

## IDENTIFICATION OF VESSEL TYPES WITH THEIR FISHING GEAR AND VOLUME OF FISHERIES PRODUCTION IN UPT PPP PONDOKDADAP, MALANG DISTRICT, EAST JAVA INDONESIA

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### Abstract

Pondokdadap Coastal Fishing Port (CFP), located in Malang Regency, is classified as a class C fishing port in East Java. Pondokdadap CFP is located in close proximity to Fisheries Management Area (WPP)-NRI 573, which covers Java and Nusa Tenggara in the South Indian Ocean. The objective of this study is to identify the quantity of fishing gear-equipped vessels that conducted loading and unloading operations at Pondokdadap CFP during the period from January to August 2023, as well as the production volume of fish caught. Qualitative and quantitative methodologies are used, applying primary and secondary data, respectively. Based on the results, the highest number of vessels in June indicates that there were 729 boats in operation, of which 152 purse seine boats and 577 boats were present, while January had the lowest number of boats in operation, with 76 boats, of which 61 purse seine boats and 15 boats. In line with the heaviest fish production volume in June at 1,863 tonnes, January recorded the lowest fish production volume at 266 tonnes. From January to August 2023, the highest total production volume for skipjack tuna was 2,627 tonnes, while the lowest total production volume for Chub Mackerel was 28 tonnes. Monthly variations in captures are determined by climatic variables such as sea waves. During the rainy season, fishing is uncommon due to the extremely high waves. In addition to the volatile nature of sea conditions, the distribution of fish also exerts an impact on catches. Among the thirteen species of fish that were captured, skipjack tuna predominated.

**Keywords:** Coastal Fishing Port, Loading and Unloading Operations, Fishing Gear-Equipped Vessels, Number of Boats in Operation, Fish Production Volume.

### INTRODUCTION

Indonesia is a country that has a very large water area, which is a great potential resource to be utilised for national development (Aryanto & Sudarti, 2017). Therefore, the existence of a fishing port is a necessity in order to support national fisheries development. Utilisation of the potential of fishery resources, which is the centre of activities for catching fish resources, developing fishing fleets, handling and processing catch production, and marketing catches (Guswanto et al., 2012). Fishing ports can help the lives of fishing communities by fulfilling their needs. The abundance of marine resources is used as a fulfilment of life needs related to the socio-economic life of fishing communities, which must have survival strategies to meet

their daily needs with their social capital. Fishermen's lives depend on the sea, with fish as the main source of income (Ulfa, 2018).

Fishing ports serve as vital public service organizations that increase the utilisation of fishery raw materials and marine fisheries, thereby significantly contributing to the development of fisheries, especially capture fisheries (Maky et al., 2023). According to the Regulation of the Minister of Maritime Affairs and Fisheries Number: PER.08/MEN/2012 concerning Fishery Ports, a fishery port is a place consisting of land and surrounding waters with certain boundaries as a place of government activities and fishery business system activities used as a place for fishing vessels to dock, anchor, and/or load and unload fish (Wahyu et al., 2019). The existence of a fishing port makes fishing activities more directed and organized. In addition to providing facilities for landing activities, fishing ports also provide optimal services for the industrial processing of catches (Nurhayatin et al., 2016). The role of the port includes several activities, including the centre of production activities, the centre of distribution activities, and the centre of fishing community activities (Salmiya et al., 2022). Based on the Regulation of the Minister of Maritime Affairs and Fisheries No. 8 of 2012 concerning Fishery Ports, the classification of fishing ports is explained. This classification is the main reference in determining the class of fishing ports in Indonesia, both those built by the government and the private sector. In this regulation, fishing ports in Indonesia are grouped into 4 classes, namely Class A Ocean Fishing Port (PPS), Class B Archipelago Fishing Port (PPN), Class C Coastal Fishing Port (CFP), and Class D Fish Landing Base (PPI) (Bulotio et al., 2023). One of the fishing ports in East Java that is included in Class C is PPP Pondokdadap, Malang Regency (Marina et al., 2014).

Pondokdadap Coastal Fishing Port is one of the important fishery bases in the South Sea of Java, with the main catch commodities in the form of fish from the Tuna, Mackerel, and Skipjack (TTC) group, which have high economic value and are in great demand in the export market (Andrimida et al., 2022). The high production of TTC is thought to be due to its strategic position, which is near the Indian Ocean, which is a potential fishing area for TTC species, and the presence of Sempu Island as a natural breakwater that provides security to ships that want to dock and land their catch (Wahyu et al., 2019). The success of a fishing port can be seen through the amount and production value of the landed catch, but it is also supported by the activities and facilities within it (Situmeang et al., 2019).

