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# **Covid-19 Impacts on the Fish Production and Distribution Status at the Nusantara Fishery Port, West Java, Indonesia**

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

This study aims to analyze the impact of Covid-19 on the operational conditions of production and distribution at the Palabuhanratu Nusantara Fisheries Port (NFP) before and after the Covid-19 pandemic. Data was collected from May 2021 to July 2022 through interviewing 7 port officers and 25 fishermen based on certain criteria and direct observations in the field. The results shows that the amount of fish production and fish catch per fishing gear decreased significantly in the peak of the pandemic. During the peak of the pandemic (2020), fish catch per fishing gear decreased from gillnet, tuna Long line, toddler fishing, trammel net, hand fishing and purse sein. The distribution of fresh fish at the peak of the pandemic has increased, while the distribution of pindang fish and salted fish has decreased. This happens because fish production at the peak of the pandemic (2020) has decreased, therefore fish in ports do not experience over stock so for Pindang and salted fish is reduced. The highest income for payang and fishing rods was Rp. 650,000 before the pandemic and after the pandemic: the lowest income was Rp. 350,000 for net fishermen. Based on the results of interviews, most fishermen stated that the average household expenditure before and after the pandemic did not change much.

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## 1. INTRODUCTION

The coronavirus (COVID-19) pandemic entered Indonesia on early 2020. The government implemented a Work From Home (WFH) system and lockdown to reduce the potential spread of the virus. The appeal was strengthened by the enactment of Government Regulation No. RI. 21 of 2020 regarding Large-Scale Social Restrictions (PSBB) in the context of accelerating the handling of Corona Virus Disease 2019 (COVID-19). The impact of the WFH system that is applied more or less affects the fishing industry players. Conditions like this will affect all aspects of the economy, including the fisheries aspect.

The COVID-19 pandemic has also affected/influenced the fishery operations at the Fishing Port. The lockdown has limited the movement of people and goods, resulting in the cessation of the marketing, distribution and operational chains at the Palabuhanratu Archipelago Fishery Port (NFP). Gokkon (2020) and KKP (Directorate General of Capture Fisheries 2020) reported a decline in fish prices due to declining demand. This is reinforced by the statement of the Indonesian Non-Governmental Organization Restrictive Fishing Watch (DFW) which considers that the impact of COVID-19 has begun to be felt in the capture fisheries industry from upstream to downstream, decreasing demand from abroad by 30-40% [1]. Based on data from the BPS (Central Statistics Agency) in 2020, it is stated that the fish price decline in last two months has occurred due to the COVID-19 pandemic in Indonesia. The number of fishing activities in the Palabuhanratu NFP does not guarantee that many fishing vessels will operate. In 2015 fishing vessels experienced a decrease in operations compared to 2014 which amounted to 20.03%, the decline in the number of vessels operating above especially occurred in the types of motorized boats (tonda and longline fishing rods 10.14-30%) and outboard motor boats (handline fishing line 13). .11%, net rampus 63.24%, paying 32.88% and dogol 12.90%) (NFP 2015).

Since the operation of Palabuhanratu NFP has been operated for a period of 23 years (1993-2015) fish production has continued to fluctuate. According to the West Java Fisheries Service, Palabuhanratu located in Sukabumi Regency is one of the capture fisheries bases for fishing areas in the South Java Sea and the Indonesian

Exclusive Economic Zone (ZEEI) in Indian Ocean waters so that most of the population works as fishermen. According to the Central Bureau of Statistics of Sukabumi Regency in 2011, this area has an area of 4,161 km<sup>2</sup> or 11.21% of the area of West Java or 3.01% of the total area of Java Island. Geographically, Sukabumi Regency is located between 6°57' - 7°25' South Latitude and 106°49' - 107°00' East Longitude. Pelabuhanratu is located on the coast of the Indian Ocean in the south of West Java. Pelabuhanratu was designated as the Nusantara Fisheries Port (NFP) in 2010 by the Ministry of Maritime Affairs and Fisheries as the location for the minapolitan capture fisheries project. The fishing port is a very important place in the development of the fishing industry and becomes a center for the development of the fishery economy, in terms of production, processing and distribution aspects [2]. The Palabuhanratu Nusantara Fishery Port (PNFP) in accordance with its several functions is carrying out marketing and distribution of fish, collecting data on catches and fishery products, carrying out counseling and developing fishing communities and providing logistic support to go to sea for fishing, which should be facilitated by the port. The implementation of catching is carried out every day, the catch is the types of fish that have economic value that are quite in demand by consumers [3,4].

The decrease in community activities outside the home will have an impact on decreasing demand for food ingredients, including fish caught by fishermen and fish cultivators. Based on this, if it lasts long enough, it will have an impact on port operations due to lockdown in several countries [5,6]. As a result, the volume of fish exports will decrease and the income of fishermen will also decrease. The Nusantara Fisheries Port (NFP) of Pelabuhanratu is an important area in the south of West Java as the largest producer of capture fisheries. This study was conducted to understand the impact of the COVID-19 pandemic on fish production and distribution at Pelabuhanratu Nusantara Fisheries Port (NFP) in West Java before and after the COVID-19 Pandemic.

This study aims to find out how the conditions of production and distribution activities before and after the COVID-19 pandemic were related to the number of operating fleets, number of trips, fish production, fish prices, distribution and how the

impact of income and expenditure at the Palabuhanratu Fisheries Port (NFP) before and after the Covid-19 pandemic.

## 2. MATERIALS AND METHODS

This research was conducted from May 2021 to July 2022 in Palabuhanratu through survey and qualitative methods. Data was collected by direct interviews or through online media. The data collected in this study are secondary data and primary data. Qualitative methods are used to explain the situation in depth by collecting data which is then analyzed to obtain research conclusions. The sampling method used is purposive sampling, which uses a sampling technique based on certain criteria. The population in this study was 7 port officers and 25 fishermen.

