



Coastal and Marine Journal

journal homepage: <https://nusantara-research.com/index.php/coastal-and-marine-journal>

Original research article:

Trend Analysis of Shrimp (*Penaeus sp.*) Production at Jambean Fishing Port, Pekalongan Regency, Central Java

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ARTICLE INFO

Article history:

Received 30 June 2025

Received in revised from 22 July 2025

Accepted 29 August 2025

Available online 30 December 2025

Keywords:

fishing gear

shrimp production

fisheries management

IFMA 712

ABSTRACT

Shrimp (*Penaeus sp.*) is one of the most economically important fishery commodities in Indonesia, contributing significantly to the capture fisheries sector and coastal community livelihoods. Monitoring shrimp production trends is essential to support sustainable fisheries management, particularly in the Indonesia Fisheries Management Area (IFMA) 712. This study aimed to analyze shrimp production trends, production value, and estimate the utilization potential of shrimp resources landed at Jambean Fishing Port, Pekalongan, during the 2020–2024 period. A quantitative descriptive approach was employed using secondary data obtained from the Statistical Data Portal of the Ministry of Marine Affairs and Fisheries of the Republic of Indonesia. The data consisted of annual shrimp production volume and production value, which were analyzed using descriptive statistics, tables, graphical trend analysis, and average production calculations. The results showed that shrimp production fluctuated throughout the study period, with the lowest production recorded in 2022 (42.19 tons) and the highest production in 2024 (74.37 tons). Similarly, shrimp production value exhibited a fluctuating trend, reaching its highest value of IDR 3,346,695 thousand in 2024. The average shrimp production during the five-year observation period was 55.44 tons. These findings indicate that shrimp resources in the study area continue to provide considerable economic potential. However, increasing fishing activities should be accompanied by sustainable fisheries management through continuous production monitoring and appropriate resource utilization strategies to maintain shrimp stock sustainability in IFMA 712.

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<https://doi.org/10.61548/cmj.v3i2.104>

Introduction

The capture fisheries sector serves as a strategic pillar in Indonesia's national economy, playing a vital role in food provisioning, fulfilling animal protein nutritional needs, and generating employment opportunities for coastal communities. Among various highly economically valuable marine commodities, shrimp (Crustacea) holds a position as a prime export commodity and a primary fishing target in the Indonesian Fisheries Management Area (IFMA 712). This area, which encompasses the Java Sea waters, is renowned for its high biological productivity for crustacean groups due to its shallow characteristics and rich nutrient supply flowing from major rivers (Umam *et al.*, 2021). These favorable environmental characteristics have made IFMA 712 a highly intensive demersal fishing ground. Therefore, effective fisheries management in this area is essential to ensure a stable supply of raw materials for the fishing industry while maintaining the ecological functions and long-term sustainability of the waters along the northern coast of Java.

Jambean Fishing Port, as a landing center in Central Java Province, specifically for Pekalongan Regency and Pekalongan City, possesses a strong historical role as one of the hubs for capture fisheries activities on the North Coast of Java (Pantura). Jambean Fishing Port is a strategic infrastructure where small-to-medium-scale fishing vessels berth to land their catches, including shrimp commodities. The existence of this port acts as a driver for the local economy, directly connecting fishermen with collectors, mini-processing plants, and the domestic market. Regular monitoring and analysis of production

data at Jambean Fishing Port provide a real depiction of the dynamics of marine living resource utilization and economic supply fluctuations occurring in the surrounding waters (Nababan *et al.*, 2020).

Based on official statistical data from the Ministry of Marine Affairs and Fisheries, the volume and value of shrimp production landed at Jambean Fishing Port during the 2020 to 2024 period exhibited fluctuating dynamics in line with changes in fishing technology. During the 2020 to 2022 period, productivity remained at a moderate level, dominated by the use of traditional fishing gears such as *dogol* or mini trawls, which had limited operational ranges restricted to the coastal zone. However, entering 2023 and 2024, a drastic surge in catch volume occurred, which was linear with the transition of fishermen's gear toward Twin Bottom Otter Trawls. This modern fishing gear features high efficiency and a much wider sweeping area at the bottom of the water column (Suman & Lestari, 2021), enabling it to net demersal commodities in massive volumes and significantly boost the economic value of the port.

