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Research Article

Measured Fishing in The North Sea of Java: For Biodiversity Protection or Fishers' Welfare?

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ABSTRACT

Indonesia has established and implemented a measured fishing policy in the maritime and fisheries sectors. The aim of this policy is to ensure the sustainability of marine resources, which are a vital source of livelihood for the community, particularly fishers. In practice, however, some fishermen still fail to comply with the regulations due to concerns about their livelihoods, particularly with regard to the use of prohibited fishing gear. This study aims to analyse the implementation of Indonesia's measured fishing policy, focusing on the North Java Sea within the Pati and Lamongan regions. The research employs an empirical legal research method with a regulatory and conceptual approach. The findings of the research indicate that limitations in human resources and infrastructure still exist in the implementation of the measured fishing policy. Insufficient human resources impact monitoring functions, while infrastructure-related issues pertain to the adequacy of equipment for conducting patrols, which are also part of the policy's monitoring implementation. This study concludes that, despite limitations in human resources and infrastructure affecting the monitoring process, the implementation of measured fishing in the North Java Sea, particularly in the Pati and Lamongan regions, has been carried out optimally.

Keywords: Measured fishing; Java Sea; Marine Environment; Biodiversity; Law of the Sea.

A. INTRODUCTION

Indonesia is an archipelagic country based on the 1982 United Nations Convention on the Law of the Sea (Risnain, 2021), and has the second longest coastline in the world (Soemarmi et al., 2019). The concept of an archipelagic state gives privileges related to the designation of internal waters for Indonesia as part of maritime sovereignty (Lestari & Ariadno, 2019). Indonesia's internal waters, one of which is the North Java Sea, are the heart of Indonesian archipelago's maritime trade and the core sea for the Southeast Asian region (Putra & Arafat, 2021). The Java Sea has enormous maritime resources (Windupranata, Nusantara & Nuraghnia, 2024) and makes a significant contribution to the economy. This includes supplying fish for domestic consumption, supporting fish marketing businesses and providing employment opportunities (Kurnia & Yuan Yuan, 2026; Purwanto, 2015). Currently, the management of maritime areas in Indonesia is based on

Government Regulation Number 11 of 2023 (Peraturan Pemerintah Nomor 11 Tahun 2023 Tentang Penangkapan Ikan Terukur, 2023) and the the Minister of Maritime Affairs and Fisheries' Regulation Number 28 of 2023 (Peraturan Menteri Kelautan Dan Perikanan Nomor 28 Tahun 2023 Tentang Peraturan Pelaksanaan Peraturan Pemerintah Nomor 11 Tahun 2023 Tentang Penangkapan Ikan Terukur, 2023), promotes the concept of measured fishing.

The North Java Sea is one of the regions that serves as the primary source of livelihood for most coastal communities, who rely on the sea for their economic needs. Currently, the region is facing an economic crisis that has led to a decline in catch yields due to overfishing (Atmaja, Sadhotomo, & Nugroho, 2017); (Tirtadanu et al., 2023). This phenomenon has forced fishers to shift their fishing operations to more distant waters, based on data indicating a migration toward the eastern waters of Indonesia (Ford, Hasbiyalloh, & Palmer, 2026); (McKenna et al., 2025). The economic crisis in the region has also led to the use of fishing gear banned by some parties in order to catch large quantities of fish (Prasetyo, Aisya, & Monica, 2022). This could certainly have an impact on the protection of marine resources, given that the fishing gear banned by these regulations can damage marine ecosystems.

Indonesia has established measured fishing standards using a quota-based system to ensure that the amount of fish caught by fishers does not exceed the resource potential (Maria et al., 2026); (Sondita, Ramdhani, & Nurani, 2022). Specifically, the concept of quota-based measured fishing maintains the sustainability of marine resources by limiting several factors, such as the number of vessels, the catch, the type of fish caught, the fishing gear, the fishing time, and the landing ports (Trenggono, 2023). This concept can address environmental damage and preserve biodiversity in the Java Sea region, currently faces environmental damage threats such as overfishing (Wartini, 2020). However, in fact, some fishers engaging in "one-day fishing" still use prohibited fishing gear (micro trawls) and have not complied with the measured fishing regulations in the Java Sea due to economic factors (Roisah et al., 2023). There are also fraudulent practices occurring in fishing although they have exceeded the quota limit, one of which is to entrust fishing to other fishers still having fishing quotas (Roisah et al., 2024). The concept of measured fishing faces two important problems: on the one hand, it protects the sustainability of marine biodiversity, and on the other hand, it faces issues related to the welfare of fishers relying on these marine resources.

There are a number of problems with measured fishing, such as worries that big companies could take over fishing in the sea (Nurlaela, 2023; Wisnaeni et al., 2025). These worries are not unwarranted, since contemporary industrial ships will get bigger quotas than village fishermen (Trenggono, 2023). Another problem is

that the infrastructure may not be ready to support the measured fishing program (Kusumawardhani, Susilowati, & Hadiyanto, 2023). According to this legislation, boats must bring their catch to certain places, called fishing grounds (Agung et al., 2018). The problems with economic certainty are just as essential. The quota system under the zoning scheme is likely to be seen as difficult, and it could lower the income of local fishers who are used to fishing freely (Hafel et al., 2025). Policies that limit fishing are new to Indonesia, and they will likely cause confusion and resistance among local fishers and company owners who don't completely comprehend them (Rahayu et al., 2020).

This research differs from several previous studies. Firstly, it was conducted in the waters off Paiton in East Java, Indonesia. This study examined fisheries management through spatial distribution and fishing activities involving competition, with the aim of supporting sustainable resource allocation and practices (Sari et al., 2025). The differences lie in both the location and subject matter. The previous study was conducted in the waters off Paiton in East Java and focused on fisheries management through spatial distribution and competition among fishing activities. In contrast, this study focuses on analysing the impact of fishing practices on biodiversity and the welfare of fishers. Secondly, a research project in the Java Sea examined the threats to fish stocks posed by cantrang fishing, concluding that a fisheries management strategy is required to ensure the sustainability of fish stocks and marine biodiversity (Taurusman et al., 2025). These findings are highly relevant given that the study evaluates the implementation of measured fishing in the North Java Sea in order to address the various challenges involved in preserving marine biodiversity and ensuring fishers' welfare. Thirdly, another study shares the same research location: the North Java Sea region, specifically Pati. However, there is a fundamental difference: this study examines the impact of restrictions on fishing gear, specifically trawl nets and gillnets, on fishers' welfare (Aprian et al., 2024). Meanwhile, this research focuses on evaluating and improving the implementation of measured fishing policies in the North Java Sea. Fourth, a research project was conducted in the Java Sea, specifically in the Pasuruan, Probolinggo, and Banyuwangi regions. The research focused on the overexploitation of fishing trips, catch yields, and total catch to assess the fish stock potential in those areas (Jauhari et al., 2018), whereas this research focuses on comprehensively evaluating the implementation of measured fishing policies to achieve the protection of marine resources and the fishers' welfare. Fifth, there is a research study examining the work of the Indonesian Ministry of Marine Affairs and Fisheries in developing a catch logbook system for small-scale fisheries. A comparison with this research shows similarities in the aspect of evaluating the implementation of policies by the Indonesian

Ministry of Marine Affairs and Fisheries, with differences in the substance of the research regarding the policies examined (Sari et al., 2021). That research studied the catch logbook system for small-scale fisheries, whereas this research focuses on the evaluation of measured fishing in the context of marine resource conservation and fishers' welfare.