Pondokdadap Coastal Fishing Port (CFP) is directly adjacent to the Fisheries Management Area (WPP)-NRI 573, namely the South Indian Ocean of Java and Nusa Tenggara (Agustina et al., 2019). WPP-NRI 573 covers the waters of the Indian Ocean south of Java to southern Nusa Tenggara, the Suwu Sea, and the western Timor Sea (Septiyaningrum et al., 2022). Fish catches at PPP Pondokdadap include Lemuru (*Sardinella lemuru*), Layang (*Decapterus sp.*), Pepper (*Leiognathidae*), Lemadang (*Coryphaena hippurus*), Yellowfin Tuna (*Thunnus albacares*), Skipjack (*Katsuwonus pelamis*), Mackerel (*Euthynnus affinis*), Big Eye Tuna (*Thunnus obesus*), Marlin (*Istiophoridae*), and Albacore (*Thunnus alalunga*) (Ariefandi et al., 2023). According to Insani et al., (2020) CFP Pondokdadap, Malang has a production level of 9,945,638 kg. The purpose of this study is to determine the results of loading and unloading fish in tonnes at Pondokdadap CFP and determine the type of fishing vessels based on fishing

gear. This study was prepared to utilize the information collected and share it as clear information about the diversity of types and volume of fish production caught by fishermen at Pondokdadap CFP from January to August 2023.

## MATERIAL AND METHODS

From January to August 2023, a study was conducted at the Pondokdadap Coastal Fisheries Port (CFP). The locations of Pondokdadap CFP, as shown in Figure 1, are Sendang Biru, Tambakrejo Village, Sumbermanjing Wetan District, and Malang Regency. Sendang Biru is located in close proximity to the Indian Ocean and in the southern region of Malang Regency (Jaya et al., 2018).



**Figure 1: Location of Study**

This study applies both qualitative and quantitative research methodologies, using primary and secondary sources of data. Primary data refers to information that is collected firsthand in the field, typically through questionnaires, interviews, field observations, or direct documentation (Guswanto et al., 2012). Qualitative research refers to its samples as sources, participants, or informants instead of respondents (Rachmawati & Fithrah Ali, 2018). Secondary data consists of information that has been previously entered into the agency database or obtained directly from the Pondokdadap CFP agency.

## RESULTS AND DISCUSSION

### Analysis of the Type and Number of Fishing Boats

Fishing port or fish landing base is a place for anchoring fishing vessels and for landing fish catches. The ship is said to be anchored when after unloading the catch, the ship leans or ties a rope in a certain place, to rest and wait for departure to the sea (Rachman et al., 2013). At Pondokdadap CFP, loading and unloading of ships is usually done in the morning until noon. Fisheries facilities at CFP Pondokdadap are types of 15-30 GT boats, pakisan boats, and payang boats.

The boats are equipped with hand line equipment and complete one journey every ten days on average. Purse seine boats are equipped with purse seine fishing equipment and travel for a minimum of one day, 8–12 days (Ziliwu et al., 2020) or a maximum of 30 days.

**Table 1: Data on Fishing Boats Loading and Unloading at Pondokdadap Coastal Fishing Port**

	Boat	Purse seiners	Total
January	15	61	76
February	40	51	91
March	199	79	278
April	328	90	418
May	473	123	596
June	577	152	729
July	409	103	512
August	271	225	496

Source: Pondokdadap, 2023



(A)

Source: Personal Documentation, 2023



(B)

Source: Ziliwu et al., 2020

**Figure 2: Boat at the Pondokdadap CFP**

Based on **Table 1**, it can be seen that the highest and lowest number of ships loading and unloading from January to August 2023. The highest number of vessels loading and unloading was in June 2023 with a total number of 729 vessels consisting of 577 boats with longline gear and 152 purse seine vessels with purse seine gear.

This is because in June the eastern season just entered and the upwelling process occurred. While the lowest number of ships loading and unloading was in January 2023 with a total number of 76 ships consisting of 15 boats with longline fishing gear and 61 purse seine vessels with purse seine fishing gear. This is because in the west season (December-March) there is a down welling process. In addition, the western season is the rainy season and high sea waves so that the intensity of fishermen to go to sea is reduced (Rahman et al., 2019).

