Study catch-per-unit-effort (CPUE) seine net as one of small-scale fishing gear in Palabuhanratu Fishing Port, Indonesia

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ABSTRACT

One of the fisheries management areas in Indonesia is the Fisheries Management Area (FMA) 573. WPP 573 consists of several fish landing centers, including PPN Palabuhanratu. The high fish production cannot be separated from the contribution of small-scale fisheries. Small-scale fishermen groups in PPN Palabuhanratu are fishermen who operate seine nets. Seine net is a part of seine in a circle which consists of a bag, a body, and two wings on the left and right, including main ropes. This study aims to determine the value of CPUE in this case the production per time setting (hours) on the seine net fishing gear in PPN Palabuhanratu. The research location chosen was PPN Palabuhanratu as a landing base for seine net fishermen. This location was chosen because it is a productive landing area in FMA 573. This study was conducted in 2019. The method that was used in this research was the survey method. Qualitative and quantitative data were collected to complete the necessity of this study. Primary data collected is the fishing production and the number of setting hours. Descriptions of fishing gear and operation method were observed directly at the study site. The highest catch value per unit of effort of seine net fishing gear in PPN Palabuhanratu is 456.22 kg/hour in June, while the lowest is 195.26 kg / hour in January.

Keyword: *CPUE, Fishing gear, Seine Net, FMA 573 and PPN Palabuhanratu*

1. INTRODUCTION

Fisheries resources that are managed sustainably are important to maintain the sustainability of natural resources [1]. One of the fisheries management areas in Indonesia is the Fisheries Management Area (FMA) 573. FMA 573 covers Indian Ocean, South of Java to the south of Nusa Tenggara, Sawu Sea, and the western of Laut Timor [2]. Since 2016 the management of FMA Indonesia has been carried out by following the EAFM rules, including FMA 573[3]. Capture fisheries activities in FMA 573 are quite productive one of them is in the Pelabuhan Perikanan Nusantara Palabuhanratu (PPN Palabuhanratu). WPP 573 consists of several fish landing centers, including PPN Palabuhanratu, PPS Cilacap, PPN Prigi, PPN Palabuhanratu is one of the bases of fish landing in Indonesia with the main commodities are tuna and skipjack [4]. FMA 573 is an area dominated by longline and trolling line fishing vessel with the main catch of tuna and skipjack [5]. The business unit tuna longline fisheries, seine and trolling landed catches at PPN Palabuhanratu, West Java Province, Indonesia [6][4].

The high fish production cannot be separated from the contribution of small-scale fisheries. Small scale fisheries in Indonesia are currently ordinary regulated and are relatively freed from existing fisheries management instruments [7][8]. This causes the management of fish resources in small scale fisheries is less than optimal. In tropical regions small scale fisheries have high complexity and are characterized by variations in catch targets, fishing gear and dynamic operating fishing methods [9]. Some challenges faced by small-scale fishermen such as optimal management system, poverty, market and climate change [10].

One of the small-scale fishermen groups in PPN Palabuhanratu are fishermen who operate seine nets fishing gear. Seine net is a fishing gear that has a high productivity and also known to almost all Indonesian coastal area [11].

Seine net is a part of seine in a circle which consists of a bag, a body, and two wings on the left and right, including main ropes [12]. Information about how this fishing gear provides benefits for fishermen is to calculate catch per unit of effort as one of productivity indicator for fishing gear. Calculation of catch per unit of effor values can be used to obtain information on the ability of fishing gear to catch fish resources [4][13]. Catch-per-unit-effort (CPUE) can also be used as an indicator of stock abundance [14]. This study aims to determine the value of CPUE in this case the production per time setting (hours) on the seine net fishing gear in PPN Palabuhanratu.

2. METHOD

The research location chosen was PPN Palabuhanratu as a landing base for seine net fishermen. This location was chosen because it is a productive landing area in FMA 573. This study was conducted in 2019. The method that was used in this research was the survey method. Qualitative and quantitative data were collected to complete the necessity of this study. Primary data collected is the fishing production and the number of setting hours. Descriptions of fishing gear and operation method were observed directly at the study site. Catch data and unit effort units are calculated to find out the CPUE value. Unit effort is the number of operational boat fishing trips [15].