B. RESEARCH METHODS

This research belongs into an empirical legal research, encompassing legal identification and research on legal effectiveness (Nugroho, Haryani, & Farkhani, 2020). The data sources used in this study include primary and secondary data. Primary data were obtained directly from informants in the field (Benuf & Azhar, 2020), while secondary data are data obtained from library materials (Fajar ND & Achmad, 2010) consisting of primary legal materials, secondary legal materials, and non-legal materials. Primary legal materials are authoritative in nature (Marzuki, 2005), in this study consisting of Law Number 6 of 2023 (amending Law Number 31 of 2004 concerning Fisheries), (Law of the Republic of Indonesia Number 6 of 2023 Concerning the Stipulation of Government Regulation in Lieu of Law Number 2 of 2022 Concerning Job Creation to Become Law, State Gazette of the Republic of Indonesia 2023 Number 41, 2023) Government Regulation Number 11 of 2023, and the Minister of Maritime Affairs' and Fisheries's Regulation Number 28 of 2023. Secondary legal materials aim to provide guidance in the direction of research (Marzuki, 2005), consisting of law books, legal scientific journals, legal research, and writings by legal experts specifically studying the measured fishing. Non-legal materials are literature in scientific fields other than law relevant to help answer the problems in this study (Fajar ND & Achmad, 2010), consisting of books, scientific journals, research, and writings from experts studing the measured fishing.

Primary data collection was conducted using interview techniques (Muhaimin, 2020). Interviews were conducted with several parties, including the Head of the Marine Resources and Fisheries Supervision Unit in Pati, and the Head of the Marine Resources and Fisheries Supervision Unit in Lamongan. Secondary data collection, consisting of primary legal materials, secondary legal materials, and non-legal materials, was conducted using library or document study techniques. This technique involves collecting, examining, and tracing legal materials (Bachtiar, 2019) by reading, viewing, and listening through various media (Fajar ND & Achmad, 2010). The use of infrastructure such as libraries or websites that can be scientifically accounted for is one part of this secondary data collection technique.

The veracity of primary data within this research was evaluated through the methodology of source triangulation, which entailed the juxtaposition of interview data, observational insights, and legal documents. Concurrently, the

dependability of the primary data was appraised utilizing a research instrument (interview instrument) that had undergone a rigorous validation process involving specialists in the domains of law, maritime affairs, and fisheries (Wiraguna, 2024). The techniques for data processing are enacted through the categorization of data to yield coherent and systematic insights (Nugroho, Haryani, & Farkhani, 2020). The data analysis phase of this inquiry was executed qualitatively to elucidate research findings (Nurhayati, Ifrani, & Said, 2021), with the interpretation of both primary and secondary data having undergone the preceding data processing activities (Muhaimin, 2020).

C. RESULTS AND DISCUSSION

This study was conducted in two marine surveillance areas off the northern coast of Java, specifically in Pati and Lamongan. In accordance with applicable laws and regulations (Peraturan Pemerintah Nomor 11 Tahun 2023 Tentang Penangkapan Ikan Terukur, 2023), this area is located in Zone 6 of the Republic of Indonesia's Fisheries Management Area (WPPNRI) 712. Fishers in the Pati region are very active in fishing and participate in fish exports to Vietnam and China, while fishers in the Lamongan region focus on fishing using traditional boats, with their main catches including kurisi, suanggi, and squid (Ariffien, Sudirman, & Juniati, 2024). This zone was selected as the subject of the study because it is a highly fished area; in fact, several studies have concluded that signs of overfishing are evident in this zone. The heavy maritime traffic in this zone is particularly relevant to study because a large number of fishers engage in fishing in accordance with established standards, namely Measured Fishing (Soeparna & Taofiqurohman, 2024). Limited resources for fisheries monitoring are confronted with the reality of vast fishing zones and the large number of fishers operating in these two marine areas using a wide variety of fishing gear (Nugroho et al., 2025).

1. The Concept of Measured fishing in Indonesia

Historically, the concept of measured fishing emerged as a result of the industrialization of the fishing industry following World War II (Ferguson-Cradler, 2023). This era has seen massive exploitation in the industrialization of the fishing industry, leading to the collapse of several global fish stocks (Finley, 2016). This is what subsequently led to the need for quota-based fisheries management. In addition, shifts in the global Blue Economy agenda have also spurred rapid progress in the concept of measured fishing (Ayilu, Fabinyi, & Barclay, 2022). The agenda focuses not only on fish catches as a source of economic support, but also on the sustainability of marine ecosystems (Sapriani, Kusumaningtyas, & Elfaki, 2024). Rapid technological advancements have also had a significant impact on the concept of measured fishing (Radi, Lamantia, & Bischi, 2025). This is because the success of global measured fishing policies implemented by

countries relies heavily on satellite-based reporting technology to ensure ongoing monitoring of compliance with quota regulations (Montana, 2025); (Willette et al., 2023).

Countries generally use quotas for fishing areas with economic and ecological goals as a way to measure fishing. The main difference is how positive we are that we can find the Maximum Sustainable Yield (MSY), which is meant to keep fish stocks healthy (Aprian et al., 2023); (Kanik & Kucuksenel, 2016). In other instances, certain nations have formulated the notion of measured fishing by implementing entire closure zones to promote ecosystem recovery in designated regions. On the other hand, some developing nations are embracing the idea of measured fishing in pilot programs to find a balance between protecting the environment and helping local fishermen make more money (Costello, 2024); (Kriegl et al., 2021); (Meilana et al., 2023); (Nessia et al., 2024).

The Measured Fishing Policy in Indonesia came about because of problems with managing fisheries, like overfishing, illicit fishing, and changes in the marine environment (Haryanto & Setiyono, 2017; Robin et al., 2025; Saraswati & Setiyono, 2017). Measured fishing stresses fishing that is controlled and proportional, takes place in set areas, and is based on fishing quotas. This is done to protect fish resources and the environment, as well as to promote fair national economic growth (Ngabalin, 2024). Control over fishing includes limits on the number of boats, the types of fish, the fishing season, the fishing gear, the local workforce, and the landing port (Iqbal et al., 2024). The technical implementation of measured fishing is done through a digital mechanism using an Android-based app. This is meant to help responsible quota-based fishing operations (Suharta, Bintoro, & Nugroho, 2025).

Measured fishing is a strategic programme introduced by the Ministry of Maritime Affairs and Fisheries of the Republic of Indonesia. It emphasises the development of the blue economy and is formally aimed at ensuring the sustainability of fish resources and improving the welfare of fishermen and regional economic growth (Mallak, 2002; Saraswati et al., 2025). The concept can maintain the sustainability of fish resources, thus ensuring that fish stocks can continue to be utilised in the future. However, it can raise social issues due to restrictions on catch volumes, which threaten fishers (Praza et al., 2024). Several studies have shown that the measured fishing concept, once implemented as a policy, has had no impact on fishers. Consequently, fishers continue to use traditional fishing methods, failing to separate fish by size or species. This ultimately increases catch volumes due to the perceived economic impact (Dewi, Sunarsih & Wardhani, 2021; Praza et al., 2025).

