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Original research article.

Analysis of Lobster Production and Resource Management in West Java Province, Indonesian Fisheries Management Area (IFMA) 573

Efrillia Nabila Fauzy*¹, Bintang Sanjari¹, Bima Prayasa Adisati¹, Septinawati¹, Ahmad Maulana Malik¹, David N. Ogbonna², Sudirman Adibrata¹

¹*Aquatic Resources Management Study Program, Faculty of Agriculture, Fishery and Marine Science, Bangka Belitung University, Indonesia*

²*Department of Microbiology, Rivers State University, Nkpulu Oroworukwo, P.M.B. 5080, Port Harcourt, Nigeria*

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ABSTRACT

Lobster is a high-value fishery commodity in the southern coastal waters of West Java, which are included in IFMA 573. Increasing market demand has led to higher lobster fishing activities, potentially threatening the sustainability of lobster resources. This study aims to analyze lobster production in West Java from 2019–2024, identify the dominant lobster species, examine the factors influencing lobster exploitation, formulate sustainable lobster management strategies, and analyze government efforts to support sustainable lobster resource management in IFMA 573. The study was conducted from April to May 2025 using data obtained from the Ministry of Marine Affairs and Fisheries. A literature review method with a qualitative descriptive approach was employed, drawing on lobster production data and relevant scientific literature to analyze trends and related issues in lobster fisheries. The results showed that lobster production in West Java fluctuated, with the highest production recorded in 2020 at 167.36 tons and the lowest in 2023 at 24.42 tons. The dominant lobster species found were sand lobster (*Panulirus homarus*), pearl lobster (*Panulirus ornatus*), and bamboo lobster (*Panulirus versicolor*). The high fishing activity has caused lobster utilization to reach a fully exploited status, requiring sustainable management through minimum catch size regulations, fishing effort control, stock monitoring, the use of environmentally friendly fishing gear, supervision of illegal fishing, and lobster aquaculture development to ensure the sustainability of lobster resources.

*Corresponding author:

Email address: efrillianabila011@gmail.com

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Introduction

Indonesia is an archipelagic nation with vast potential for marine fishery resources, one of which is the lobster (*Panulirus* spp.), which has high economic value and is a leading export commodity. Lobsters are commonly found in tropical waters with coral reef and rocky ecosystems. High demand in both domestic and international markets has led to a steady increase in lobster fishing activity year after year. Lobster, as a leading capture fishery commodity, has a high export value, particularly to the East Asian market (MMAF, 2023). This situation makes lobster a vital source of income for coastal fishermen, but on the other hand, it also has the potential to put pressure on the sustainability of wild lobster stocks (Nurfirani & Wijaya, 2019).

One of the key areas for lobster fishery management in Indonesia is the Indonesian Fisheries Management Area (IFMA) 573, which covers the Indian Ocean from southern Java to Nusa Tenggara. This area is known as a center for sand lobster (*Panulirus homarus*) fishing, with a fairly intensive level of utilization. In West Java, particularly from Pangandaran waters to Palabuhan Ratu Bay, lobster fishing activity is quite high due to favorable oceanographic conditions. Dominant oceanographic parameters, such as sea surface temperature and chlorophyll-a concentration, support the existence of fishery resources. Research by Panggabean *et al.* (2023) indicates that the southern coast of West Java is a potential fishing ground in the Indonesian Fisheries Management Area (IFMA) 573, particularly from Pangandaran waters to the coast of Palabuhan Ratu. Common fishing gear used includes traps (fish traps/bubu) and gill nets, which are operated in coral and rocky waters, the primary lobster habitat (FAO, 2023; MMAF, 2023). Fishing activity in IFMA 573 occurs year-round, with catches still

dominated by small or unfishable lobsters. This situation indicates exploitation pressure that could lead to stock decline if not balanced with sustainable management (Suman *et al.*, 2019).

The pressure on lobster exploitation in the 573 Indonesian Fisheries Management Area (IFMA) is also reflected in several studies indicating overfishing of sand lobsters. Exploitation rates exceeding the optimum limit indicate excessive fishing, threatening the sustainability of wild lobster populations. Furthermore, catching lobsters that have not yet reached gonad maturity can hinder stock regeneration. Therefore, sustainability-based management is essential through regulating catch sizes, reducing fishing effort, and monitoring lobster fishing activities in the 573 Indonesian Fisheries Management Area (IFMA) (Tirtadanu *et al.*, 2022).

