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PRODUCTIVITY AND CATCH COMPOSITION OF PURSE SEINE FISHERIES AT THE KASIWA FISH LANDING BASE, MAMUJU REGENCY, WEST SULAWESI

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ABSTRACT

This study aims to analyze the productivity and catch composition of fish using purse seine gear at the Fish Landing Base Kasiwa, Mamuju Regency, West Sulawesi. The research employed a quantitative approach, with primary data collected from two purse seine vessels during one month of fishing operations. Secondary data were obtained from relevant literature and institutions. The analysis was conducted by calculating the productivity levels and catch composition of purse seine operations. The results show that the productivity of purse seine varied across fishing trips, but overall, the gear was considered operationally effective and relatively efficient. The catch composition was dominated by small pelagic fish, particularly Bullet tuna (32%) and Little tunny (24%), followed by Little tuna, Skipjack tuna, mackerel, and scads. These findings indicate that purse seine fishing is well-suited to the characteristics of fish resources in Mamuju waters and has the potential to support sustainable fisheries management.

Keywords: Income, Kampung Laut Water's, Purse Seine

INTRODUCTION

The city of Mamuju is part of the administrative area of Mamuju Regency, which is one of six regencies in West Sulawesi Province. Mamuju Regency possesses abundant fisheries resources, particularly capture fisheries, as most of the area consists of coastal waters. The capture fisheries productivity of Mamuju Regency reached 21,468 tons in 2019, with a production value of IDR 435,276,899,000. The catch landed by fishers in Mamuju Regency consists of various fish species, ranging from small pelagic to large pelagic fishes. One of the most common capture fisheries commodities in Mamuju Regency is tuna, which is primarily caught using purse seine gear (Central Bureau of Statistics, 2021).

Among the various fishing gears used in capturing fisheries, purse seine is one of the most popular and efficient gears for catching schooling small pelagic fish, such as scads, mackerels, and frigate tuna. The use of purse seine plays a strategic role in increasing the productivity volume of capture fisheries, particularly in regions with high marine resource potential (Supriadi et al., 2021). Purse seine is often referred to as a surrounding net because of the drawstring rope at the bottom of the net.

Observations of mini purse seine fisheries at the Lempasing Fishing Port conducted by Handayani et al. (2023) reported that purse seine nets generally have a rectangular shape and are classified as surrounding net fishing gear, which functions by encircling and enclosing fish schools within a designated fishing area.

The level of productivity in capture fisheries activities is influenced by the intensity of fishing effort exerted in a fishing ground. Factors such as fishing gear and vessel size, number of fishing days, and the application of fishing technology significantly determine the magnitude of fishing effort. The level of fishing effort plays an important role in determining catch volume within a given area and, consequently, affects the condition of fish resources. Therefore, an analysis of fish resource productivity is essential to ensure sustainable utilization and to assess the level of productivity achieved. Without appropriate management measures, this condition may pose a threat to the sustainability of fish resources. In addition, the availability and productivity of fish resources for capturing fisheries fluctuate annually due to changes in marine environmental conditions, which are naturally difficult to control. This makes capture fisheries inherently uncertain and difficult to predict. If fishing effort continues to increase without proper regulation alongside economic growth, there is concern that capture fisheries productivity will eventually decline (Novitasari, 2019).

Fishing productivity is one of the main indicators used to evaluate the capability and success of a fishing operation, as well as to measure the effectiveness and efficiency of the fishing gear employed (Franjaya et al., 2018). Catch composition refers to the diversity of species caught during a fishing operation. After the catch is obtained, the subsequent step undertaken by researchers is species identification to determine both common names and scientific (Latin) names of each captured species (Rini et al., 2021). This is consistent with the findings of Mirnawati (2019), who stated that catch composition includes fish identification based on species, weight, and body length, which are classified according to the mesh size used in fishing operations.