The established concept of Measured Fishing in Indonesia (Peraturan Pemerintah Nomor 11 Tahun 2023 Tentang Penangkapan Ikan Terukur, 2023), is a policy based on quotas and zoning in the context of the industry, local

fishers, and fish breeding, aimed at achieving sustainable fisheries. In addition, this concept aims to preserve the ecosystem and accelerate national economic equality. Certain scholars elucidate that the fundamental principle of the Measured Fishing policy is the delineation of fishing zones referred to as the Republic of Indonesia's Fisheries Management Areas (WPPNRI) alongside the execution of quota-based frameworks predicated on environmental carrying capacity (Zora, 2026). Broadly speaking, Measured Fishing aspires to attain a harmonious equilibrium between economic imperatives and ecological considerations, reconciling financial advantages with the sustainability of marine ecosystems, thereby ensuring the competitiveness of local fishers and augmenting governmental revenue derived from fisheries (Purwanto et al., 2025); (Sondita et al., 2025). This concept of Measured Fishing is subject to strict oversight, which involves the use of a Vessel Monitoring System (VMS), logbooks, and monitoring upon the fishing vessel's arrival at port (Han et al., 2025). This concept faces challenges related to fishing port infrastructure, the activities of traditional fishers, and quota transparency, which is fraught with social conflict (Azhar et al., 2018); (Hafel et al., 2025); (Hananto et al., 2023). Measured Fishing is consistent with the provisions of the United Nations Convention on the Law of the Sea (UNCLOS 1982), which grants states the rights and obligations to manage marine resources within their territorial waters and Exclusive Economic Zones (EEZs). Furthermore, the concept of Measured Fishing also implements the provisions of the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU Fishing 2001), which addresses the eradication of illegal fishing. Several countries have successfully implemented managed fishing policies, and Norway has been operating a strict management system for sustainable fisheries for several decades (Abe, Nøstbakken, & Wold, 2024). Norway strictly enforces a zone- and quota-based system to protect its marine ecosystems (Standal & Hersoug, 2023). In addition, Iceland is a country that employs an effective quota system and holds Responsible Fisheries Management certification to ensure the sustainability of its resources (Basoeki, Suadi, & Djumanto, 2026).

2. Understanding the Implementation of Measured Fishing in the North Java Sea

Regulations related to Measured fishing, having been established since 2023, are currently not optimally implemented in several areas of the North Java Sea. For example, in Juwana Pati, information was obtained that Measured fishing has not been implemented optimally because quotas have not been set, and the implementation of fishing in this area uses a post-production Non-Tax State Revenue (Pendapatan Negara Bukan Pajak or PNBP) collection system. Looking at the Measured fishing regulation explaining that fishing is carried out in a quota-based measured fishing zone, or carried out by Crew (ABK) involved in the

fishing prioritized to be domiciled in that zone, this has not been fully implemented and has resulted in suboptimal implementation of the regulation. The attempt to realize and implement the Measured fishing policy are principally due to the practice of some fishers fishing “recklessly” or as much as possible regardless of the quality of catch. If there is a very large catch of fish in one area due to unstructured fishing methods, this will have an impact on reducing the economic value of the catch. Therefore, limiting the number of fish to be caught can provide stability in the economic value of the fish caught by fishers (Armanto, 2025).

In other parts of the North Java Sea, such as the Lamongan region, the Measured Fishing Act has also been implemented. This is based on quotas and restrictions on fishing gear, such as trawls. These restricted gear specifications are also assigned quotas based on the quality of the vessels used for fishing. However, in reality, these fishing gear restrictions are still ignored by some fishers seeking larger catches. This raises concerns about the oversight mechanism for the implementation of the Measured Fishing Act (MSA) policy. Furthermore, the licensing process for fishers can also contribute to policy implementation, as complicated licensing can lead to the violations of MSA policy. A system is also in place to track fishers to ensure that they remain within the designated fishing zones. This simplifies the supervision mechanism against the fishers violating the regulations, allowing them to be sanctioned as a form of law enforcement within the MSA policy framework. This supervision aspect, in its implementation, faces limitations in human resources, and will be a focus for the future implementation of MSA policy (Suryono, 2025).

Sustainable fishing offers several opportunities for implementation, including: ensuring the sustainability of fish stocks to maintain a healthy and productive marine ecosystem; promoting economic equality through the WPPNRI; increasing income to support the development of fishing villages; and modernizing the industry through the use of modern technology and fishing gear to prevent illegal fishing (Novalino & Wulandari, 2024). The implementation of Measured Fishing also faces several challenges, namely: inadequate infrastructure that can disrupt the smooth operation of fishing activities; resistance from fishers regarding their understanding of quota limits and administrative processes; cost burdens such as the obligation to pay Non-Tax State Revenue (PNBP), which is considered to increase operational costs; data and monitoring related to the accuracy of quota setting due to limited fish stock data and a lack of on-site monitoring regarding fishers compliance with regulations; and the readiness of human resources to adapt to the quota system and new technologies (Nasution, Noviyanti, & Jalil, 2024); (Nugroho et al., 2025); (Nurlaela et al., 2025).

The North Java Sea forms part of the archipelagic waters defined in the 1982 United Nations Convention on the Law of the Sea (UNCLOS 1982). The legal status of these maritime areas is that of archipelagic waters connecting islands, thereby granting Indonesia full sovereignty to enforce its national laws (Kusuma & Kurnia, 2022; Pramono et al., 2025). This may explain why Indonesia's establishment of the concept of measured fishing as a national legal provision governing its archipelagic waters constituted an exercise of its sovereignty over the territory (Ambarsari et al., 2023; Magdariza, 2024). Therefore, within the framework of the relationship between national and international law, the provisions on measured fishing do not conflict with UNCLOS 1982.

3. Sustainability of Measured Fishing Regulations in the North Java Sea in Biodiversity and Fishers Welfare Dimensions

The implementation of Measured Fishing Regulations presents challenges in technical aspect. However, conceptually, the Measured Fishing Regulations includes a range of regulations encompassing environmental, economic, and social justice. Considering the technical challenges encountered in the implementation of Measured Fishing Regulations, this policy remains a viable solution to address the environmental damage in the North Java Sea and the challenges of improving the fishers welfare in the region. Several indicators that can be met in this context include the Measured Fishing Regulations restricting fishing gear deemed harmful to marine ecosystems, such as trawls, seines, and other micro-trawl-like gear (Armanto, 2025). Furthermore, the restrictions or quotas imposed by the Measured Fishing Regulations aim to maintain the economic value of fishers catches and prevent excessive accumulation of catches in one area, which could reduce their economic value (Suryono, 2025). In addition, Measured Fishing must be carried out through key stages, based on philosophical, sociological, and legal foundations, prioritizing sustainability to ensure the preservation of marine resources and the welfare of fishers. This serves as a reference in formulating the material content of the Measured Fishing regulations, along with the regulations under it (Peraturan Pemerintah Nomor 11 Tahun 2023 Tentang Penangkapan Ikan Terukur, 2023).