In the context of national fisheries management, West Java is closely linked to lobster resource utilization, as the majority of coastal communities rely on capture fisheries and coastal ecosystems for their livelihoods. West Java, particularly the southern coastal areas, boasts significant lobster resource potential due to the favorable conditions of the Indian Ocean and the presence of coral reef ecosystems that serve as lobster habitats. Living fringing reefs closer to shore are dominated by healthy life forms, while some contain dead coral and algae, providing habitat for a variety of fish and crayfish species (Adibrata *et al.*, 2023). Therefore, information on the condition of lobster resources in IFMA 573 can be an important reference in developing sustainable lobster fisheries management in coastal areas of Indonesia, including as a consideration for aquatic resource management in West Java to maintain a balance between economic utilization and marine resource sustainability (Panggabean *et al.*, 2023). The objectives of this study were to

analyze lobster production in West Java from 2019–2024, identify the dominant lobster species, examine the factors influencing lobster exploitation, formulate sustainable lobster management strategies, and analyze government efforts to support the sustainable management of lobster resources in the Indonesian Fisheries Management Area (IFMA) 573.

Methods

Time and Location

This research was conducted in April to May 2025, located in the southern waters of West Java Province (Figure 1), from Pangandaran to Pelabuhan Ratu. This location was chosen because it is an area with high lobster fishing activity in the Indonesian Fisheries Management Area (IFMA) 573.

Tools and Materials

Table 1. Tools and Materials

No	Tools/Materials	Use
1	Laptop	Used for writing articles and processing research data
2	Microsoft Word	Used for writing and compiling scientific articles
3	Microsoft Excel	Used for processing lobster production data and creating graphs
4	Scientific articles and research journals	Used as data sources and research references
5	Statistical data from the Ministry of Maritime Affairs and Fisheries (MMAF)	Used for lobster production and fisheries data
6	Data and information from the Indonesian Fisheries Management Area (IFMA) 573	Used to support research area analysis

Research Methods

This study employed a literature review with both qualitative and quantitative descriptive approaches. The study was conducted by collecting and reviewing various scientific articles, research journals, and lobster production data related to the potential and management of lobster resources in the southern waters of West Java, IFMA 573. The data used covered lobster production for 2019–2024. The study results were then analyzed descriptively to explain the current state of lobster resource utilization and efforts to manage them sustainably in the southern waters of West Java. Lobster catch data was used to support the analysis of lobster resource conditions and their sustainable management in the study area.

Data Analysis

This study used descriptive qualitative and quantitative methods by reviewing and comparing findings from scientific journals, government reports, fisheries statistics, and lobster production data from 2019–2024. The collected data were compiled and interpreted to describe lobster production trends, dominant lobster species, factors influencing lobster exploitation, sustainable management strategies, and government efforts in lobster resource management in the West Java 573 Indonesia Fisheries Management Area (IFMA). The results of the analysis were used to describe the condition of lobster resources and support sustainable management in the West Java 573 Indonesian Fisheries Management Area (IFMA) (Suman *et al.*, 2019).