Although the increase in shrimp production volume and value brings positive impacts on fishermen's income and local economic growth in the Pekalongan region, the phenomenon of modernizing bottom-towing gears triggers concerns from a fisheries biology perspective. The intensive use of otter trawls in the Java Sea has the potential to exert overfishing pressure and cause physical damage to benthic habitats where shrimp spawn and forage (Mamun *et al.*, 2018). If the fishing effort is continuously pushed forward without quota restrictions, catchable size

regulations, and strict zoning, it is feared that shrimp resources will suffer stock depletion in the future. Therefore, this study aims to evaluate the fluctuating trends of shrimp production volume and value at Jambean Fishing Port and formulate recommendations regarding its utilization status to maintain a balance between short-term economic gains and long-term ecological sustainability in IFMA 712.

The objective of this statistical data analysis is to evaluate the fluctuating trends of the volume and value of shrimp production at Jambean Fishing Port, Pekalongan during a five-year period (2020–2024), as well as to identify the impacts of the fishing gear transition from *Dogol* to Twin Bottom Otter Trawls on economic efficiency and fishermen's productivity levels. Additionally, this analysis aims to provide macro-data-

based recommendations regarding the utilization status of shrimp resources in IFMA 712 waters, so it can serve as a consideration for relevant agencies in formulating adaptive fishing effort restrictions to maintain the marine ecosystem sustainability on the North Coast of Central Java.

Research Methods

Time and Location of the Study

This study was conducted from April to May 2025. The research location was at Jambean Fishing Port, Pekalongan City, Central Java Province, which is located within the Indonesian Fisheries Management Area (IFMA) 712. The research activities included the collection, processing, and analysis of shrimp production data landed at Jambean Fishing Port during the period of 2020–2024 (Figure 1).



Figure 1. Research Location

Research Materials and Equipment

The equipment used in this study consisted of a laptop and data processing software, including Microsoft Word and Microsoft Excel, which were utilized for data processing and manuscript preparation. The primary material used in this study was secondary data on shrimp production from 2020 to 2024. In addition, scientific journals, official documents from the Ministry of Marine Affairs and Fisheries (MMAF), fisheries statistical reports, and references related to fisheries resources and shrimp production in IFMA 712 were used to support the analysis and discussion.

Data Analysis Method

Data analysis was conducted using a quantitative descriptive approach with the assistance of Microsoft Excel software. Quantitative descriptive analysis was employed to describe trends in shrimp production based on numerical data presented in tables and graphs, thereby facilitating the interpretation of production dynamics during the observation period. This approach is commonly applied in capture fisheries research to examine developments in fishery production, fluctuations in catch volumes, and changes in production value over time (Wicaksono *et al.*, 2020). The shrimp production data obtained were processed and analyzed to identify production trends during the 2020–2024 period. The results were presented in the form of tables and line graphs to facilitate discussion regarding increases and decreases in shrimp production within the study area. Time-series analysis was applied because it is considered effective for describing the development of capture fisheries production over time and for evaluating the utilization status of fisheries resources in a particular region.

Shrimp production trend analysis

Trend analysis of production was carried out to understand the development of shrimp production during the 2020–2024 research period. The analysis was conducted by comparing the production amount of each year to observe the increasing or decreasing patterns of shrimp catches at Jambean Fishing Port. The obtained production data were then presented in tables and line graphs to ease the interpretation of the fluctuating production patterns during the study period. Production trend analysis using time-series data is widely applied in fisheries research to describe the utilization status of fisheries resources and catch developments in a water body. Fluctuations in shrimp production can be influenced by fishing seasons, oceanographic conditions, fishing intensity, and environmental conditions of the Java Sea waters (Nelwan *et al.*, 2008).

Average production analysis

Average production analysis was conducted to determine the mean annual shrimp production during the 2020–2024 observation period. This analysis was intended to provide a general overview of shrimp production levels at Jambean Fishing Port throughout the study period. The average production was calculated by dividing the total shrimp production recorded during the observation period by the total number of observation years. Average production analysis is commonly applied in fisheries statistical studies to evaluate production performance, identify long-term production patterns, and assess the stability of fisheries resource utilization over time. Therefore, the calculated average production can serve as a useful indicator for evaluating the overall

utilization status of shrimp resources in the study area and supporting sustainable fisheries management decisions.