There are several indicators that can serve as benchmarks for the successful implementation of the measured fishing concept in Indonesia. First, digital transformation as a process of integration from upstream to downstream covering licensing, quotas, logbooks, and self-reporting procedures, in the implementation of measured fishing (Emery et al., 2025); (Kasmi et al., 2024); (Suherman et al., 2025). Second, technology that supports the monitoring process for real-time fishing surveillance (Dudi et al., 2025); (Jiang et al., 2024). This is crucial because

it helps prevent data manipulation by fishing operators. Third, accurate data validation is required through the presence of observers on board and the use of electronic logbooks to ensure that catch data is accurate and in line with established quotas (Emery et al., 2025); (Setyadji, Patmiarsih, & Raup, 2021). Fourth, zone-based fisheries management is based on quotas for specific zones, which are divided into industrial zones and local fishing zones, while ensuring the sustainability of fish stocks (Purba, Irawan, & Alda, 2024); (Sari et al., 2021). Fifth, law enforcement must be accompanied by strict administrative sanctions against fishing practices that violate quota or zoning regulations (Kuemlangan et al., 2023); (Sulistyo, Utama, & Putrijanti, 2026); (Yuan & Zhang, 2026). Sixth, establishing infrastructure connectivity to develop fishing ports as integrated industrial zones in support of measured fishing (Aritonang, Simatupang, & Handayati, 2025); (Badriyah et al., 2021); (Yuan & Pan, 2025). These indicators need to be established and consistently implemented to produce a measured fishing policy capable of protecting marine resources and promoting the well-being of communities, particularly fishers.

The comprehensive implementation of the Measured Fishing Policy can be achieved if each stage of the regulation is implemented consistently. These stages must be a system encompassing planning, implementation, supervision, and enforcement. At the field level, human resources must be strengthened quantitatively and proportionally to implement the system. This is because there is a need for sufficient human resources to monitor the vast marine area in the North Java Sea. Intensive mentoring is also needed to provide fishers with an understanding that the Measured Fishing Policy aims to achieve sustainable marine management prioritizing biodiversity protection and ishermen welfare in the North Java Sea (Suryono, 2025).

Indonesia has established a partnership with Norway to implement measured fishing policies. Satellite technology for the blue economy is a key focus of this partnership. This partnership involves Kongsberg Satellite Service (KSAT) of Norway in monitoring fishing activities to support satellite-based, targeted fisheries monitoring (Zucchetta et al., 2025). In addition, cooperation between Indonesia and Norway also includes the development of a marine resource inventory to assess the potential catch under quota systems. Furthermore, Indonesia and Norway have committed to combating Illegal, Unreported, and Unregulated (IUU) Fishing in order to ensure the sustainability of marine ecosystems (Ahlquist, Hatlebrekke, & Tiller, 2025); (Wicaksono, Kusumaningrum, & Sediyono, 2024). Indonesia and Norway have also established collaborations in the field of marine aquaculture, including the use of efficient and environmentally friendly vessel technology. Some of these collaborative initiatives aim to implement fisheries policies that

support the well-being of fishers and the sustainable conservation of biodiversity in Indonesia's marine waters (Kementerian Luar Negeri Republik Indonesia, 2025).

D. CONCLUSION

The implementation of the Measured Fishing Policy in the North Java Sea has been carried out with a focus on sustainability in maintaining biodiversity and fishers welfare. Several technical issues have emerged, such as the lack of proportion (quantitatively) in human resources, particularly in the implementation of the Measured Fishing Policy oversight. Furthermore, all fishers need clear information regarding the policy implementation. This is because the violations of the Measured Fishing Regulations are still found to be committed by some fishers, such as using prohibited fishing gear or falsifying documents on vessel specifications to gain significant profits (Soemarmi et al., 2025). This well-formulated Measured Fishing Policy needs to be strengthened in its implementation and supervision mechanisms to realize marine management while maintaining biodiversity and fishers welfare in the North Java Sea region.

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REFERENCES

JOURNALS

Abe, K., Nøstbakken, L., & Wold, M. F. (2024). Quota Consolidation in Norwegian Coastal Fisheries. *Environmental and Resource Economics*,*87*(5),1295–1326. https://doi.org/10.1007/s10640-024-00866-x

Agung, A., Zainuri, M., Wirasatriya, A., Maslukah, L., Subardjo, P., Suryosaputro, A. A. D., & Handoyo, G. (2018). Analisis Sebaran Klorofil-A dan Suhu Permukaan Laut sebagai Fishing Ground Potensial (Ikan Pelagis Kecil) di Perairan Kendal, Jawa Tengah. *Buletin Oseanografi Marina*, *7*(2), 67.https://doi.org/10.14710/buloma.v7i2.20378

Ahlquist, I. H., Hatlebrekke, H. H., & Tiller, R. (2025). Fishing for solutions: Norwegian fishers' perspectives on the implementation of automatic catch registration for combating IUU fishing. *Marine Policy*, *179*. https://doi.org/10.1016/j.marpol.2025.106750

Ambarsari, K. T., Ilham, R., Abidin, A. M. F., & Putri, A. D. A. (2023). Concept of Illegal Fishing for Indonesian Regulations and UNCLOS. *Yuridika*, *38*(1), 1–16. https://doi.org/10.20473/ydk.v38i1.38045

Aprian, M., Adrianto, L., Boer, M., & Kurniawan, F. (2023). Re-Thinking Indonesian Marine Fisheries Quota-Based Policy: a Qualitative

Network of Stakeholder Perception at Fisheries Management Area 718. *Ocean & Coastal Management*, *243*. https://doi.org/10.1016/j.ocecoaman.2023.106766

Aprian, M., Adrianto, L., Boer, M., Kurniawan, F., & Nurhijayat, A. (2024). Unexpected social change: The transformation of the Pati Regency's coastal community due to the Indonesian government's trawl restriction policy. *IOP Conference Series: Earth and Environmental Science*, *1400*(1). https://doi.org/10.1088/1755-1315/1400/1/012028

Ariffien, A., Sudirman, I., & Juniati, A. T. (2024). The Influence of Sustainable Captured Fish Supply Chain Management on the Quality of Sea-Caught Fish Exports. *Ilomata International Journal of Management*, *5*(1), 320–339. https://doi.org/10.52728/ijjm.v5i1.1041

Aritonang, L. R. Y., Simatupang, T. M., & Handayati, Y. (2025). Towards Quota-based Fishery: Current Status and Future Needs of The Quota-Based Fisheries Management in Indonesia. *Journal of Economics and Business*,*8*(2). https://doi.org/10.31014/aior.1992.08.02.674

Atmaja, S. B., Sadhotomo, B., & Nugroho, D. (2017). Overfishing pada Perikanan Pukat Cincin Semi Industri di Laut Jawa dan Implikasi Pengelolaannya. *Jurnal Kebijakan Perikanan Indonesia*, *3*(1), 51. https://doi.org/10.15578/jkpi.3.1.2011.51-60

Ayilu, R. K., Fabinyi, M., & Barclay, K. (2022). Small-Scale Fisheries in the Blue Economy: Review of Scholarly Papers and Multilateral Documents. *Ocean & Coastal Management*, *216*.https://doi.org/10.1016/j.ocecoaman.2021.105982