Results and Discussion

General Overview of IFMA 573 and West Java Waters

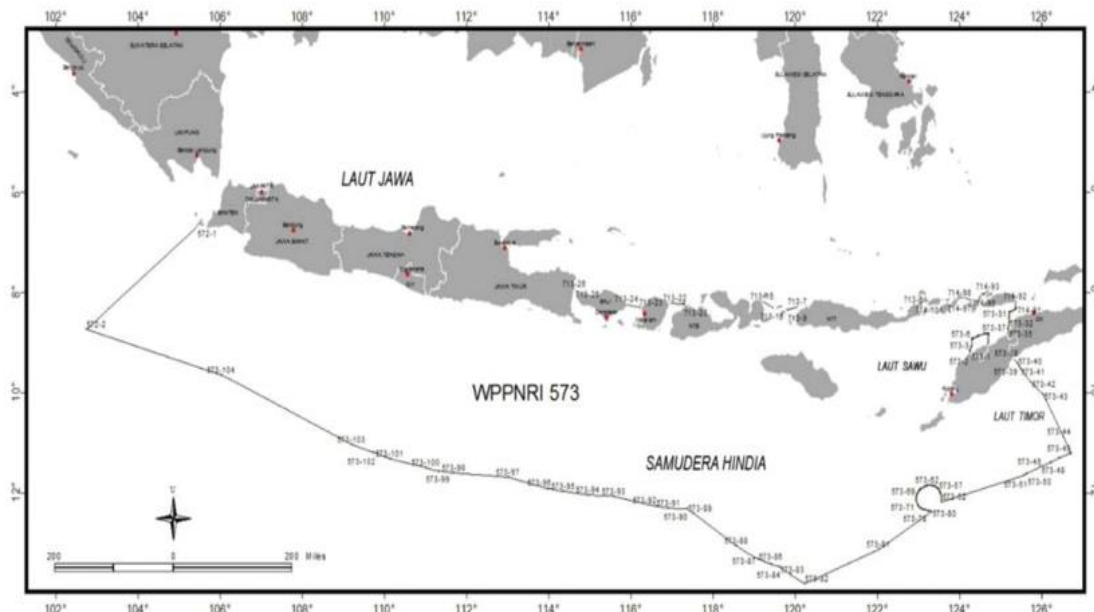


Figure 1. Map of the West Java Region of IFMA 573
Source: (MMAF, 2014)

The southern waters of West Java, from Pangandaran waters to Palabuhanratu, are areas with quite high lobster fishing activity in IFMA 573 (Rahayu *et al.*, 2024). IFMA 573 is a fisheries management area encompassing the southern Indian Ocean from Java Island to Nusa Tenggara, the Sawu Sea, and the western Timor Sea. This region has high fisheries resource potential due to the influence of upwelling phenomena that increase water fertility and nutrient availability for marine organisms. The combination of favorable oceanographic conditions and abundant marine resources makes this area an important habitat for lobster populations and supports the sustainability of lobster fisheries. West Java Province is one of the areas covered by IFMA 573, particularly in the southern coastal areas such as Palabuhan Ratu and Pangandaran, which are important lobster fishing grounds in Indonesia (Bussalam & Junianto, 2024).

The habitat conditions in the form of coral reefs and rocky water beds

support the life of various types of lobster, especially sand lobster (*Panulirus homarus*). Coral reef ecosystems and rocky substrates play an important role in maintaining lobster populations by providing suitable habitats for shelter, feeding, and juvenile development (Tirtadanu *et al.*, 2022). In addition, environmental factors such as sea surface temperature, ocean currents, and primary productivity influence lobster distribution and population dynamics, indicating that habitat quality and oceanographic conditions are important considerations for sustainable lobster fisheries management (Pancoro *et al.*, 2024). These favorable habitat and environmental conditions support productive lobster fisheries, making the southern waters of West Java one of the important lobster utilization areas in IFMA 573. Therefore, lobster resource management needs to be carried out sustainably to maintain the balance between resource utilization and conservation (Tirtadanu *et al.*, 2022).

Lobster Production in West Jawa

Based on Table 2, lobster production in West Java during the 2019–2024 period exhibited a fluctuating pattern. The highest production occurred in 2020, at 167.36 tons, with a production value of IDR 41,788,032,000. This high production reflects increased lobster fishing activity and high market demand

for lobster (Pinandito, 2021). However, lobster production declined from 2021 to 2023 before increasing again in 2024 to 75.19 tons. These fluctuations indicate that lobster production may be influenced by changes in environmental conditions and resource availability, which affect lobster distribution and catch levels (Pancoro et al., 2024).

Table 2. Lobster Production in West Java 2019-2024

Year	Province	Fish Group	Volume (Tons)	Economic Value
2019	West Java	Lobster	56,41	13,847.850
2020	West Java	Lobster	167,36	41,788.032
2021	West Java	Lobster	80,95	19,530.526
2022	West Java	Lobster	43,74	9,098.751
2023	West Java	Lobster	24,42	5,665.080
2024	West Java	Lobster	75,19	15,768.242

Source : (MMAF, 2025)