The average production formula used is:

$$\bar{x} = \frac{\sum x}{n}$$

X = average production

x = total production

n = number of observation years

Results and Discussion

Estimation of Shrimp Potential at Jambean Fishing Port, Pekalongan Regency

Shrimp production landed at Jambean Fishing Port, Pekalongan City during the 2020–2024 period showed fluctuating conditions each year. These production fluctuations were influenced by various factors such as fishing seasons, weather conditions, fishing operation intensity, and water environmental conditions in IFMA 712. The Java Sea region is known as an important fishing ground for crustacean commodities, including shrimp, due to its relatively high aquatic productivity supported by year-round capture fisheries activities (Ma'mun *et al.*, 2019).

Based on Table 1 and Figure 2, the volume of shrimp production landed at Jambean Fishing Port, Pekalongan during the 2020–2024 period showed a fluctuating pattern with an increasing trend in the last two years. Shrimp production was recorded at 44.16 tons in 2020, increased to 45.80 tons in 2021, and then decreased to 42.19 tons in 2022. Afterward, a significant increase occurred in 2023 amounting to 70.69 tons and continued to increase in 2024 to 74.37 tons. The increase in production during 2023–2024 is assumed to be related to the increasing fishing activities and the effectiveness of fishing ground utilization in IFMA 712. Furthermore, oceanographic conditions such as sea surface temperature, salinity, currents, and natural food availability are known to influence the distribution and abundance of fisheries resources in the Java Sea, thereby affecting the catches landed at the fishing port. Research results by Ma'mun *et al.* indicate that variations in oceanographic conditions have a close relationship with the distribution of fish resources in IFMA 712, thus influencing capture fisheries productivity in that region (MMAF, 2025).

Table 1. Shrimp Production in 2020-2024

Year	Production Volume (Tons)	Production Value (RP .000)
2020	44.16	902.511
2021	45.80	873.093
2022	42.19	843.820
2023	70.69	1.155.900
2024	74.37	3.346.695
Total		27.,21
Average Production		55.44

Source: MMAF Statistical Data Portal, 2025

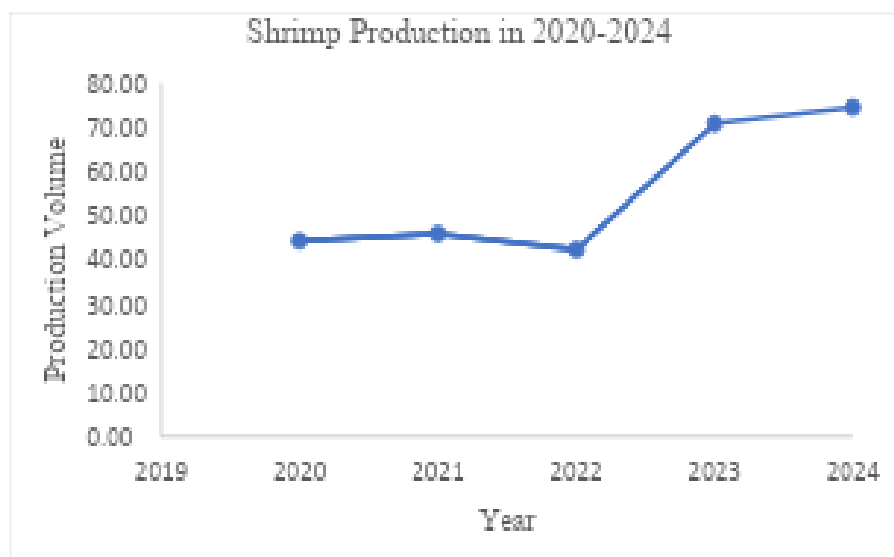


Figure 2. Shrimp Production Graph

The value of shrimp production also showed a pattern line with production volume. The production value increased from IDR 902,511 thousand in 2020 to IDR 3,346,695 thousand in 2024, with a highly significant spike occurring in the final year of observation. This rise in production value was not only driven by the increased catch volume but could also be affected by changes in market prices, catch quality, and the high demand for shrimp, which is an economically high-valued fisheries commodity. Data from the Ministry of Marine Affairs and Fisheries indicate that the national capture fisheries sector is still experiencing production growth and remains one of the main pillars for utilizing Indonesian fisheries resources. This condition indicates that the increase in shrimp production at PP Jambean has the potential to contribute positively to fishermen's income and the local economy. However, the production increase needs to be balanced with sustainable management so that shrimp resource utilization remains preserved and does not cause excessive pressure on resource stocks in IFMA 712 (Ma *et al.*, 2019).

