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Production Analysis and Fisheries Management of Spanish Mackerel (*Scomberomorus spp.*) in Bangka Belitung Islands Province, Indonesia

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ABSTRACT

Spanish mackerel (*Scomberomorus spp.*) is a pelagic fishery commodity with high economic value that is widely utilized in the Bangka Belitung Islands Province. High fishing activity has the potential to put pressure on the sustainability of fish resources if not balanced with proper management. Therefore, this study aims to analyze Spanish mackerel (*Scomberomorus spp.*) production, assess the utilization status of large pelagic fish resources, and describe fisheries management conditions in Bangka Belitung Islands Province. This study was conducted from April to May 2025 in Bangka Belitung Islands Province using secondary data obtained from the Statistics Data Portal of the Ministry of Marine Affairs and Fisheries and other relevant scientific publications. The research method used is a literature study and secondary data analysis obtained from the Ministry of Maritime Affairs and Fisheries Statistics Data Portal and various related scientific journals. Data were analyzed descriptively to determine the development of mackerel production and the condition of large pelagic fish resource utilization in the study area. The results show that mackerel production fluctuated with an increasing trend during the 2020–2024 period. The highest production occurred in 2024 at 17,149.72 tons, while the lowest production occurred in 2020 at 9,964.02 tons. Based on Ministerial Decree MMAF No. 19 of 2022, the utilization rate of large pelagic fish in the Indonesian Fisheries Management Area (IFMA) 711 is classified as fully exploited, with a utilization rate of 0.7. This condition indicates that intensive utilization of fish resources requires sustainable management through controlling fishing activities, monitoring fishing gear, and implementing measured fishing policies to maintain the sustainability of fish resources in the Bangka Belitung Islands Province.

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Introduction

Indonesia is a maritime nation with vast fishery resource potential spread across various Indonesian Fisheries Management Area (IFMA). One area with significant pelagic fish resource potential is IFMA 711, which encompasses the Natuna Sea, Karimata Strait, and the South China Sea. This region is a hub for capture fisheries activity in Indonesia, particularly for large pelagic fish species such as mackerel, tuna, skipjack tuna, and skipjack (Hermanto *et al.*, 2019).

Spanish mackerel (*Scomberomorus* sp.) is a large pelagic fishery commodity with high economic value and is a primary target for fishermen in the Bangka Belitung Islands Province. High market demand for mackerel has led to a year-on-year increase in fish resource utilization. This demonstrates the strategic role mackerel plays in supporting the coastal economy and the capture fisheries sector in the Bangka Belitung Islands Province (Fadillah *et al.*, 2024).

High levels of mackerel fishing activity without proper management have the potential to lead to future declines in fish stocks. Research on the selectivity of gillnet fishing gear for mackerel in Sungailiat, Bangka Belitung, indicates that mackerel is a primary target for fishermen, necessitating fisheries management that implements sustainability principles and the use of environmentally friendly fishing gear (Rengi *et al.*, 2021).

In addition to fishing pressure, Spanish mackerel catch productivity is influenced by fishing seasons and environmental conditions. Previous studies have shown that fluctuations in catches and CPUE values are closely

related to oceanographic conditions and fishing intensity in Bangka Belitung waters (Kusnadi *et al.*, 2024). Furthermore, increasing fishing activities may exert greater pressure on large pelagic fish resources if not accompanied by appropriate management measures. Therefore, information on production trends, resource utilization status, and fisheries management is essential to support the sustainable use of Spanish mackerel resources in Bangka Belitung Islands Province. This study aims to analyze Spanish mackerel (*Scomberomorus* spp.) production, assess the utilization status of large pelagic fish resources, and describe fisheries management conditions in Bangka Belitung Islands Province.

Research Methods

Time and Place

The research was conducted from April to May 2025 in Bangka Belitung Islands Province, located within the Indonesian Fisheries Management Area 711 (Figure 1).

Tools and Materials

The tools and materials used in this study include a laptop and data processing software such as Microsoft Word and Microsoft Excel, which are used to process data and compile the research manuscript. In addition, this study uses mackerel fish production data for 2020–2024 as the primary research data, as well as scientific journals and official documents from the Ministry of Maritime Affairs and Fisheries (MMAF) which are used as reference sources, data on fish resource potential, Total Allowable Catch (TAC), and the level of fish resource utilization in IFMA 711.