3. RESULT AND DISCUSSION

3.1. Description of Seine Net in PPN Palabuhanratu

Seine net is one type of fishing gear that operates in PPN Palabuhanratu. This fishing gear is operated to catch pelagic fish [16]. Seine net fishing unit consists of fishing gear, boat, and fishermen. Seine net is included in the seine group [17]. The seine fishing gear group is a cod-end fishing gear group without a net mouth opening, operating by encircling a schooling of fish and pulling it to a ship that is stopping / anchoring anchor or ashore / shore through both wing and strap sides of the main ropes [17]. In detail seine net fishing gear consists of wings, body, pouches, *ris* ropes, buoys and weights [16].
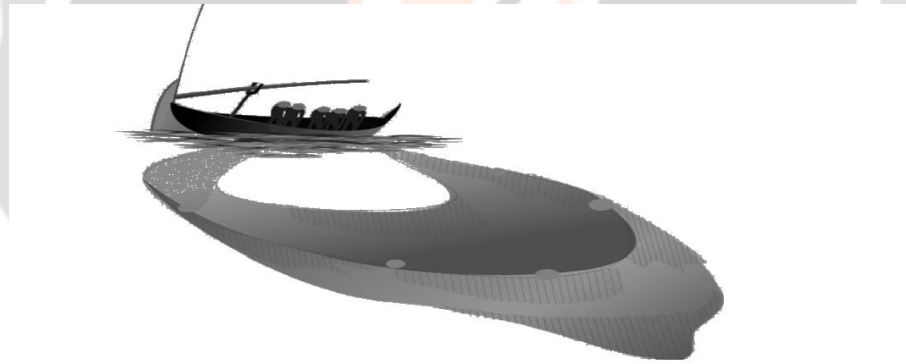

Fig 1. Sketch of Seine Net [17]

There are two types of boat that operate seine nets. These are boats made of wood and boats made of fiber with a size of 10x1.5x1 meter^3. The boat is operated by using a 40 PK engine. One seine boat usually carries 15 fishermen consisting of 1 helmsman (*tekong*), 1 helper, and 13 crew members (ABK). However, in times of low fish abundance, not all crew members go to sail so the number of fishermen are less than 15. In addition there are also several seine net boats that carry more than 15 fishermen. The number of fishermen on duty is determined based on the type of fish caught and the size of the boat used.

3.2. Fishing Method

Fishing operations of seine nets in PPN Palabuhanratu are usually conducted for one day fishing. It starts at ± 06.00 WIB and ends at ± 18.00 WIB. However, if the catch is deemed sufficient, the Seine net boat can land earlier, at the earliest at 13.00 WIB. Conversely, if the catch is deemed insufficient the boat can land at night, the most late is at 22.00 o'clock.

Seine net operation can be divided into four stages: the preparation stage, the fishing phase, the fishing gear drop (setting) stage, and thestagehauling.

- Preparation
  This stage consists of preparing supplies such as food during fishing, fuel, ice, inspection of machinery and fishing gear. Preparation of engines and fishing gear is usually done half an hour before the boat goes to sea.
- Fishing phase
  After the preparation is complete, the Seine net boat departs to look for fishing grounds. In seine net fishing operations, the location is usually not predetermined, to which point the boat moves completely depending on the situation and conditions where a fish schooling was found. As long as fishermen do not see the fish school, the ship will continue to move to explore the area of fishing by considering the fuel reserves carried.
- Setting
  The third stage in the operation of pay catching equipment is setting. When the fishermen see the fish schooling, the boat approaches and drops the net. Seine net is lowered when the ship is moving fast. Seine net is lowered from the left where the boat moves in a circle to the left. This stage begins by lowering the ropes and buoys at one end of the seine net. Next the net body set slowly by lowering one by one kuluh (bamboo float) and ballast on the net. After the entire body of the net is lowered, the main rope (the other end of the net) left on the boat is fastened to the pole on the boat. The boat moves to the other end of the rope as it floats on the water. The end of the rope is tied to the pole. The schooling fish are confined in a Seine net circle whose edges are tied to the boat. The time needed for the process setting is about 10 minutes.
- Stage of hauling
  After the schooling fish are confined by the circle of seine net, carried out the stage of withdrawal of seine nets (hauling). Before the net is actually pulled, it must be ensured that the initial position of the drawn string is the same distance from the first buoy. Therefore, before the stage hauling, a rope is drawn at the end of one (lowered later) net that is longer than the first drop-off rope. In this stage the boat turns 180o so that the position of the boat is in a net circle. After that, the boat turned 180o again so that it returned to the starting position. Hauling is done at both ends of the net from the front and back of the boat. The position of fishermen is standing from the front to the back of the boat.
  These fishermen are divided into two groups with the same number, one group pulls one side of the net (left), another group draws the other side of the net (right). Fishermen in the first position draw the top of the right nets (rope and rope) and the rear draw the top of the left nets. Fishermen in the middle position of the boat pull the middle of the net, while the two middle fishermen pull the bottom of the net (ballast). Both groups of fishermen are endeavored to pull both sides of the seine net at the same speed so that the number of helicopters raised to the boat for both sides is equal and eventually the drawdown reaches the center of the net (pockets) at the same time. The fish caught are trapped in a paybag bag. The time needed for the hauling process is around 20 minutes.

3.3. Catches of Seine net

Fishing gear is a device that is operated on the surface of the water, so that the fish caught are types of small pelagic fish. According to Silaban et al. (2017), several species of small pelagic fish caught in Palabuhanratu are very diverse, including Sardinella fimbriata, Decapterus kurroides, Auxis rochei, anchovies (Stolephorus sp.), Rastrelliger sp.), Selaroides sp., Mene maculata, and Leiognathus sp., as the types of small pelagic fish that are commonly caught by seine net in PPN Palabuhanratu.