Shrimp Production Value

The shrimp production value indicates the economic magnitude of the shrimp catches landed at Jambean Fishing Port during the research period. The production value is influenced by the number of catches and the selling price of shrimp in the market. The higher the shrimp production volume, the higher the generated production value tends to be. Shrimp is a fisheries commodity with high economic value due to its popularity among consumers and the fish processing industry. Therefore, shrimp commodities make an important contribution to the income of fishing communities in coastal areas.

Based on Figure 3, the value of shrimp production landed at Jambean Fishing Port Pekalongan during the 2020–2024 period exhibited a fluctuating trend with an increasing tendency toward the end of the observation period. The production value was recorded at IDR 902,511 thousand in 2020, then decreased to IDR 873,093 thousand in 2021 and decreased further to IDR 843,820 thousand in 2022. Subsequently, a substantial increase occurred in 2023 at IDR 1,155,900 thousand and reached its

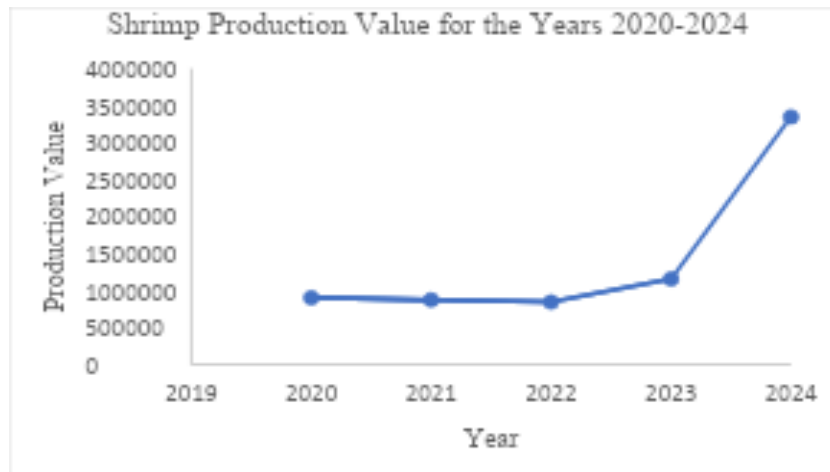


Figure 3. Shrimp Production Value Graph

highest value in 2024 at IDR 3,346,695 thousand. This increase in production value was line with the rising volume of shrimp production landed at the port, but was also influenced by market price factors, catch quality, and high demand for shrimp commodities. According to data from the Ministry of Marine Affairs and Fisheries (MMAF), the increase in national capture fisheries production was supported by the optimization of fishing port activities and improvements in catch data recording systems, thereby contributing to the increased economic value of the capture fisheries sector. In addition, fisheries resources in IFMA 712 possess productivity that is influenced by oceanographic conditions and aquatic environmental dynamics that support the presence of economically valuable fishing organisms, so an increase in catches can directly impact the rise in production value received by fishermen and fisheries business actors. Therefore, the increase in shrimp production value in 2024 indicates that shrimp commodities still make an important economic contribution to capture fisheries activities in the Java Sea region; however, sustainable management remains necessary to maintain production stability

and resource sustainability in the future (Mamun *et al.*, 2018).

Shrimp Resource Potential and Management Estimation

Based on the average production calculation results, the average shrimp production value during the 2020–2024 period was 55.44 tons. This average value shows that shrimp production in the research area is still categorized as fairly good as an economically important crustacean commodity in the Java Sea region. The high shrimp production shows that the IFMA 712 area still possesses quite a large fisheries resource potential to be utilized by fishing communities. The increase in production in 2023 and 2024 also indicates that shrimp resources in the study area are still capable of supporting fishermen's harvesting activities in Java Sea waters (MMAF, 2025). The estimation of shrimp resource potential in this study was conducted descriptively based on the development of production trends during the research period. The production results, which tended to increase in the last two years, indicate that shrimp resources in the study area still have a

relatively good utilization opportunity. Nevertheless, the continuous increase in fishing activities needs to be balanced with sustainable fisheries resource management to avoid causing a decline in shrimp resource stocks in the future. Overexploitation of shrimp resources can lead to population declines and disturb the balance of aquatic ecosystems. Therefore, shrimp resource management needs to be carried out through fishing intensity regulation, fishing gear usage monitoring, and regular catch production tracking. Furthermore, routine collection of production statistical data is also required to understand the condition changes of shrimp resources in IFMA 712. The available production data can be used as a basis for more effective and sustainable fisheries management policy-making. With good management, it is expected that the shrimp resource potential in the Java Sea region will remain maintained and able to provide sustainable economic benefits for fishing communities. Shrimp as a marine resource can make a significant contribution to livelihood security, poverty alleviation, and environmental sustainability, while also financing the provision of ecosystem services (Adibrata *et al.*, 2022).