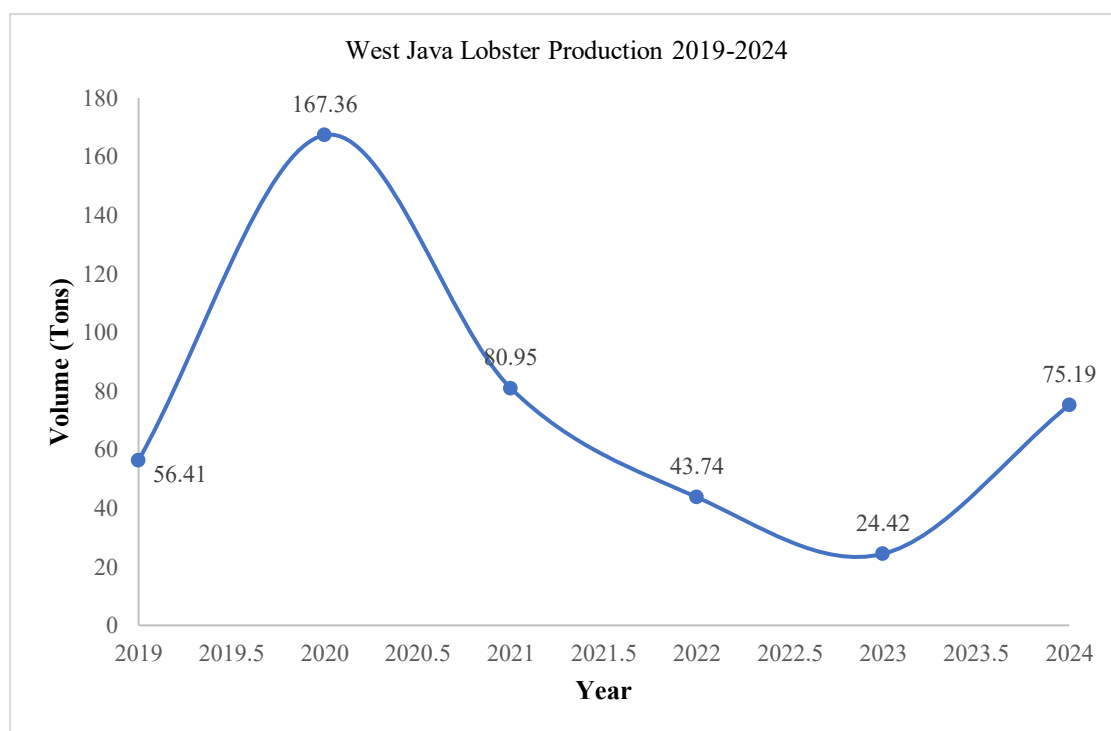


Figure 2. Lobster Production Value Graph 2019-2024

Lobster production fluctuations are influenced by aquatic environmental conditions, fishing season, fishing intensity, and the state of wild lobster stocks. Lobster is a highly valuable fishery commodity in West Java due to its high selling price and high demand in

both domestic and export markets (Gordon, 2021). In addition, environmental variability, particularly sea surface temperature and ocean currents, affects lobster distribution and population dynamics, which may also contribute to variations in production

over time (Pancoro *et al.*, 2024). The high level of fishing activity has caused increasing pressure on lobster exploitation in IFMA 573. The high level of fishing activity has increased exploitation pressure on lobster resources in IFMA 573, highlighting the need for sustainable fisheries management to maintain lobster populations and ensure long-term resource utilization (Tirtadanu *et al.*, 2022). The fluctuating production trend also indicates that lobster fisheries are closely linked to the condition of the aquatic environment and resource availability. Although production increased again in 2024, maintaining sustainable production remains a challenge due to the increasing pressure on lobster resources. Continuous monitoring of production trends is therefore necessary to evaluate stock conditions and support effective fisheries management. Sustainable utilization is expected to maintain resource productivity while supporting the livelihoods of coastal communities that depend on lobster fisheries (Pancoro *et al.*, 2024). The observed production fluctuations also highlight the importance of adaptive fisheries management in IFMA 573. Changes in production levels can serve as an early indicator of shifts in stock abundance and fishing pressure. Therefore, production data should be continuously evaluated and integrated into management decision-making

processes to ensure that lobster exploitation remains within sustainable limits. Effective management is expected to balance economic benefits with resource conservation, thereby supporting the long-term sustainability of lobster fisheries in West Java (Tirtadanu *et al.*, 2022).

Types and Levels of Lobster Utilization in West Jawa

The dominant lobster species found in West Java are sand lobsters (*Panulirus homarus*), pearl lobsters (*Panulirus ornatus*), and bamboo lobsters (*Panulirus versicolor*), see in Table 3. Sand lobster is the dominant species landed in the southern waters of West Java, particularly in Pangandaran, due to its relatively high abundance and broad distribution in rocky coastal habitats and coral reef ecosystems (Rahman *et al.*, 2024). Pearl lobsters have high economic value because of their large body size and good meat quality, while bamboo lobsters have a smaller production volume compared to other types of lobsters (Bussalam & Junianto, 2024). The dominance of *Panulirus homarus* in lobster catches indicates its important contribution to fisheries production and highlights the need for sustainable management to maintain the species' population in West Java waters (Rahman *et al.*, 2024).