Capture fisheries activities at the Kasiwa Fish Landing Base are predominantly dominated by purse seine operations targeting various pelagic fish species. However, to date, there has been no research conducted in the waters of West Sulawesi concerning the analysis of productivity and catch composition of purse seine fisheries at the Kasiwa Fish Landing Base, as indicated by the absence of relevant journal articles and undergraduate theses. The fact that purse seine gear is widely used in fishing operations makes it highly relevant for research aimed at identifying optimal strategies for

utilizing fisheries resources and providing recommendations and guidance. Therefore, it is necessary to examine the production of purse seine catches that landed at the Kasiwa Fish Landing Base, Mamuju Regency, as well as the catch composition of purse seine fisheries that landed at the same location.

MATERIAL AND METHOD

Data Collection

This study was conducted from 26 May to 5 July 2025 at the Kasiwa Fish Landing Base, which operates under the supervision of the Marine and Fisheries Service of West Sulawesi Province. The study employed a quantitative research approach using both primary and secondary data sources. Primary data were obtained directly through field observations, structured interviews with skippers, fishing Crew, and officers at the Kasiwa Fish Landing Base, as well as questionnaire surveys administered according to criteria predetermined by the researchers. Secondary data were collected from relevant literature and documents that supported the objectives of the study.

Data Analysis

Fishing Productivity

The analytical method used in this study involved calculating the fishing productivity of mini purse seine operations using a modified version of the formula proposed by Dahle (1981), expressed as follows:

$$Produktivitas = \frac{C}{t}$$

where:

C = total catch (kg)

T = effective fishing time (minutes),

defined as the duration from the moment the net is deployed until the mini purse seine net reappears on the surface.

Catch Composition

Data on species composition of catches obtained using purse seine gear were analyzed by calculating the total catch and the total weight of each captured species. This analysis followed the method described by Andari (2017), using the following formula:

$$P = \frac{ni}{N} \times 100\%$$

where:

P = species composition of the catch (%)

ni = total weight of each captured species (kg)

N = total weight of all captured species (kg)

RESULTS AND DISCUSSION

Catch Results

Based on data collected over a one-month observation period at the Kasiwa Fish Landing Base, Mamuju Regency, the results indicate a significant diversity in both species composition and catch volume. The fisheries commodities analyzed were obtained from two sample fishing vessels operating purse seine gear. As

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shown in Figure 1, the total catch landed by the two vessels during the study period from 26 June to 5 July 2025 amounted to 9,421 kg. The most dominant species caught was frigate tuna, with a total weight of 3,003 kg, while the least abundant species was Scad, with a total catch of 510 kg.

The fish species landed at PPI Kasiwa included skipjack tuna, Scad, Indian mackerel, Bullet Tuna, Little tunny, and Little tuna. Overall, the catch composition was dominated by small pelagic species commonly targeted by purse seine fisheries. Detailed information on the quantity and species composition of catches from both vessels is presented in Figure 1.

