that the

role of these sectors is still limited or not yet integrated into local policies, thus presenting a strategic opportunity for further development in future development planning.

Based on Presidential Regulation Number 16 of 2017 concerning Indonesian Marine Policy, the government affirms the direction of national marine development oriented towards sustainability. In line with global commitments through the High-Level Panel for a Sustainable Ocean Economy, Indonesia is participating in the blue economy agenda—a sustainable marine economic approach that integrates economic and social benefits with long-term marine environmental conservation (Surya Bakti dan Lukman Nuzul Hakim, 2024). This principle demands planned, integrated, and evidence-based coastal area management.

Therefore, the results of this research can provide a scientific basis for the Tolitoli Regency Government to formulate sectoral and cross-sectoral policies that are data-driven, environmentally conscious, and aligned with national policies, to promote sustainable marine and coastal management.

CONCLUSION

This study reveals new findings that marine resource management in Tolitoli Regency has not fully considered the correlation analysis approach between budget allocation, workforce, and available marine sector potential. These findings suggest that by proportionally applying correlative analysis, marine resource management, particularly in the biological and tourism sectors, can be maximized to produce more significant and measurable impacts.

Furthermore, this study found that the utilization of marine renewable energy technology remains very minimal, despite its significant potential to support sustainable marine resource management. This presents a strategic gap that can be optimized in coastal development policies.

Another important finding is that Tolitoli Regency's geographic location, directly bordering Malaysian and Philippine waters, provides opportunities for international cooperation in strengthening coastal area management. Therefore, the Blue Economy concept is a relevant strategic approach, not only to encourage economic growth and the welfare of coastal communities, but also to ensure ecological sustainability.

As a next step, this study recommends the need for collaboration across government, the private sector, and academia to support innovation and investment in coastal resource utilization in line with sustainable development goals (SDG 14).

BIBLIOGRAPHY

A'yunin, Q. *et al.* (2021) "Perikanan berkelanjutan," in T.U. Press (ed.) *Perikanan*. https://bo. Malang: UB Press, hal. 1–229.

Ali, M.M., Yusuf, R. dan Darise, R.I. (2023) "Sosialisasi Pemanfaatan Sampah Dan Penanaman Pohon Mangrove Desa Laulalang Kabupaten Tolitoli," *Lamahu: Jurnal Pengabdian Masyarakat Terintegrasi*, 2(1), hal. 37–43. Tersedia pada: https://doi.org/10.34312/ljpmt.v2i1.17928.

Ambarsari, K.T. *et al.* (2023) "Concept of Illegal Fishing for Indonesian Regulations and

UNCLOS," *Yuridika* [Preprint]. Tersedia pada: https://doi.org/10.20473/ydk.v38i1.38045.

Aprilia dan Mulyanie, E. (2023) "Implementasi Konsep Blue Economy di Indonesia sebagai Upaya Mewujudkan Sutainable Development Goals (SDgs) 14: Life Below Water," *Jurnal Ilmiah Samudra Akuatika*, 7(2), hal. 79–87. Tersedia pada: https://doi.org/https://doi.org/10.33059/jisa.v7i2.9116.

Arif, W. dan Yanto, A. (2022) "Konsep makna keamanan maritim," *Jurnal Maritim Indonesia*, 10(3), hal. 277–234. Tersedia pada: https://doi.org/http://doi.org/10.52307//jmi.v912.115.

Arum, D.S. (2023) "Penerapan Konsep 'Blue Economy' Sebagai Pengembangan Kemampuan Pertahanan Laut," *Jurnal Strategi Pertahanan Laut*, 9(2), hal. 46–61. Tersedia pada: https://doi.org/10.33172/spl.v9i2.14490.

Aryanti, D. *et al.* (2023) *Ekonomi Laut Berkelanjutan dan Tantangan Pengelolaan Kawasan Pesisir*. 3312002 ed. Diedit oleh Direktorat Statistik Ketahanan Sosial. Badan Pusat Statistik. Tersedia pada: https://www.bps.go.id/id/publication/2023/11/30/45b0e0c30911979641959fe5/statistik-sumber-daya-laut-dan-pesisir-2023.

Asyrofi, M. *et al.* (2024) "Strategy Analysis of Sustainable Livelihood Development Among Fishermen Community in Pananjung Village, Pangandaran Subdistrict, Pangandaran Distruct.," *Jurnal Sosial Ekonomi Kelautan dan Perikanan*, 19(1), hal. 101–110. Tersedia pada: https://doi.org/http://dx.doi.org/10.15578/jsekp.v19i1.13563.