Azhar, M., Suhartoyo, S., ALW, L. T., Suharso, P., & Herawati, V. E. (2018). Protection of Traditional Fishermen in The Granting of Fishery Licenses in Indonesia. *E3S Web of Conferences*,*47*.https://doi.org/10.1051/e3sconf/20184707003

Badriyah, S. M., Mahmudah, S., Soemarmi, A., Suharto, R., Marjo, M., Allam, M. H. F., & Larasati, A. (2021). The Responsibility of Private Pawnshops in Facilitating Ecologically-Friendly Marine Economies. *Environment and Ecology Research*, *9*(6), 362–369. https://doi.org/10.13189/eer.2021.090604

Basoeki, S. S. P., Suadi, S., & Djumanto, D. (2026). Assessing Indonesia's Fishing Port Readiness for Implementing the Measured Fishing Policy Through Facility and Service Quality Assessment: Evidence From Two Ocean Fishing Ports. *Maritime Technology and Research*, *8*(2), 283032. https://doi.org/10.33175/mtr.2026.283032

Benuf, K., & Azhar, M. (2020). Metodologi Penelitian Hukum sebagai Instrumen Mengurai Permasalahan Hukum Kontemporer. *Gema Keadilan*, *7*(1), 20–33. https://doi.org/10.14710/gk.2020.7504

Dewi, K., Sunarsih, S., & Wardhani, L. T. A. L. (2021). Protection Efforts of Coral Reefs Ecosystem from Anthropogenic Threats at Karimunjawa National Park, Indonesia. *E3S Web of Conferences*, *317*. https://doi.org/10.1051/e3sconf/202131701100

Dudi, A., Collins, C., Nuno, A., & Karnad, D. (2025). Bridging Policy and Practice: a Review Of Monitoring, Control, and Surveillance in Managing Illegal Fishing in India. *Marine Policy*, *182*. https://doi.org/10.1016/j.marpol.2025.106881

Emery, T. J., Noriega, R., Parsa, M., Bromhead, D., & Timmiss, T. (2025). The Capability of Electronic Monitoring to Measure Logbook Reporting Performance and Improve Data for Scientific Analyses. *Fisheries Research*, *291*.https://doi.org/10.1016/j.fishres.2025.107518

Ferguson-Cradler, G. (2023). Managing Economies, Managing Nature: Industry and Regulation of Fisheries in the Post-War Soviet Union and Norway. *International Journal of Maritime History*, *35*(3), 475–492. https://doi.org/10.1177/08438714231182504

Ford, M., Hasbiyalloh, B., & Palmer, W. (2026). Unintended Consequences: The Impact of Policy Change on Indonesia's Commercial Fishing Sector. *Bulletin of Indonesian Economic Studies*, *62*(1), 83–108. https://doi.org/10.1080/00074918.2025.2565147

Hafel, A. P. K., Suryana, A. A. H., Nurhayati, A. N., & Maulina, I. (2025). Analisis Persepsi Masyarakat Nelayan Palabuhanratu Kabupaten Sukabumi Terhadap Rencana Pelaksanaan Kebijakan Penangkapan Ikan Terukur. *Journal Galung Tropika*, *14*(2), 234–245. https://doi.org/10.31850/jgt.v14i2.1317

Han, F., Liu, Y., Tian, H., Li, J., & Tian, Y. (2025). A Comprehensive Framework Incorporating Deep Learning for Analyzing Fishing Vessel Activity Using Automatic Identification System Data. *ICES Journal of Marine Science*,*82*(2). https://doi.org/10.1093/icesjms/fsae166

Hananto, P. W. H., Trihastuti, N., Prananda, R. R., Pratama, A. A., & Rahayu, H. E. P. (2023). The Challenge of Blue Economy in ASEAN 2023: Climate Change and Regional Security. *IOP Conference Series: Earth and Environmental Science*, *1270*(1). https://doi.org/10.1088/1755-1315/1270/1/012030

Haryanto, H., & Setiyono, J. (2017). Kebijakan Penenggelaman Kapal Asing Pelaku Illegal Fishing oleh Pemerintah Indonesia dalam Persfektif Hukum Pidana Internasional. *Law Reform*,*13*(1),70. https://doi.org/10.14710/lr.v13i1.15952

Iqbal, M., Tanhir, M. F., Apriliansyah, B. A., Pratama, X. C., Nadja, K. K., Lotaldy, A., & Wahyuningrum, P. I. (2024). Design and Development of a Deep Learning-Based

Automatic Fisheries Logbook Filling Tool. *Marine Fisheries : Journal of Marine Fisheries Technology and Management*, *15*(2),189–203. https://doi.org/10.29244/jmf.v15i2.47574

Jauhari, A., Arisandi, D. M., Sambah, A. B., & Alfarizi, W. (2018). Fish Catch Quota Assessment for Sustainable Marine Fisheries Resources in East Java. *International Journal of GEOMATE*, *15*(50). https://doi.org/10.21660/2018.50.7212

Jiang, Y., Huang, L., Liu, Y., & Wang, S. (2024). Impact of Digital Development and Technology Innovation on the Marine Fishery Economy Quality. *Fishes*, *9*(7), 266. https://doi.org/10.3390/fishes9070266

Kanik, Z., & Kucuksenel, S. (2016). Quota Implementation of The Maximum Sustainable Yield for Age-Structured Fisheries. *Mathematical Biosciences*, *276*, 59–66. https://doi.org/10.1016/j.mbs.2016.03.007

Kriegl, M., Elías Ilosvay, X. E., von Dorrien, C., & Oesterwind, D. (2021). Marine Protected Areas: At the Crossroads of Nature Conservation and Fisheries Management. *Frontiers in Marine Science*, *8*. https://doi.org/10.3389/fmars.2021.676264

Kuemlangan, B., Amidjogbe, E.-R., Nakamura, J., Tomassi, A., Hupperts, R., Bojang, B., & Amador, T. (2023). Enforcement Approaches Against Illegal Fishing in National Fisheries Legislation. *Marine Policy*,*149*.https://doi.org/10.1016/j.marpol.2023.105514

Kurnia, I., & Yuan Yuan, L. (2026). Inequality Between The Potential of Fishery Resources and The Poverty Level of Fisherman Communities in Coastal Areas. *Law Reform*, *22*(1), 1–34. https://doi.org/10.14710/lr.v22i1.76139

Kusuma, W., & Kurnia, A. C. (2022). Kerentanan Pulau Terluar dalam Menjaga Kedaulatan Negara dalam Kerangka Hukum Laut Internasional. *Jurnal Pembangunan Hukum Indonesia*,*4*(3),447–458. https://doi.org/10.14710/jphi.v4i3.447-458

Kusumawardhani, H. A., Susilowati, I., & Hadiyanto, H. (2023). Vulnerable yet Viable: Stakeholders' Role in Small-Scale Fishermen Governance towards Viable Life. *Wseas Transactions On Environment And Development*,*19*,207–217. https://doi.org/10.37394/232015.2023.19.18

Lestari, M. M., & Ariadno, M. K. (2019). The Importance of Internal Waters Delimitation to Secure State Sovereignty: A Case of Archipelagic State of Indonesia. *Pertanika Journal Social Sciences & Humanities,* *27*(3).http://www.pertanika.upm.edu.my/pjssh/browse/regular-issue?article=JSSH(S)-1081-20