Conclusion

Based on the analysis of shrimp production statistical data at Jambean Fishing Port during the 2020–2024 period, it is known that the volume and value of shrimp production showed a fluctuating pattern with an increasing trend in the last two years of observation. The highest shrimp production was recorded in 2024 at 74.37 tons with a production value reaching IDR 3,346,695 thousand, while the lowest production occurred in 2022 at 42.19 tons. The significant increase in production and

economic value in 2023–2024 is assumed to be associated with the transition of fishing gear from *dogol* to Twin Bottom Otter Trawls, which possess higher catching efficiency and can boost catch productivity. The results of this study indicate that shrimp resources in IFMA 712 still provide an important economic contribution to the capture fisheries sector, but the increased intensity of utilization needs to be balanced with sustainable management. Therefore, policies controlling fishing effort, regular production monitoring, and adaptive fishing gear supervision are required as a basis for ecosystem-based fisheries management to maintain the sustainability of shrimp resources and marine ecosystem stability on the North Coast of Central Java.

References

- Adibrata S., Lingga R., Nugraha M. A., 2022b [Application of blue economy with white-leg shrimp (*Litopenaeus vannamei*) cultivation]. *Journal of Tropical Marine Science* 5(1):45-54. [In Indonesian].
- Ma, A., Priatna, A., & Amri, K. (2019). The relationship between oceanographic conditions and the spatial distribution of pelagic fish in Indonesian Fisheries Management Area 712 of the Java Sea. *Indonesian Fisheries Research Journal*, 25(1), 1–14.
- Mamun, A., Priatna, A. K. A., & Nurdin, E. (2019). The relationship between oceanographic conditions and the spatial distribution of pelagic fish in Indonesian Fisheries Management Area 712 (Java Sea). *Indonesian Fisheries Research Journal*, 25(1), 1–14.

- Mamun, A., Priatna, A., Suwarso, & Natsir, M. (2018). Potential and spatial distribution of demersal fish in the Java Sea (Indonesian Fisheries Management Area 712) using hydroacoustic technology. *Journal of Tropical Marine Science and Technology*, 10(2), 489–499.
- Ministry of Marine Affairs and Fisheries. (2024). *Exceeding targets, capture fisheries production reached 111.33% of the first-semester 2024 target*. Ministry of Marine Affairs and Fisheries of the Republic of Indonesia News.
- Ministry of Marine Affairs and Fisheries. (2025). *Indonesian fisheries production*. MMAF Fisheries Statistics Data Portal. Ministry of Marine Affairs and Fisheries Data Portal.
- MMAF (Ministry of Marine Affairs and Fisheries). (2025). *Fish production statistics summary*. Retrieved May 2, 2025, from <https://portaldata.kkp.go.id/portal/data-statistik/prod-ikan/summary>
- Nababan, B. O., Kusumastanto, T., Adrianto, L., & Fahrudin, A. (2020). An economic analysis of *arad* fishing gear on the northern coast of Central Java Province. *Journal of Marine and Fisheries Socio-Economics*, 15(1), 1–14.
- Nelwan, A. F., Sondita, M. F. A., Monintja, D. R., & Simbolon, D. (2008). Evaluation of small pelagic fish production in the western coastal waters of South Sulawesi. *Journal of Fisheries and Marine Technology*, 10(1), 41–51.
- Suman, A., & Lestari, P. (2021). Management of mantis shrimp (*Harpiosquilla raphidea*) in West Tanjung Jabung and surrounding waters, Jambi. *Indonesian Fisheries Policy Journal*, 13(1), 43–58.
- Umam, M. F., Suherman, A., & Prihantoko, K. E. (2021). Analysis of the potential banana prawn (*Penaeus merguensis*) in the northern waters of Rembang Regency. *Marine Fisheries: Journal of Marine Fisheries Technology and Management*, 12(1), 73–88. <https://doi.org/10.29244/jmf.v12i1.36081>
- Wicaksono, B. R., Sutandi, T., & Tembo, S. (2020). Forecasting fisheries production in Indonesia. *Journal of Economics and Development Studies*, 21(2), 17–26.