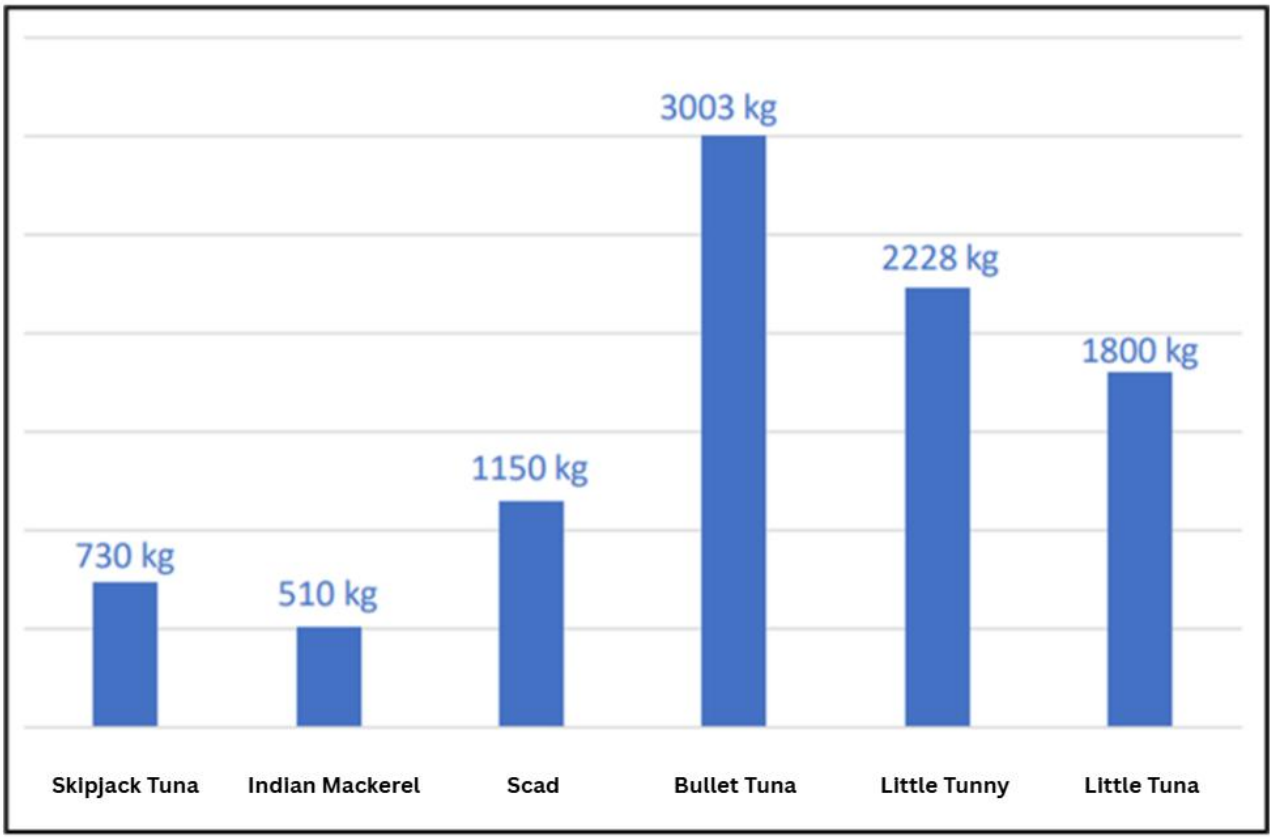

Figure 1. Summary of catch composition by species and total weight from two fishing vessels.

Catch Productivity

Catch productivity in this study was calculated by dividing the total catch weight (kg) by the effective fishing time (minutes). Effective fishing time was measured from the moment the purse seine net was deployed into the water until the hauling process was completed and the net was fully retrieved onboard. The two sample vessels conducted fishing operations six to seven times during the one-month observation period. Each fishing trip lasted approximately three days, during which purse seine operations were generally conducted one to two times per trip. The productivity of catches from both vessels is illustrated in Figure 8.