The fishing fleet used in Pondokdadap Beach Fishing Port includes lifeboats, purse seine vessels, and jukung vessels (Mawarida et al., 2022). The lifeboat and purse seine vessels have an engine capacity of 15-30 GT while the jukung vessel has an engine capacity of <10 GT. The average lifeboat takes 10 days in one trip with a crew of 5-6 people including the captain. The longest purse seine vessel in one trip is 30 days. While jukung vessels operate on a daily basis (Setyohadi et al., 2022).

The high and low number of fishing boat landing and loading and unloading is caused by the monsoon. The monsoon system in the southern waters of Java is characterized by a seasonal reversal of wind direction that causes different patterns of water mass movement. During December-March the northwest monsoon winds blow, while during June-September the Southeast monsoon winds blow. During the northwest monsoon, the waters south of Java experience down welling, while during the Southeast monsoon, they experience upwelling (Yoga et al., 2014). The number of vessels that carry out loading and unloading activities of captured fish based on fishing gear from January to August 2023 can be seen in **Table 1**.

## VOLUME OF FISH PRODUCTION

Pondokdadap CFP exhibits a significant level of productivity in contrast to areas of the Java Sea that have suffered from overfishing (Sujianto, 2015). The increase and decrease in the amount of fish production can be caused by several factors, one of the influencing factors is the number of trips of fishermen in conducting fishing activities, besides that weather and climate can affect fishing activities by fishermen. The amount of fish production is the amount of fish that can be landed at the fishing port. The amount of fish production is influenced by the season and the number of trips that go to sea. There is also a production value which is the product of the amount of fish production that can be landed at the fish landing base and the selling price of fish in the market (Fitriani et al., 2020).

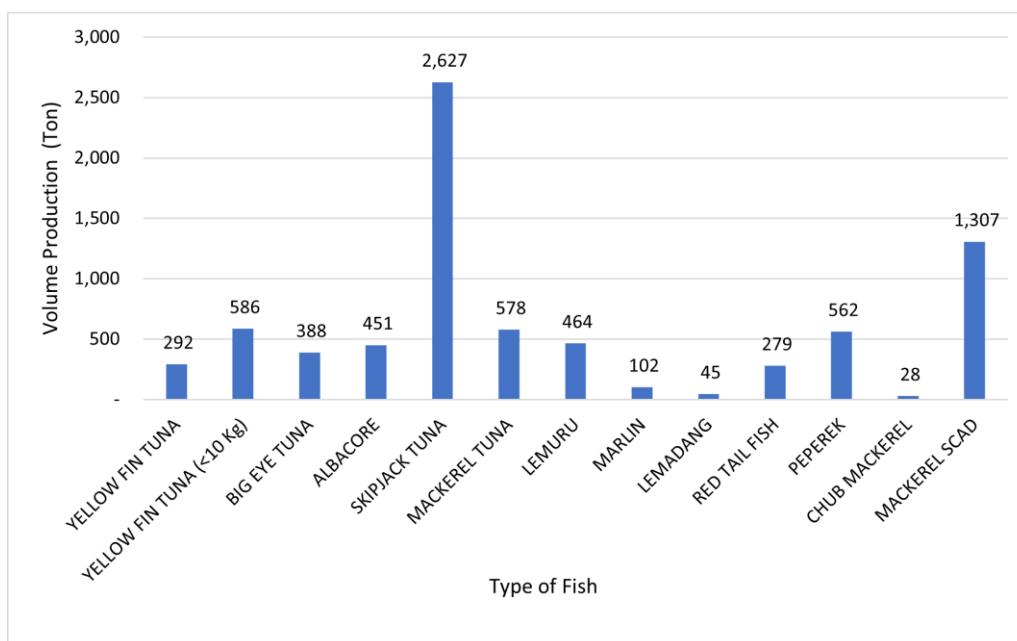
**Table 2: Fish Production (Tonnes) at CFP Pondokdadap during January-August 2023**