3.4. Fishing Ground

Seine net fishing locations are limited in the area of the Gulf of Palabuhanratu which includes the waters of Cisolok Subdistrict, Cikakak Subdistrict, Palabuhanratu Subdistrict, and Simpenan Subdistrict waters. In fishing activities, fishermen from PPN Palabuhanratu, Cisolok and Cibangban do fishing in the waters of the Palabuhanratu Bay. Sometimes when it is difficult to catch fish in the gulf region, seine net fishermen fish out of the Bay, to the Ujung Genteng or Binuangeun (Banten). When fish season this is not done. During the peak season, the fishing operation is only carried out in the waters around the harbor where the seine net boat originates.

3.5. Catch per unit of effort (CPUE)

In general, the formula used to measure the productivity of fishing gear is to calculate the value of catch per unit effort (CPUE). CPUE calculation is done by the formula: c/f where c is the number of catches (kg) and f is the effort / capture effort (hours / settings / trip). Calculations with CPUE will make it easier to compare the productivity of a fishing gear, because the productivity of a fishing gear can be reflected by the magnitude of the CPUE value. Based on the calculation using daily production data that is defective by PPN Palabuhanratu obtained seine net fishing gear productivity per unit hour and per unit trip.

In general, the productivity of seine net fishing gear in Palabuhanratu in January-August 2019 varied with the lowest productivity value of 54.67 kg / trip and the highest productivity of 1,973.33 kg / trip. When viewed from the percentage of the number of ships, ships with a productivity of 251-500 kg / trip are vessels with a dominant average productivity of 45.26%. In the data, there is no difference in the productivity of payroll fishing gear that uses VMA or not. After submitting the VMA equipment to fishermen in April 2019 (as shown in Table 2), then the comparison of the productivity of pay catching gear using VMA and the productivity of pay catching gear not using VMA can be done. The following graph shows the average productivity of payload fishing gear for VMA and non-VMA vessels.
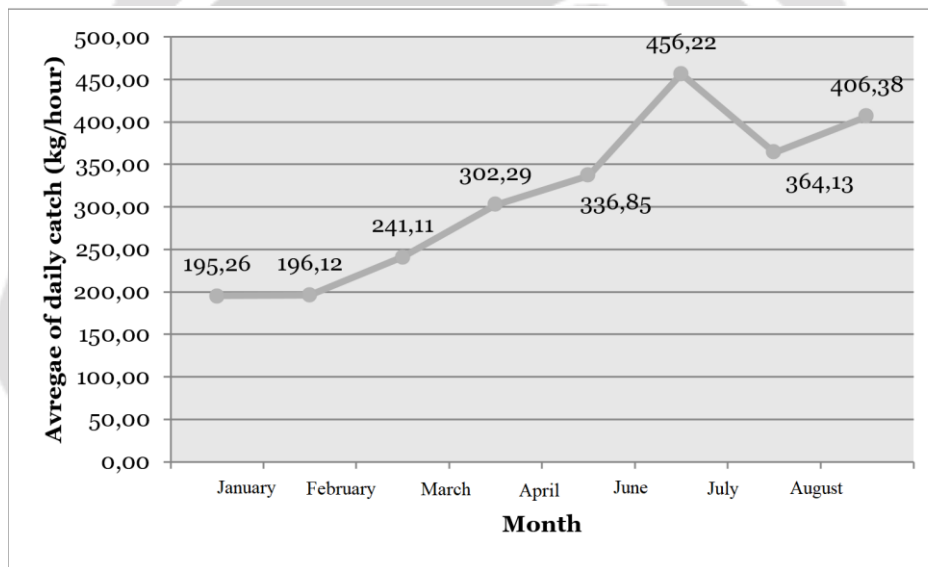

Fig 2. Catch per unit of effort (CPUE) of Seine Net

Based on the graph above, there is an increasing trend of seine net fishermen production in Palabuhanratu. This relates to the ongoing season. The tropical climatic conditions in the coastal area of Palabuhanratu Bay, Sukabumi Regency, are influenced by the west monsoon which blows from east to west, and the east monsoon that blows from west to east. The west wind season blows from December to March, in the west season the fishermen do not do a lot of fishing operations at sea because in this season often heavy rains, very strong winds and large waves. While the east monsoon lasts between June and September. In the east monsoon the condition of the waters is relatively calm, it rarely rains and the wind is blowing hard. This situation makes it possible for fishermen to go down to the sea and is usually the peak of many fish. WPP 573 catching season occurs in January to February and May to July with the highest peak season obtained in June [4].

4. CONCLUSIONS

The highest catch value per unit of effort of seine net fishing gear in PPN Palabuhanratu is 456.22 kg/hour in June, while the lowest is 195.26 kg / hour in January.

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