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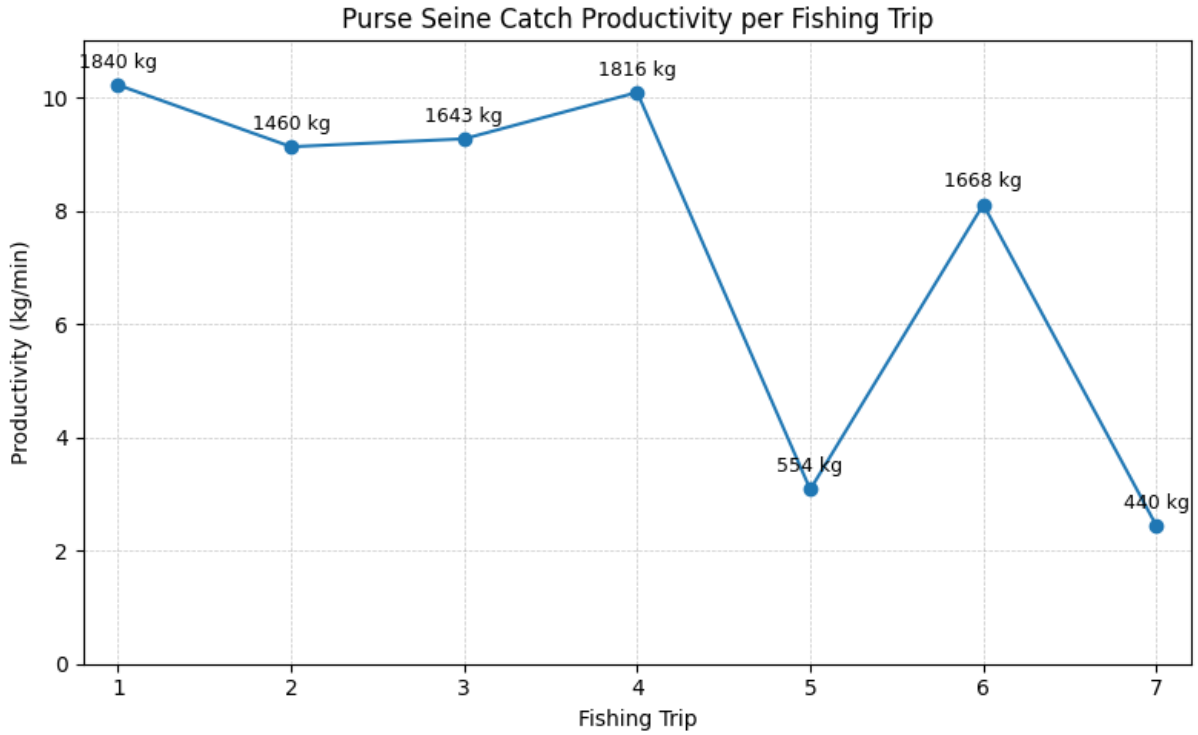

Figure 2. Productivity of purse seine catch during fishing trips.

Figure 2 shows that the productivity of purse seine catches tended to decline over the one-month fishing period. The highest productivity was recorded during the first fishing operation, reaching 10.22 kg/min with a total catch of 1,840 kg. In contrast, the lowest productivity occurred during the seventh trip, with a value of 2.44 kg/min and a total catch of 440 kg. These fluctuations indicate that catch productivity is influenced by various environmental factors that play a crucial role in determining the success of fishing operations.

One of the main influencing factors is oceanographic conditions, including weather variability, sea currents, and wave height, which can affect fish distribution and behavior. A study by Haiyqal et al. (2022), entitled *Characteristics of Sea Wave Height During Normal, El Niño, and La Niña Periods in the Makassar Strait*, reported that wave heights peak between June and August (JJA), particularly during La Niña phases. In the southern part of the Makassar Strait, wave heights reach their maximum levels, posing navigational challenges for fishing vessels and contributing to reduced catch performance. Similarly, Tindaon et al. (2022) demonstrated that seasonal variability in wave conditions, currents, and wind direction in the Sulawesi Sea significantly influences the intensity and effectiveness of fishing activities.

These findings are consistent with Dahle (1981), who emphasized that fishing productivity is not solely determined by the number of fishing gears or operational duration,

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but is also influenced by biological conditions and technical factors during fishing operations. Furthermore, Sudirman et al. (2019) highlighted that the success of purse seine operations is strongly dependent on accurate timing, appropriate fishing locations, and the technical skills of fishers.

Catch Composition

Catch composition in this study was analyzed by calculating the proportion of the weight of each species (kg) relative to the total catch weight. The analysis was based on data obtained from two fishing vessels, each of which conducted six to seven fishing operations during the one-month observation period. Throughout this period, various pelagic fish species were captured using purse seine gear. A detailed presentation of catch composition from both vessels is shown in Figure 3.