Source: MMAF Regulation No. 18 of 2014 (MMAF, 2014)

Figure 1. Map of the Fisheries Management Area of the Republic of Indonesia (IFMA) 711

Data Analysis

This research employed a literature review and secondary data analysis. The data used included mackerel (*Scomberomorus* sp.) production in the Bangka Belitung Islands Province from 2020 to 2024, obtained from the Ministry of Marine Affairs and Fisheries' Statistical Data Portal, as well as various scientific journals, research reports, and official documents related to fish resource management in the Indonesian Fisheries Management Area (IFMA) 711. This study also utilized data on estimated fish resource potential, allowable catch, and resource utilization levels based on MMAF Regulation No. 19 of 2022.

The mackerel production data was analyzed descriptively to determine the development of production and the state of utilization of mackerel resources in the Bangka Belitung Islands Province. The analysis also compared the production

data with estimates of fish resource potential and the TAC value of large pelagic fish groups in IFMA 711 based on Ministerial Decree No. 19 of 2022. The results of the analysis are presented in the form of tables, graphs, and narrative descriptions to support the discussion on sustainable fisheries management in the Bangka Belitung Islands Province, and IFMA 711.

Results and Discussion

Mackerel Fish Production in the Bangka Belitung Islands Province

Based on capture fisheries production data from 2020–2024, mackerel (*Scomberomorus* sp.) production in the Bangka Belitung Islands Province fluctuated with an annual increase. Mackerel production is a pelagic fishery commodity with high economic value and is a primary target for fishermen in the IFMA 711 region.

Table 1. Mackerel Production in the Bangka Belitung Islands Province 2020–2024

Year	Mackerel Production (tons)
2020	9,964.02
2021	11,096.14
2022	14,134.78
2023	13,304.62
2024	17,149.72

Source: MMAF Statistical Data Portal (MMAF, 2025)

Based on Table 1, the production of mackerel (*Scomberomorus* sp.) in the Bangka Belitung Islands Province fluctuated with an increasing trend during 2020–2024. In 2020, mackerel production was 9,964.02 tons, then increased to 11,096.14 tons in 2021 and again to 14,134.78 tons in 2022. This increase in production indicates that mackerel resources in the Bangka Belitung Islands Province, IFMA 711, still have considerable potential to be optimally utilized.

The high production of mackerel in the Bangka Belitung region is influenced by water characteristics that support the presence of large pelagic fish. The marine waters of the Bangka Belitung Islands Province, IFMA 711, have a relatively high level of water productivity, making them a potential fishing ground for mackerel. Research by Saimona *et al.*, (2021) states that the Belitung waters are one of the centers of capture fisheries activity in the Bangka Belitung Islands Province, with a relatively high level of fish resource utilization. In addition to aquatic environmental conditions, high mackerel production is also influenced by fishing activities and the use of effective fishing gear.

Spanish mackerel is one of the primary catches for fishermen on the Bangka and Belitung Islands. Research by Kurniawan *et al.*, (2019) shows that pelagic fish, including Spanish mackerel, are often caught using gillnets and fishing

lines. The use of these fishing gears is considered quite effective in supporting large pelagic fish catches in the waters of Bangka Belitung.

In 2023, mackerel production decreased to 13,304.62 tons. This decrease in production is thought to be influenced by changes in fishing seasons and oceanographic conditions. Fluctuations in mackerel catches are influenced by fish distribution in fishing areas and marine environmental conditions, which change each season. Kusnadi *et al.*, (2024) stated that seasonal patterns of mackerel fishing in Central Bangka change during certain seasons, thus affecting fishermen's catches.

In 2024, mackerel production increased again to 17,149.72 tons, the highest production value during the observation period. This increase indicates that intensive utilization of mackerel resources in the waters of the Bangka Belitung Islands Province, within the Indonesian Fisheries Management Area (IFMA) 711, remains ongoing. However, increased fishing activity must be balanced with sustainable fisheries resource management to avoid excessive pressure on wild mackerel stocks.

Management of mackerel fish resources can be carried out through monitoring fishing activities, controlling fishing gear, and regulating the use of fish resources in accordance with fisheries management policies in IFMA 711. In addition, information on potential fishing areas and oceanographic conditions of the

waters can be used to increase fishing effectiveness without increasing excessive exploitation pressure (Fadillah *et al.*, 2024). Efforts to manage mackerel fisheries in IFMA 711 need to be directed at implementing measured fishing, limiting fishing effort, and increasing supervision of the use of environmentally unfriendly fishing gear. Furthermore, the use of oceanographic data and information on potential fishing areas can support the effectiveness of sustainable fish resource management.