Table 3. Dominant Lobster Species in West Java

Local Name	Scientific Name	Habitat	Characteristics
Lobster Pasir	<i>Panulirus homarus</i>	Rocky and sandy bottom	Brownish-green color
Lobster Mutiara	<i>Panulirus ornatus</i>	Coral reefs	Bright patterns and large size
Lobster Bambu	<i>Panulirus versicolor</i>	Shallow corals	Has a striped body

Source : (MMAF, 2025)

The high level of fishing activity indicates that lobster is a fishery commodity with significant economic value for coastal communities in West Java. The high market value and increasing demand for lobster have

encouraged intensive fishing activities, making lobster one of the main fishery commodities in the region (Pinandito, 2021). Continuous lobster fishing has resulted in smaller lobster catches, with many individuals not yet reaching gonad

maturity. This condition reflects increasing fishing pressure that may reduce stock productivity and threaten the long-term sustainability of lobster fisheries if not properly managed (Widhiastika *et al.*, 2024). Therefore, sustainable fisheries management, including the regulation of legal catch size, fishing effort, and habitat conservation, is essential to maintain lobster resources and ensure sustainable fisheries in IFMA 573 (Widhiastika *et al.*, 2024). The presence of several commercially important lobster species indicates that West Java waters possess considerable potential for lobster fisheries development. However, maintaining species diversity is important because each species plays a different role in supporting fisheries production and ecosystem stability. Sustainable utilization practices are therefore necessary to ensure that lobster resources remain available for future generations while continuing to contribute to regional fisheries production (Bussalam & Junianto, 2024).

Factors Influencing High Lobster Exploitation

The high level of lobster exploitation in West Java is influenced by the high economic value and market demand for lobster. Lobster is a high-value fishery commodity, highly sought after by both domestic and export markets, encouraging fishermen to increase fishing intensity. Furthermore, suitable habitat conditions, such as coral reefs and rocky bottoms along the southern coast of West Java, make this region a productive lobster fishing ground and is widely utilized by fishermen (Bussalam & Junianto, 2024). The combination of favorable environmental conditions and strong market demand has contributed to increasing exploitation pressure on lobster resources, particularly in productive fishing areas within IFMA 573 (Rahman *et al.*, 2024). In addition to

economic factors, continuous fishing activities also increase pressure on wild lobster stocks. Catching lobsters that have not reached gonad maturity can inhibit reproduction and reduce the population's ability to recover naturally. The capture of undersized lobsters may also reduce future recruitment, potentially affecting the long-term productivity of lobster fisheries if effective management measures are not implemented (Rahman *et al.*, 2024).

This situation indicates that lobster utilization in IFMA 573 has reached a fully exploited state, necessitating sustainable management to maintain a balance between economic utilization and the preservation of lobster resources (Erwansyah *et al.*, 2023). Continuous fishing pressure may reduce the abundance of mature individuals and affect the reproductive capacity of lobster populations. If not properly managed, excessive exploitation can negatively affect stock sustainability and reduce future fishery productivity. Furthermore, the decline in mature individuals may limit natural recruitment and hinder the recovery of lobster populations in the wild. Therefore, balancing economic interests with conservation measures is essential to ensure long-term resource sustainability (Rahman *et al.*, 2024). In this context, sustainable fisheries management through catch size regulations, fishing effort control, and habitat conservation is necessary to maintain healthy lobster populations and ensure the long-term sustainability of lobster fisheries in West Java (Widhiastika *et al.*, 2024).

Lobster Management Strategy in West Java in IFMA 573

The lobster management strategy in West Java is carried out to maintain a balance between economic utilization and the sustainability of lobster resources in IFMA 573 (Table 4). High fishing activity has caused increasing pressure on

lobster exploitation, so that it is necessary to reduce fishing efforts and monitor minimum catch sizes so that the lobster population remains stable (Erwansyah *et al.*, 2023). Implementing minimum legal catch sizes allows juvenile lobsters to reach reproductive maturity before harvest, thereby supporting stock recruitment and long-term sustainability

(Rahman *et al.*, 2024). In addition, regulating fishing seasons and using environmentally friendly fishing gear is also necessary to reduce damage to the basic water habitat where lobsters live (Bussalam & Junianto, 2024). These measures also help minimize bycatch and maintain ecosystem balance in lobster fishing areas (Widhiastika *et al.*, 2024).