Magdariza, M. (2024). Implementasi Pengaturan Traditional Fishing Rights Dalam Hukum Indonesia. *Nagari Law Review, 7*(3), 649.

https://doi.org/10.25077/nalrev.v.7.i.3.p.649-659.2024

Maria, N. S. B., Susilowati, I., Iskandar, D. D., Al Hafidz, Z., Furoida, A. N., Wardhani, A. A., & Suciati, I. (2026). Mapping The Potential of The Blue Economy in Efforts to Improve The Welfare of Small-Scale Fishers, Case Study of Morodemak Village, Demak Regency, Central Java Province. *AACL Bioflux*,*19*(1),227–240. https://scholar.undip.ac.id/en/publications/mapping-the-potential-of-the-blue-economy-in-efforts-to-improve-t/

McKenna, K., Adhuri, D. S., Stacey, N., Zamroni, A., Fitriana, R., Ninef, J. S. R., Safitri, W., Lasmi, & Nalle, T. (2025). The Behavioral Drivers of Illegal Indonesian Small-Scale Transboundary Fishing in the Australian Fishing Zone. *Maritime Studies*, *24*(4), 62. https://doi.org/10.1007/s40152-025-00451-y

Meilana, L., Fang, Q., Susanto, H. A., Widiastutik, R., Syaputra, D. E., Ikhumhen, H. O., Sholihah, R., Hakim, A., Yang, S., & Liu, Z. (2023). How Indonesian Marine Protected Areas (MPAs) are Doing: a Management Performance-Based Evaluation. *Biological Conservation*,*282*.https://doi.org/10.1016/j.biocon.2023.110033

Montana, J. (2025). Co-Producing Fisheries Governance with New Data Technologies: Satellite Tracking Turtles and Fishing Vessels for Co-Management and Marine Protection. *Environment and Planning E: Nature and Space*, *8*(4), 1196–1212. https://doi.org/10.1177/25148486251337250

Nasution, Z., Noviyanti, R., & Jalil, J. (2024). Strategi Pengawas Perikanan Pada Stasiun Psdkp Belawan Dalam Rangka Peningkatan Kepatuhan Penangkapan Ikan Terukur Di Pelabuhan Perikanan Samudera Belaw. *Techno-Fish,8*(2),190–207. https://ejournal.unitomo.ac.id/index.php/perikanan/article/view/9183

Nessia, H. R., Hanns, B. J., Haggitt, T. R., & Shears, N. T. (2024). Using Marine Protected Areas to Assess the Status and Recovery of the Spiny Lobster Jasus Edwardsii Fishery in The Hauraki Gulf, Aotearoa New Zealand. *Frontiers in Marine Science*,*11*. https://doi.org/10.3389/fmars.2024.1440350

Ngabalin, A. M. (2024). Application of Measured Fishing Method in Kei Islands, Maluku Province. *Jurnal Ilmiah Manajemen Kesatuan*,*12*(5),1491–1498. https://doi.org/10.37641/jimkes.v12i5.2793

Novalino, D., & Wulandari, N. (2024). Implementation of the Measured Fishing Policy-Penangkapan Ikan Terukur (PIT) in the Riau Islands Province. *Journal of Maritime Policy Science*, *1*(3), 119–127. https://doi.org/10.31629/jmps.v1i3.6946

Nugroho, P. C., Suherman, A., Jayanto, B. B., Hernuryadin, Y., Suroso, W., & Kurohman, F. (2025). Faktor-Faktor yang Mempengaruhi Implementasi Kebijakan

Penangkapan Ikan Terukur di Pelabuhan Perikanan Pantai Tamperan, Pacitan, Jawa Timur. *Jurnal Kebijakan Perikanan Indonesia*, *17*(2), 91. https://doi.org/10.15578/jkpi.17.2.2025.91-104

Nurhayati, Y., Ifrani, I., & Said, M. Y. (2021). Metodologi Normatif dan Empiris dalam Perspektif Ilmu Hukum. *Jurnal Penegakan Hukum Indonesia*, *2*(1), 1–20. https://doi.org/10.51749/jphi.v2i1.14

Nurlaela, E., Ripaldi, M., Saputra, A., Choerudin, H., & Nababan, S. P. (2025). Effectiveness of Measured Fishing Policy and Post-Production Non-Tax State Revenue Mechanism at Klidang Lor Coastal Fisheries Port, Central Java. *ALBACORE Jurnal Penelitian Perikanan Laut*, *9*(2), 155–173. https://doi.org/10.29244/core.9.2.155-173

Pramono, B., Pramono, A., & Umar, R. I. (2025). Determination of Indonesian Islands Sea Lane as a Tools of Providing Legal Certainty for Foreign Flag Vessels Through Indonesian Waters. *Perspektif Hukum*, 187–203. https://doi.org/10.30649/ph.v25i1.390

Prasetyo, B., Aisya, A., & Monica, M. (2022). Sosialisasi Kegiatan Ekonomi Perikanan Masyarakat sebagai Upaya Pencegahan Ilegal Fishing serta Dampaknya bagi Ekosistem Perairan di Kelurahan Kameloh Baru Kecamatan Sebangau Kota Palangka Raya. *Mangente: Jurnal Pengabdian Kepada Masyarakat*, *2*(1), 125. https://doi.org/10.33477/mangente.v2i1.3301

Praza, R., Yunanda, R., Fariadi, D., Saputra, S., & Astuti, D. (2024). Social and Economic Impact of Measurable Fishing Policies on Fishermen in North Aceh Regency. *Proceedings of Malikussaleh International Conference on Multidisciplinary Studies (MICoMS)*,*4*,20. https://doi.org/10.29103/micoms.v4i.903

Praza, R., Yunanda, R., Fasya, T. K., Fariadi, D., Wahyuni, F., & Hilda, R. (2025). Adaptive Strategy for Fisher Empowerment to the Impact of Measured Fishing Policy in North Aceh Regency. *Veredas Do Direito*, *22*. https://doi.org/10.18623/rvd.v22.n2.3212

Purba, R. P., Irawan, M. D., & Alda, M. (2024). Implementasi Sistem Informasi E-Log Book Penangkapan Ikan di Dinas Kelautan dan Perikanan Sumatera Utara. *Journal of Information Technology*, *4*(2), 211–216. https://doi.org/10.46229/jifotech.v4i2.940

Purwanto, H., Suharta, Bintoro, S., Pratama, F. S., & Maulana, I. (2025). SWOT Analysis of Transhipment Relaxation Impact on Measured Fishing Program (PIT) Policy Implementation. *ALBACORE Jurnal Penelitian Perikanan Laut*, *9*(2), 125–139. https://doi.org/10.29244/core.9.2.125-139

Purwanto, P. (2015). Perkembangan dan Potensi Produksi Perikanan Pelagis Kecil, Serta Strategi Pemulihan Sumber Daya Ikannya di Laut Jawa. *Jurnal Penelitian Perikanan*

Indonesia,*21*(1),25. https://doi.org/10.15578/jppi.21.1.2015.25-36

Putra, A., & Arafat, Y. (2021). Penyelenggaraan Pembangunan NKRI Menuju Negara Maritim Berdasarkan Prinsip Negara Kepulauan. *JURNAL AKTA YUDISIA*, *3*(1). https://doi.org/10.35334/ay.v3i1.982