Management of mackerel resources in the waters of the Bangka Belitung Islands Province, within the Indonesian Fisheries Management Area (IFMA) 711, also requires attention to the level of fish resource utilization based on national policy. Ministerial Decree MMAF No. 19 of 2022 explains that fisheries management in each IFMA is based on estimates of fish resource potential, the allowable catch (TAC), and the level of fish resource utilization. This policy serves as the basis for implementing sustainable fisheries management and measured fishing in Indonesia.

IFMA 711 is a water area with significant pelagic fish resource potential and is a key fishing area in Indonesia. The high level of fishing activity in this area demonstrates the need for sustainable fisheries resource management to avoid excessive pressure on natural fish stocks. Fisheries management based on environmental carrying capacity is a crucial step in maintaining a balance between fish resource utilization and aquatic ecosystem sustainability.

Hermanto *et al.*, (2019) stated that capture fisheries management in IFMA 711 requires control of fishing effort and monitoring of fishing activities to ensure optimal and sustainable fish resource utilization. Furthermore, information on potential pelagic fishing areas can be utilized to improve fishing effectiveness without overexploitation (Hidayat *et al.*, 2019).

The increasing production of Spanish mackerel in Bangka Belitung Islands Province should be accompanied by fisheries management that considers fishing seasons, the size of fish caught, and the sustainability of fish resources. The main fishing season for narrow-barred Spanish mackerel (*Scomberomorus commerson*) occurs from January to May, with the peak season in February. Therefore, information on seasonal fishing patterns can serve as a basis for determining the optimal fishing period and supporting the development of more effective and sustainable fisheries management strategies (Fardilah *et al.*, 2025).

Level of Utilization of Fish Resources in IFMA 711

Based on Ministerial Decree MMAF No. 19 of 2022, IFMA 711 is a fisheries management area with significant potential for large pelagic fish resources. Large pelagic fish include mackerel, tuna, skipjack tuna, and skipjack tuna, which are important commodities in capture fisheries in the Karimata Strait, Natuna Sea, and North Natuna Sea.

Table 2. Estimated Potential, Total Allowable Catch (TAC), and Level of Utilization of Large Pelagic Fish Groups in IFMA 711

IFMA	SDI Group	Estimated Potential (tons/year)	TAC (tons/year)	Utilization Rate	Utilization Status
WPP 711	Large Pelagic	163,744	114,621	0.7	<i>Fully exploited</i>

Source: MMAF Regulation No. 19 of 2022 (MMAF, 2022)

Based on Table 2, the large pelagic fish resource group in IFMA 711 has an estimated potential of 163,744 tons/year, with a Total Allowable Catch (TAC) of 114,621 tons/year. This TAC value is set as the limit for fish resource utilization to ensure fishing activities remain sustainable and do not cause a decline in natural fish stocks.

The utilization rate of large pelagic fish resources in IFMA 711 is 0.7, with the status Fully exploited. This status indicates that the utilization of large pelagic fish resources in the region has been intensive, so that fishing activity controls are needed to prevent overexploitation. According to research on the management of capture fisheries resources in IFMA 711, controlling fishing effort and monitoring fishing activities are important steps in maintaining the sustainability of large pelagic fish resources in the region (Hermanto *et al.*, 2019).

Spanish mackerel production in the Bangka Belitung Islands Province during 2020–2024 remained below the TAC value for large pelagic fish in IFMA 711. However, the annual increase in production indicates significant pressure on fish resource utilization. Therefore, management of Spanish mackerel resources requires the implementation of measured fishing policies, monitoring of fishing gear, and utilization of fish resources in accordance with the estimated potential and TAC value set by the government (Hermanto *et al.*, 2018).

The increasing production of Spanish mackerel should be accompanied

by adaptive fisheries management that considers the spatial and temporal dynamics of fishing grounds. Fardilah *et al.*, (2024) demonstrated that the distribution of prospective Spanish mackerel fishing grounds in Indonesia Fisheries Management Area (IFMA) 711 changes throughout the year in response to regional monsoon patterns and oceanographic conditions, including sea surface temperature, chlorophyll-*a* concentration, and sea surface salinity. These environmental dynamics influence the availability and distribution of Spanish mackerel, resulting in seasonal shifts in productive fishing areas. Therefore, integrating information on environmental conditions and seasonal fishing-ground distribution into fisheries management can improve fishing efficiency, optimize resource utilization, and support the sustainable management of Spanish mackerel resources in Indonesia Fisheries Management Area (IFMA) 711.