Banu, N.M. (2020) "Konsep Blue Economy Terhadap Pembangunan Ekonomi Di Indonesia," *Ekonis: Jurnal Ekonomi dan Bisnis*, 22(1), hal. 27–31. Tersedia pada: https://doi.org/10.30811/ekonis.v22i1.1907.

Bharata, W. dan Arifin, M.N. (2023) "Meningkatkan sektor perikanan berkelanjutan untuk menyongsong pembangunan ekonomi desa liang ulu," *Jurnal Abditani*, 6(1), hal. 43–47. Tersedia pada: https://doi.org/https://doi.org/10.31970/abditani.v6i1.203.

BPS Kabupaten Tolitoli (2024) *Kabupaten Tolitoli Dalam Angka 2024*. Diedit oleh BPS Kabupaten Tolitoli. Kabupaten Tolitoli, Sulawesi Tengah: BPS Kabupaten Tolitoli. Tersedia pada: https://tolitolikab.bps.go.id/id/publication/2024/02/28/e87254ec5eb989f0c5a9bd16/kabupaten-toli-toli-dalam-angka-2024.html.

Gerard, B.H.S. (2023) *Analisis Kesesuaian Padang Lamun Di Pantai Lalos Tolitoli Sulawesi Tengah Sebagai Kawasan Konservasi Habitat Dugong Dugon (Müller, 1776)*. Universitas Kristen Duta Wacana. Tersedia pada: http://katalog.ukdw.ac.id/id/eprint/8028.

Häyry, M. dan Laihonen, M. (2022) "Situating a sustainable bioeconomy strategy on a map of justice: a solution and its problems," *Environment, Development and Sustainability*, 26(1), hal. 517–534. Tersedia pada: https://doi.org/10.1007/s10668-022-02720-w.

Hendrik, B., Wahyuni, R. dan Saputra, A. (2024) "Optimasi proses penangkapan ikan: pengembangan sistem informasi berbasis teknologi untuk pemantauan dan pengelolaan sumber daya perikanan di daerah pesisir," *Jurnal PKM BANGSA*, 2(1), hal. 13–18. Tersedia pada: https://rcf-indonesia.org/jurnal/index.php/bangsa/article/view/208.

Kartiko, T.D. dan Mursitama, T.N. (2023) "Making Global Maritime Fulcrum Relevant: Efforts To Increase Indonesian Tuna Export To Japan," in *Proceedings of the*

International Conference on Industrial Engineering and Operations Management. Michigan, USA: IEOM Society International, hal. 3976–3986. Tersedia pada: https://doi.org/10.46254/AN12.20220747.

Kuo, H.M. *et al.* (2021) "Place attachment and environmentally responsible behavior: The mediating role of destination psychological ownership," *Sustainability (Switzerland)*, 13(12), hal. 1–16. Tersedia pada: https://doi.org/https://doi.org/10.3390/su13126809.

Muarief, R. (2022) "Penerapan Kerjasama dengan Industri Pertahanan Indonesia dan Belanda dalam Meningkatkan Kekuatan Maritim (Studi Kasus: PKR 10514)," *Jurnal Kewarganegaraan*, 6(3), hal. 5873–5882. Tersedia pada: https://doi.org/https://doi.org/10.31316/jk.v6i3.4087.

Nugroho, E. *et al.* (2022) "Utilization of marine and fishery resources through sustainable aquaculture for the nation's welfare towards a community of 5.0," *Jurnal Kebijakan Perikanan Indonesia*, 14(2), hal. 111–119. Tersedia pada: https://doi.org/http://dx.doi.org/10.15578/jkpi.14.2.2022.%25p.

Nurdin, N., Khumaera, N.I. dan Mantu, Y.H. (2021) "Analisis Manfaat Langsung Sumberdaya Mangrove Pada Kawasan Ekowisata Mangrove Lantebung Kota Makassar," *PAPALELE (Jurnal Penelitian Sosial Ekonomi Perikanan dan Kelautan)*, 5(2), hal. 94–99. Tersedia pada: https://doi.org/10.30598/papalele.2021.5.2.94.

Puspaputri, E. dan Ramdhani, L.I. (2024) *Panduan Penelitian dan Pengabdian Kepada Masyarakat*. 2024 ed. Diedit oleh M. Andriansyah. Jakarta Pusat: Direktorat Jenderal Pendidikan Tinggi, Riset, dan Teknologi Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi. Tersedia pada: https://bima.kemdikbud.go.id/panduan.