Radi, D., Lamantia, F., & Bischi, G. I. (2025). Benefits and Perils of Integrated Data Systems in Managing Sustainable Fishing Quotas. *Environmental and Resource Economics*,*88*(11),2845–2883. https://doi.org/10.1007/s10640-025-00979-x

Rahayu, D. P., Faisal, F., Sari, R., & Satrio, N. (2020). Law Enforcement in the Context of Legal Culture in Society. *Law Reform*, *16*(2),276–289. https://doi.org/10.14710/lr.v16i2.33780

Risnain, M. (2021). The Concept of The Archipelagic Province and Archipelagic State in The Perspective of National and International Law. *Lampung Journal of International Law*, *3*(2), 73–84. https://doi.org/10.25041/lajil.v3i2.2367

Robin, Taswin Munie, M., Hamka, E., & Mansyur, L. O. (2025). The Fuzzy Cognitive Mapping of Stakeholders Related to the Measured Fishing Policy (In Southeast Sulawesi). *Sodality: Jurnal Sosiologi Pedesaan*, *13*(1), 56–67. https://doi.org/10.22500/13202555185

Roisah, K., Rahayu, R., Susetyorini, P., Yusliwidaka, A., & Aziz, S. N. A. (2024). Measurable Fishing as An Attempt of Preventing Overfishing Phenomenon in Indonesian Waters. *Lex Scientia Law Review*,*8*(1),385–404. https://doi.org/10.15294/lslr.v8i1.2054

Roisah, K., Rahayu, R., Yusliwidaka, A., Mubarok, Z., & Buditama, A. (2023). Legal Development in the Overcoming Overfishing in Indonesian Coastal Areas. *Journal of Indonesian Legal Studies*, *8*(2). https://doi.org/10.15294/jils.v8i2.69358

Sapriani, S., Kusumaningtyas, R. O., & Elfaki, K. E. (2024). Strengthening Blue Economy Policy to Achieve Sustainable Fisheries. *Journal of Sustainable Development and Regulatory Issues (JSDERI)*, *2*(1), 1–19. https://doi.org/10.53955/jsderi.v2i1.23

Saraswati, D. A., & Setiyono, J. (2017). Yurisdiksi Kriminal Negara dalam Penenggelaman Kapal Pelaku Tindak Pidana Illegal Fishing di Perairan Indonesia. *Law Reform*, *13*(2),180. https://doi.org/10.14710/lr.v13i2.16154

Saraswati, R., Hananto, P. W., Prananda, R. R., Mahramhafiz, M., & Pennesi, L. (2025). The Role of Indonesia as a Presidency for ASEAN and Blue Economy's driver: SDG's Issues and Legal Perspective. *Law Reform*,*21*(1),180–202. https://doi.org/10.14710/lr.v21i1.67157

Sari, I., Ichsan, M., White, A., Raup, S. A., & Wisudo, S. H. (2021). Monitoring Small-Scale Fisheries Catches in Indonesia Through a Fishing Logbook System: Challenges and Strategies. *Marine Policy*, *134*.https://doi.org/10.1016/j.marpol.2021.104770

Sari, W. K., Rahmalinda, W. P. F., Harlyan, L. I., Sambah, A. B., Matsuishi, T. F., & Rust, S. (2025). Fishing Area Mapping and Gear Competition in Paiton Waters, East Java, Indonesia. *Biodiversitas Journal of Biological Diversity*, *26*(2). https://doi.org/10.13057/biodiv/d260211

Setyadji, B., Patmiarsih, S., & Raup, S. Abd. (2021). Langkah Awal Penggunaan E-Log Book sebagai Data Dasar Pengelolaan Perikanan Rawai Tuna yang Berkelanjutan. *Jurnal Kebijakan Perikanan Indonesia*, *13*(2).https://doi.org/10.15578/jkpi.13.1.2021.85-94

Soemarmi, A., Indarti, E., Pujiyono, P., & Diamantina, A. (2019). Konsep Negara Kepulauan dalam Upaya Perlindungan Wilayah Pengelolaan Perikanan Indonesia. *Masalah-Masalah Hukum*, *48*(3), 241. https://doi.org/10.14710/mmh.48.3.2019.241-248

Soemarmi, A., Setyawanta Rebala, L. T., Herawati, R., Ayiliani, F. M., & Gunawan (2025). Fisheries Law Investigation in Coastal Areas and Small Islands in a Progressive Law Perspective. *IOP Conference Series: Earth and Environmental Science*, *1537*(1). https://doi.org/10.1088/1755-1315/1537/1/012071

Soeparna, I. I., & Taofiqurohman, A. (2024). Transversal Policy Between The Protection of Marine Fishery Resources and Fisheries Subsidies to Address Overfishing in Indonesia. *Marine Policy*, *163*. https://doi.org/10.1016/j.marpol.2024.106112

Sondita, M. F. A., Darmawan, Purbayanto, A., Zulkarnain, Simbolon, D., & Wahju, R. I. (2025). Consideration of Fish Stock Dynamics for the Implementation of Fishing Precision Policy. *ALBACORE Jurnal Penelitian Perikanan Laut*, *9*(2), 249–260. https://doi.org/10.29244/core.9.2.249-260

Sondita, M. F. A., Ramdhani, N. M., & Nurani, T. W. (2022). Strategi Pengembangan Pemantauan Kuota Penangkapan Ikan untuk Suatu Wilayah Pengelolaan Perikanan di Indonesia. *Marine Fisheries : Journal of Marine Fisheries Technology and Management*,*13*(1),15–29. https://doi.org/10.29244/jmf.v13i1.36354

Standal, D., & Hersoug, B. (2023). Illegal fishing: A Challenge to Fisheries Management in Norway. *Marine Policy*, *155*. https://doi.org/10.1016/j.marpol.2023.105750

Suharta, Bintoro, S., & Nugroho, S. (2025). Analysis of the Implementation of Electronic Measurable Fishing Information System (e-

PIT) at Tegalsari Fishing Port. *International Journal of Multidisciplinary Research and Growth Evaluation*,*6*(2),01–11. https://doi.org/10.54660/.IJMRGE.2025.6.2.01-11

Suherman, A., Nurul Huda, H., Timilsina, R. R., Hernuryadin, Y., Untoro, F., Amboro, R. T., Sock, F., & Koirala, P. (2025). Scaling Digital Fisheries Management: The Role of e-PIT in Enhancing Data Accuracy and Operational Efficiency. *Jurnal Ilmiah Perikanan Dan Kelautan*, *17*(2), 404–420. https://doi.org/10.20473/jipk.v17i2.69393

Sulistyo, T. S., Utama, Y. J., & Putrijanti, A. (2026). Maritime Sanctions and Shadow Economy: Rethinking How Flag States Enforce Administrative Penalties on Dark Fleet Vessels. *Lex Portus*, *12*(1). https://doi.org/10.62821/lp12103

Taurusman, A. A., Wulandari, T. L., Nurani, T. W., Wiryawan, B., Yulianto, I., Novita, Y., & Wahju, R. I. (2025). Assessing the Indicated Impact of Cantrang (Boat Danish Seine) based on Catch Characteristics in Java Sea, Indonesia. *Fisheries and Aquatic Sciences*, *28*(5),343–355. https://doi.org/10.47853/FAS.2025.e30