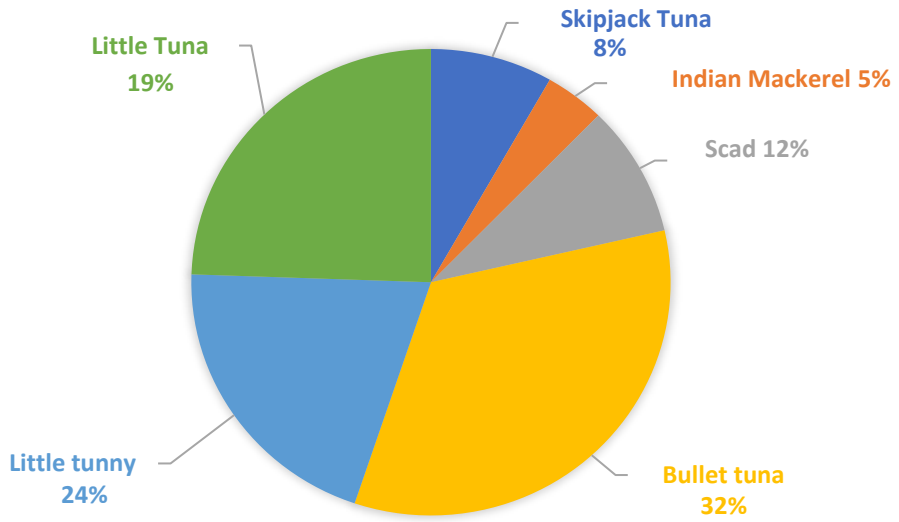

Figure 3. Species composition of purse seine catches.

Figure 3 illustrates the species composition of purse seine catches obtained from seven fishing trips conducted by two vessels. Bullet tuna was the most dominant species, accounting for 32% of the total catch, followed by Little tunny (24%) and Little tuna (19%). Skipjack tuna contributed 8% of the total catch, while Indian mackerel and Scad accounted for 5% and 12%, respectively.

Based on the species composition data, it can be concluded that Bullet tuna represented the highest proportion of the total catch, amounting to 32% or approximately 3,003 kg, as shown in Figure 1. This indicates that Bullet tuna was the dominant commodity captured by the two vessels during the observation period. These findings are consistent with the study by Nuraisyah et al. (2018, which reported that this

species exhibits optimal abundance between May and July.

The dominance of Bullet tuna and Little tunny in the catch can be attributed to variations in the spatial distribution of pelagic fish species, which are strongly influenced by fishing locations. Safruddin (2022), in a study entitled *Characteristics of Fishing Grounds Using Purse Seine in the Makassar Strait and Flores Sea*, reported that frigate tuna is more frequently captured in the Flores Sea and Makassar Strait between January and June, with the fishing season shifting from April–May toward June–July. This shift is supported by favorable sea surface temperature and chlorophyll-a distributions that align with the habitat preferences of frigate tuna.

Environmental dynamics, particularly changes in ocean currents and wave conditions, also play an important role in determining catch variability. This finding is in line with Iriani et al. (2023), who evaluated the relationship between oceanographic parameters and pelagic fish catches by purse seine fishers in the Makassar Strait, Tolitoli Regency. Their regression analysis indicated that sea surface temperature had a significant effect on catch levels. Although other oceanographic parameters were not statistically significant, the study suggested the possible influence of additional factors such as fishing seasonality and timing of operations.

CONCLUSION

Based on the research results, adding 5% fish meat flour resulted in cireng with the highest preference score from the panelists. The texture attribute received the highest score of 7.80, followed by appearance (7.13), aroma (7.07), and taste (7.07). In addition to improving sensory appeal, the addition of fish meat flour also increased the nutritional content of cireng, with protein content reaching 3.11% and fat content 0.83%. In terms of physical characteristics, the addition of 5% fish meat flour increased hardness to 1,104.188 gForce and springiness to 0.996%, but caused a decrease in cohesiveness to 0.430%, chewiness to 455.576 gForce, gumminess to 478.129 gForce, and resilience to 0.631%.

These findings demonstrate that incorporating fish meat flour into traditional snacks can enhance both their nutritional value and consumer acceptability, making it a promising strategy for developing functional food products.

SUGGESTION

Based on the findings of this study, it is recommended to apply the formulation with the addition of 5% fish meat flour in the production of cireng to obtain a product with optimal sensory quality and nutritional value. Further studies can be conducted to explore the effects of various other ingredients to enhance

organoleptic characteristics and nutritional content.

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