Puspitasari, D., Chasanah, A.N. dan Masitha, F.W. (2022) "Peran Transformasi Digital dalam Industri Perikanan Berkelanjutan yang Berbasis Blue Economy di Desa Tlogoweru," in *National Seminar on Accounting, Finance, and Economics (NSAFE)*. Mala: Fakultas Ekonomi, Universitas Negeri Malang, hal. 26–35. Tersedia pada: http://conference.um.ac.id/index.php/nsafe/article/view/3377%0Ahttp://conference.um.ac.id/index.php/nsafe/article/viewFile/3377/2279.

Ridwan, M. dan Natsir, N.A. (2023) "Asimetrik Desentralisasi Management Marine Resources Desentralisasi Asimetrik Dalam Pengelolaan Sumber Daya Laut," *Pattimura Proceeding: Conference of Science and Technology*, hal. 59–71. Tersedia pada: https://doi.org/10.30598/PattimuraSci.2020.SNPK19.59-71.

Rifai, S.N. (2024) "PREDIKSI SPASIAL PRODUKTIVITAS KLOROFIL-A LAUTAN MENGGUNAKAN METODE BACKPROPAGATION," *Jurnal Informatika dan Teknik Elektro Terapan*, 12(1). Tersedia pada: https://doi.org/10.23960/jitet.v12i1.3804.

Sari, R. *et al.* (2023) "Morphological and Habitat of Parhippolyte uveae Borradaile 1900 from Tanjung Sanjangan Central Sulawesi," *Jurnal Biologi Tropis*, 23(1), hal. 112–120. Tersedia pada: https://doi.org/10.29303/jbt.v23i4b.5857.

Siregar, E.S. *et al.* (2023) "Sosialisasi Kebijakan dan Peranan Hukum di Bidang Pengawasan Sumberdaya Kelautan dan Perikanan," *Dedikasi Sains dan Teknologi*, 3(1), hal. 45–50. Tersedia pada: https://doi.org/10.47709/dst.v3i1.2370.

Suasapha, A.H. (2020) "Skala Likert Untuk Penelitian Pariwisata; Beberapa Catatan Untuk Menyusunnya Dengan Baik," *JURNAL KEPARIWISATAAN*, 19(1), hal. 26–37. Tersedia pada: https://doi.org/10.52352/jpar.v19i1.407.

Surya Bakti dan Lukman Nuzul Hakim (2024) "EKONOMI BIRU DAN

KEPEMIMPINAN STRATEGIS: MENDORONG PEMBANGUNAN BERKELANJUTAN DI INDONESIA," *KALIANDA HALOK GAGAS*, 7(1), hal. 1–18. Tersedia pada: https://doi.org/10.52655/khg.v7i1.88.

Trenggono, S.W. (2024) *PERATURAN MENTERI KELAUTAN DAN PERIKANAN REPUBLIK INDONESIA NOMOR 15 TAHUN 2024 - TENTANG PERUBAHAN KEDUA ATAS PERATURAN MENTERI KELAUTAN DAN PERIKANAN NOMOR 17/PERMEN-KP/2020 TENTANG RENCANA STRATEGIS KEMENTERIAN KELAUTAN DAN PERIKANAN TAHUN 2020-2024 DE*.

Wahyuni Putri, I. *et al.* (2023) "Pesisir dan Masyarakat Pesisir," in S. Laheng dan M.K.U. BK (ed.) *Buku Bahan Ajar*. Kota Makassar: CV. Tohar Media, hal. 1–201. Tersedia pada: https://toharmedia.co.id.

Wardhani, W., Hamrun, H. dan Pratama Putra, M.A. (2021) "Strategi Pemerintah Daerah Dalam Pengembangan Sumber Daya Genetik Rumput Laut Di Kabupaten Bantaeng," *Kybernology : Journal of Government Studies* [Preprint]. Tersedia pada: https://doi.org/10.26618/kjgs.v1i1.5005.

Yanto, E. *et al.* (2023) "Pengelolaan Ekowisata Desa Kapas Berbasis Sistem Informasi Manajemen (SIM) Melalui Kemitraan Bumdes," *Communnity Development Journal*, 4(6), hal. 12038–12041. Tersedia pada: https://doi.org/https://doi.org/10.31004/cdj.v4i6.22890.