Tirtadanu, Prihatiningsih, Yusuf, H. N., Zamroni, A., Amri, K., & Chodrijah, U. (2023). Assessing the Stock Status of Areolate Grouper (Epinephelus areolatus) in Java Sea, Indonesia. *Regional Studies in Marine Science*,*66*. https://doi.org/10.1016/j.rsma.2023.103116

Trenggono, S. W. (2023). Penangkapan Ikan Terukur berbasis Kuota untuk Keberlanjutan Sumber Daya Perikanan di Indonesia. *Jurnal Kelautan Dan Perikanan Terapan (JKPT)*,*1*,1. https://doi.org/10.15578/jkpt.v1i0.12057

Wartini, S. (2020). The Implementation of Establishing Marine Protected Area: Lessons Learned From Raja Ampat to Achieve Sustainable Fishery. *Law Reform*,*16*(2),224–242. https://doi.org/10.14710/lr.v16i2.33774

Wicaksono, J. A., Kusumaningrum, R., & Sediyono, E. (2024). Sentiment Analysis of Public Response to Measurable Fishing Capture Policy Using LDA and LSTM Methods.*TELKOMNIKA(Telecommunication Computing Electronics and Control)*, *22*(6),1405.https://doi.org/10.12928/telkomnika.v22i6.25935

Willette, D. A., Ababouch, L., Barber, P. H., Bunje, P. M. E., Cauzac, J.-P., Conchon, A., & Trenkel, V. M. (2023). Emerging Monitoring Technologies to Reduce Illegal Fishing Activities at Sea and Prevent Entry of Fraudulent Fish Into Markets. *Frontiers in Sustainable Food Systems*, *7*. https://doi.org/10.3389/fsufs.2023.1166131

Windupranata, W., Nusantara, C. A. D. S., & Nuraghnia, A. (2024). Variasi Spasial Karakteristik Pasang Surut di Laut Jawa Berbasiskan Model Pasut Global TPXO9v5. *Buletin Oseanografi Marina*, *13*(2), 239–249.

https://doi.org/10.14710/buloma.v13i2.59689

Wiraguna, S. A. (2024). Metode Normatif dan Empiris dalam Penelitian Hukum: Studi Eksploratif di Indonesia. *Public Sphere: Jurnal Sosial Politik, Pemerintahan Dan Hukum*,*3*(3). https://doi.org/10.59818/jps.v3i3.1390

Wisnaeni, F., Diamantina, A., Indarja, Sejati, A. B., & Firjatullah, M. G. (2025). Optimizing Blue Justice in the Protection of Small-Scale Fishermen in the Coastal Region of Yogyakarta. *IOP Conference Series: Earth and Environmental Science*, *1537*(1). https://doi.org/10.1088/1755-1315/1537/1/012012

Yuan, W., & Pan, X. (2025). The Fishing Moratorium Regime Under the Framework of Global Marine Governance: Insights from China. *Frontiers in Marine Science*, *12*. https://doi.org/10.3389/fmars.2025.1679193

Yuan, W., & Zhang, L. (2026). Curbing IUU Fishing by Enforcing the Port State Measures Agreement. *Frontiers in Marine Science*,*13*. https://doi.org/10.3389/fmars.2026.1775690

Zora, Z. (2026). Hak Nelayan Tradisional Indonesia atas Perikanan di Wilayah Pengelolaan Perikanan Republik Indonesia. *Unes Journal of Swara Justisia*, *9*(4), 727–733. https://doi.org/10.31933/ey0kxr13

Zucchetta, M., Madricardo, F., Ghezzo, M., Petrizzo, A., & Picciulin, M. (2025). Satellite-Based Monitoring of Small Boat for Environmental Studies: A Systematic Review. *Journal of Marine Science and Engineering*,*13*(3),390. https://doi.org/10.3390/jmse13030390

CONFERENCE / PROCEEDINGS

Costello, M. J. (2024). Fully Protected Marine Protected Areas Do Not Displace Fisheries. *Proceedings of the National Academy of Sciences (PNAS)*, *121*(34). https://doi.org/10.1073/pnas.2412543121

Kasmi, M., Abdullah, A., Makkulawu, A., Aman, A., & Mariam, M. (2024). Designing a Digital Logbook System to Improve Fishermen's Data Management. *Proceedings of the 2nd International Conference on Environmental, Energy, and Earth Science, ICEEES 2023, 30 October 2023, Pekanbaru, Indonesia*. https://doi.org/10.4108/eai.30-10-2023.2343083

Mallak, L. A. (2002). Challenges in implementing e-learning. In *PICMET '01. Portland International Conference on Management of Engineering and Technology. Proceedings Vol.1: Book of Summaries (IEEE Cat. No.01CH37199)*, pp.298–299. Portland: IEEE. https://doi.org/10.1109/picmet.2001.952186

REFERENCE ARTICLE

Finley, C. (2016). The Industrialization of Commercial Fishing, 1930–2016. In *Oxford*

Research Encyclopedia of Environmental Science. Oxford University Press. https://doi.org/10.1093/acrefore/9780199389414.013.31

BOOKS

Bachtiar, B. (2019). *Metode Penelitian Hukum*. Serang: UNPAM Press.

Fajar ND, M., & Achmad, Y. (2010). *Dualisme Penelitian Hukum: Normatif & Empiris*. Yogyakarta: Pustaka Pelajar.

Marzuki, P. M. (2005). *Penelitian Hukum: Edisi Revisi*. Jakarta: Kencana.

Muhaimin. (2020). *Metode Penelitian Hukum*. Mataram: Mataram University Press.

Nugroho, S. S., Haryani, A. T., & Farkhani, F. (2020). *Metodologi Riset Hukum*. Madiun: Oase Pustaka.

Nurlaela, E. (2023). Penangkapan Ikan Terukur: Tantangan dan Penerapan. In Khairul Amri et al (Eds.). *Pengelolaan Sumber Daya Perikanan Laut Berkelanjutan*. Penerbit BRIN.https://doi.org/10.55981/brin.908.c759

REGULATIONS

Peraturan Menteri Kelautan Dan Perikanan Nomor 28 Tahun 2023 Tentang Peraturan Pelaksanaan Peraturan Pemerintah Nomor 11 Tahun 2023 Tentang Penangkapan Ikan Terukur, Pub. L. 28, Berita Negara Republik Indonesia (2023).

Peraturan Pemerintah Nomor 11 Tahun 2023 Tentang Penangkapan Ikan Terukur (2023). Retrieved from https://peraturan.bpk.go.id/Details/244907/pp-no-11-tahun-2023

ONLINE SOURCE

Kementerian Luar Negeri Republik Indonesia. (2025). *Indonesia dan Norwegia Selenggarakan Ocean Dialogue Pertama di Oslo*. Kementerian Luar Negeri RI. Retrieved from https://kemlu.go.id/berita/indonesia-dan-norwegia-selenggarakan-ocean-dialogue-pertama-di-oslo?type=publication

INTERVIEWS

Armanto, S. (2025). The Marine and Fisheries Resources Supervision Resource Person in Pati. Pati: 15 October 2025.

Suryono, S. (2025). The Marine and Fisheries Resources Supervision Resource Person in Lamongan. Lamongan: 16 October 2025.