Type of Fish	January	February	March	April	May	June	July	August
Yellow Fin Tuna	0	0	10.96	11.21	75.57	150.95	34.01	8.81
Yellow Fin Tuna (<10 Kg)	8.53	29.02	131.95	107.84	112.64	103.43	44.05	48.17
Big Eye Tuna	1.52	0.94	25.94	19.12	76.28	167.29	70.66	26.61
Albacore	0.07	0.13	3.79	2.56	88.55	67.88	217.76	69.86
Skipjack Tuna	7.54	50.03	195.79	271.3	659.32	800.61	306.73	336.13
Mackerel Tuna	0	0.78	137.86	99.97	59.98	55.91	46.46	176.69
Lemuru	162.93	212.48	31.17	18.79	4.78	9.85	3.13	21.01
Marlin	0.04	0.26	25.78	36.82	14.91	16.81	5.28	1.95
Lemadang	5.83	5.37	10.77	2.68	3.5	3.7	7.32	5.66
Red Tail Fish	0	0	4.25	0	0	31.73	5.13	237.5
Peperek	0	1.95	3.67	4.43	3.28	2.77	460.18	85.33
Chub Mackerel	0	0	3.32	0	0	2.54	2.15	19.54
Mackerel Scad	79.56	7.7	90.47	112.74	360.14	450	66.1	140.54
<b>TOTAL</b>	<b>266.01</b>	<b>308.64</b>	<b>675.69</b>	<b>687.44</b>	<b>1,458.95</b>	<b>1,863.49</b>	<b>1,268.97</b>	<b>1,177.81</b>

Source: Pondokdadap, 2023

Based on the fish data which can be seen in Table 2 regarding the volume of fish production in tons unloaded at the CFP Pondokdadap pier from January to August 2023, it can be seen that from January to August 2023 there were 13 types of fish landed, namely Yellow-fin Tuna, Yellow-fin Tuna (<10 kg), Big Eye Tuna, Albacore, Skipjack Tuna, Mackerel Tuna, Lemuru, Marlin, Lemadang, Red Tail Fish, Peperek, Chub Mackerel, and Mackerel Scad. The highest fish production volume was in June at 1,863 tons of fish and the lowest fish production was in January at 266 tons of fish.

Differences in the amount of catch each month can be influenced by climatic factors such as sea waves. In January, catches are still low due to the influence of high sea waves. From February to April, the number of catches begins to increase slightly because sea waves have begun to stabilize. In May, the catch starts to be relatively high for each trip, and June is the highest catch because the sea wave conditions are stable. This is likely due to the fact that upwelling is more prevalent in Southern Java, Indian Ocean, between June and July (Ningsih et al., 2022). Every month the number of catches is not the same (Setyanto et al., 2023), this is because the distribution of fish is also difficult to predict which results in the number of catches tending to be unstable but still relatively high catches each month (Harahap et al., 2017).



**Figure 3: Fish Production by Type**

Based on Figure 2, from the various types of fish landed, the total value of fish production volume from January to August 2023 at PPP Pondokdadap was obtained. It can be seen that skipjack tuna is the most widely caught fish with a total weight of 2,627 tons, while chub mackerel is the fish with the lowest production volume with a weight of 28 tons.

Skipjack tuna (*Katsuwonus pelamis*) is classified as a large pelagic fish that is frequently caught with purse seines (Atmadja et al., 2017; Mallawa et al., 2016), but hand lines and troll lines have been reported. Additionally, longline fisheries have reported instances of skipjack tuna occurring by catch (Novianto et al., 2019). This fish is a species that migrates widely and adapts to water conditions such as sea surface temperature, sufficient oxygen and the availability of prey that is evenly distributed in the waters of the Indian Ocean and migrates long distances in tropical and sub-tropical waters. Skipjack tuna (*Katsuwonus pelamis*) spawns several times in areas with sea surface temperatures higher than 24°C (Mawarida et al., 2022).

## CONCLUSION

The conclusion from the results of this research is that in 2023, precisely from January to August, it is known that the number of ships carrying out loading and unloading at PPP Pondokdadap will be 3,196 purse seine vessels and lifeboats. The highest number of ships carrying out loading and unloading was in June 2023 with a total of 729 ships, consisting of 577 lifeboats and 152 purse seine ships. Meanwhile, the lowest number of ships carrying out loading and unloading was in January 2023 with a total of 76 ships, consisting of 15 lifeboats and 61 purse seine ships. There are 13 types of fish landed at PPP Pondokdadap, namely Yellow-fin Tuna, Yellow-fin Tuna (<10 kg), Big Eye Tuna, Albacore, Skipjack Tuna, Mackerel

Tuna, Lemuru, Marlin, Lemadang, Red Tail Fish, Peperek, Chub Mackerel, and Mackerel Scad. It can be seen that the volume of fish production from January to August 2023 has a total of 7,707 tons. The highest volume of fish production was in June at 1,863 tons of fish and the lowest fish production was in January at 266 tons of fish. Skipjack tuna is the most commonly caught fish with a total weight of 2,627 tons, while salmon is the fish with the lowest production volume with a weight of 28 tons. Fish production data landed at UPT PPP Pondokdadap is updated every day because data is entered daily on the website provided.

## DECLARATION OF INTEREST STATEMENT

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