Mackerel Fishing Fleet and Fishing Gear

Based on data on the number of vessels and fishing gear in the Bangka Belitung Islands Province, fishing activity in the IFMA 711 region is quite high. The dominant fishing gear used by fishermen includes handlines, drift gillnets, fixed gillnets, and traps. The high number of fishing vessels indicates intensive exploitation of large pelagic fish resources, including mackerel (*Scomberomorus* sp.), in the region.

Table 3. Number of Vessels and Types of Dominant Fishing Gear in the Bangka Belitung Islands Province

Types of Fishing Gear	Number of Ships/API
Handline fishing	2,314
Drift Gillnet	1,991
Traps	1,859
Fixed Gillnet	1,203
Combination gillnet	272
Rod fishing	142

Source: MMAF Statistical Data Portal (MMAF, 2025)

Based on Table 3, handlines and drift gillnets are the most common fishing gear used by fishermen in the Bangka Belitung Islands Province. These gears are commonly used to catch large pelagic fish such as mackerel due to their high catching efficiency. Research on drift gillnet fishing efforts in Sungailiat PPN shows that drift gillnets have good productivity and economic value in capture fisheries activities in Bangka Belitung (Fitria *et al.*, 2021).

Furthermore, research on fixed gillnet catches in Sungailiat PPN shows that gillnets often catch pelagic fish species with high economic value and are the primary target of fishermen. The high level of gillnet fishing activity indicates that the pressure on fish resources in the IFMA 711 region is significant, necessitating sustainable fisheries management (Feniola *et al.*, 2024).

Spanish mackerel fishing activities in the Bangka Belitung region are also supported by the use of handlines. Research by Kusnadi *et al.*, (2024) indicates that handlines are one of the primary fishing gear used by fishermen in catching Spanish mackerel in the Kurau Fishing Port, Central Bangka Regency. Fluctuating CPUE values for Spanish mackerel indicate that increased fishing activity can impact the condition of fish stocks in the waters of the Indonesian Fisheries Management Area (IFMA) 711 (Kusnadi *et al.*, 2024).

The high number of fishing fleets and the use of fishing gear in the waters of the Bangka Belitung Islands Province, IFMA 711, has the potential to increase mackerel production. However, increased fishing intensity can also increase pressure on fish resources if not balanced with proper management. The utilization status of large pelagic fish groups in IFMA 711, which is categorized as Fully exploited, indicates that control of fishing effort and supervision of fisheries activities are necessary to prevent overexploitation of fish stocks in nature.

Controlling the number of fishing fleets needs to be supported by the use of selective and environmentally friendly fishing gear to maintain the sustainability of mackerel fish resources in the IFMA 711 area. According to Feniola *et al.*, (2024), gillnet fishing gear is still widely used by fishermen in the Sungailiat PPN and is one of the main fishing gears in catching pelagic fish with high economic value. The high use of this fishing gear indicates that pelagic fishing activities in the Bangka Belitung region are quite intensive, so sustainable fisheries management is needed to maintain the utilization of fish resources.

Sustainable fisheries management should not only focus on increasing production but also on improving fisheries governance and fishing practices. Effective management requires the application of selective and environmentally friendly fishing gear, enhancement of fishers' capacity, proper vessel documentation, and stronger collaboration among government institutions, local communities, and other stakeholders. In addition, participatory management and adaptive governance are essential to ensure compliance with fisheries regulations while maintaining the long-term sustainability of Spanish mackerel resources. These management measures are expected to balance resource utilization with conservation objectives, thereby supporting sustainable fisheries in the Indonesian Fisheries Management Area (Sinaga *et al.*, 2026).

Conclusion

Spanish mackerel (*Scomberomorus* sp.) production in the Bangka Belitung Islands Province fluctuated with an increasing trend during 2020–2024, with the highest production occurring in 2024 at 17,149.72 tons and the lowest at 9,964.02 tons in 2020. The high fishing activity indicates that Spanish mackerel resources play a significant role in the

regional capture fisheries sector. Based on Ministerial Decree MMAF No. 19 of 2022, the utilization rate of large pelagic fish in the Indonesian Fisheries Management Area (IFMA) is fully exploited with a utilization value of 0.7, necessitating sustainable management through controlling fishing effort, monitoring fishing gear, and implementing measured fishing practices to maintain the sustainability of fish resources.

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