Table 4. Management Strategy

Management Strategy	Objectives
Reducing fishing effort	Reducing lobster exploitation pressure
Setting minimum catch sizes	Maintaining lobster reproduction
Monitoring fishing seasons	Maintaining lobster population sustainability
Using environmentally friendly fishing gear	Reducing habitat destruction
Monitoring lobster stocks	Determining the condition of lobster populations

Lobster stock monitoring is also crucial to understand the condition of wild lobster populations and to inform more effective management policies. Sustainable management is necessary because high fishing pressure can lead to a decline in lobster stocks and disrupt the lobster reproductive process in the waters south of West Java (Tirtadanu *et al.*, 2022). Regular monitoring of stock indicators, such as catch composition and lobster size distribution, provides scientific evidence for evaluating management effectiveness and adjusting fisheries regulations when necessary (Rahman *et al.*, 2024). Effective implementation of lobster management strategies requires active participation from fishers, government agencies, and other stakeholders. Compliance with regulations regarding minimum catch size and fishing effort limitations can contribute significantly to maintaining healthy lobster populations. In addition, increasing awareness of sustainable fishing practices can improve the effectiveness of conservation measures and support long-term fisheries sustainability in IFMA 573 (Widhiastika *et al.*, 2024).

Government Efforts in Lobster Management in West Java

The Indonesian government, through the Ministry of Maritime Affairs and Fisheries (MMAF), continues to implement various management measures to maintain the sustainability of lobster resources in the IFMA 573 region (Table 5). One such effort is through Ministerial Decree No. 16 of 2022, which stipulates regulations regarding the size of lobsters that can be caught, namely having a minimum carapace length of 8 cm or a minimum weight of 200 grams. Furthermore, catching lobsters during egg-laying is also prohibited because lobsters in this phase play a crucial role in the regeneration process of the wild population. In addition to implementing regulations, the government has strengthened supervision of lobster fishing activities through patrols and monitoring programs in territorial waters to ensure compliance with fisheries regulations and reduce illegal fishing activities (Marsela *et al.*, 2022).

The government is also conducting research and data collection on lobster stocks as a basis for developing sustainable management policies in

accordance with Ministerial Decree No. 19 of 2022. Accurate information on lobster production, catch composition, and stock conditions is essential for evaluating the effectiveness of existing management measures and supporting adaptive fisheries management. In addition, lobster aquaculture development is promoted as an alternative strategy to reduce fishing

pressure on wild stocks while maintaining resource sustainability. Strengthening cooperation among government institutions, researchers, and fishing communities, as well as implementing education and outreach programs, can further improve awareness of sustainable fishing practices and support the long-term sustainability of lobster resources in IFMA 573 (Rahman *et al.*, 2024).

Table 5. Government Efforts in Lobster Management

Government Efforts	Objectives
Establishing minimum catch sizes	Maintaining lobster sustainability
Prohibiting the capture of egg-bearing lobsters	Maintaining the reproductive process
Monitoring illegal fishing	Reducing overexploitation
Monitoring the trade of live lobsters	Protecting juvenile lobster stocks
Developing lobster cultivation	Reducing fishing pressure in the wild

Conclusion

Lobster production in West Java from 2019 to 2024 exhibited a fluctuating pattern, with the highest production occurring in 2020 at 167.36 tons and the lowest in 2023 at 24.42 tons. The dominant lobster species found in the West Java region within the 573 Indonesian Fisheries Management Area (IFMA) are sand lobsters (*Panulirus homarus*), pearl lobsters (*Panulirus ornatus*), and bamboo lobsters (*Panulirus versicolor*). The high level of lobster exploitation was influenced by increasing fishing activity, high market demand, environmental conditions, and the capture of undersized lobsters, resulting in a fully exploited status of lobster resources. Sustainable management is required through the implementation of minimum catch size regulations, fishing effort control, stock monitoring, the use of environmentally friendly fishing gear, and lobster aquaculture development. Government efforts to support sustainable lobster management include regulating legal catch sizes, prohibiting the capture of egg-bearing lobsters, monitoring illegal fishing activities, controlling lobster trade, and promoting lobster aquaculture development. The

implementation of these management measures is expected to maintain lobster stock sustainability while supporting the economic benefits derived from lobster fisheries. Continuous monitoring and adaptive management are essential to ensure the long-term sustainability of lobster resources in IFMA 573.

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