### 2.1 Data Analysis

Analysis of the data used in this study using descriptive analysis methods, including:

#### 2.1.1 Data reduction

Reducing data that is summarizing, choosing the main things, focusing on the things that are important, looking for themes and patterns and discarding unnecessary ones.

#### 2.1.2 Data display

Presentation of data, namely data will be organized, arranged in a pattern of relationships, so that it will be easier to understand. In qualitative research, data presentation can be done in the form of brief descriptions, charts, relationships between categories, and *flowcharts*. The most frequently used in presenting data in qualitative research is narrative text. By presenting the data will make it easier and understand what happened and facilitate the planning of work to be done next.

#### 2.1.3 Drawing conclusions and verification

Drawing conclusions and verification, because the initial conclusions put forward are still temporary, and will change if no strong evidence is found to support the next stage of data collection. But if the conclusions put forward at the initial stage are supported by valid and consistent evidence when the researcher returns to the field to collect data, then the conclusion is a credible conclusion. In qualitative research, the expected conclusions are new findings that have

never existed before. These findings can be in the form of a description or description of an object that is not yet clear so that it will become clear after research (Sugiyono 2015).

### 2.2 Study Area

Palabuhanratu is a sub-district located in Sukabumi Regency which is geographically located at 06°57' South Latitude-07° South Latitude and 106°22' East Longitude-106°33' East Longitude with an area of 6.59% of the total Sukabumi Regency. The majority of Palabuhanratu people make a living as fishermen by using various fishing gear. Palabuhanratu waters have a beach length of ±105 km and is the largest bay along the southern coast of Java Island which is directly connected to the Indian Ocean [7]. Administratively, the boundaries of the area include Bogor Regency in the north, the south with the Indian Ocean, in the east with Cianjur Regency, and in the west with Lebak Regency and the Indian Ocean [8]. Several rivers that are known to flow into the waters of Palabuhanratu Bay include 7 rivers, namely 2 rivers including large rivers, S. Cibareno and S. Cimandiri and 5 other rivers including rivers belonging to small rivers, S. Cidadap, S. Cicutun, S. Cimaja, S. Cibalabuhan and S. Ciletuh. The number of rivers that emptied there makes the waters have a very high fertility rate [9].

Palabuhanratu is generally the same as other regions in Indonesia which has two seasons, namely the west season which takes place in November-May and the east season which takes place in June-October, besides that there is also a transitional season from the east season to the west season and vice versa. Usually call it the *liwung* which lasts from March to May and September to November [9]. The west season is a period of very high rainfall and relatively poor water conditions marked by the large waves in these waters, causing most fishermen not to go to sea but fishermen take advantage of this condition to repair boats, repair fishing gear or build businesses in other fields. The east season is a dry period where the water conditions are relatively calm. In this condition fishermen go to sea and carry out fishing operations so that in this period the catch obtained is quite high [9].

Indonesia has implemented a response period for handling covid since early March 2020, then followed by modification of the regional quarantine policy to PSBB starting on April 10, 2020 in Jakarta, then followed by several cities

and then followed by other regions within the province, district or city which showed a tendency to increase cases significantly. . After going through the emergency period and the PSBB, the Indonesian government has begun to implement the new normal and loosen the PSBB. In this study, the time span before the Covid-19 pandemic was 2019, at the peak of the pandemic in 2020 and after the peak of the pandemic in 2021.

### 3. RESULTS AND DISCUSSION

#### 3.1 Fishing Gear

The fishing fleet at NFP Palabuhanratu is a type of boat and motor boat with sizes of 1-10 GT and > 30 GT with a variety of fishing gear. The dominant fishing gears used include umbrellas, gill nets, handlines, rampus nets, long line tuna and long line fishing rods. The number of vessels actively operating from 2019-2021 at NFP Palabuhanratu is presented in Table 1.

The number of fishing vessels operating at the Palabuhanratu Nusantara Fishery Port during the pandemic was 550 units and 480 units before the pandemic, a slight increase of 15% was followed by a decrease in the number of ships in 2021.

The fishing fleet operating at the Palabuhanratu Nusantara Fisheries Port is dominated by hand line fishing gear.

#### 3.2 Number of Trips

The number of boat trips in this study is the frequency of entry and exit of fishing vessels that reduce their catch at Palabuhanratu NFP. Fishing vessels travel at least 1 day to sea and a maximum of 16 days at one time at sea. The following is data on the number of ship trips at Palabuhanratu NFP.

Based on Table 2, the number of trips at the Palabuhanratu Nusantara Fishery Port before the pandemic [10] was 16,281 trips while at the peak of the pandemic it decreased [11] to 3,327 trips and after the peak of the pandemic (2021) again decreased to 222 trips. Factors that affect the number of trips are that several ships in 2020 and 2021 are not operating due to unpredictable natural factors such as in previous years, lack of fishing capital, declining number of buyers and not fishing season at sea. This is in line with Anna's opinion [12] which states that the vid-19 pandemic has an impact on the number of trips, the number of catches and product prices.

**Table 1. Number of fleet operating in Nusantara fishery Port in 2019, 2020 and 2021**

Catching tool	Number of ships		
	2019	2020	2021
Kincang Pancing Ulur ( <i>hand line</i> )	236	219	228
Kincang jaring Rampus ( <i>Shrimp Entagline Gill Net</i> )	31	38	35
Kincang Bubu	-	15	15
MT. Payang ( <i>Pelagic Danish Seinne</i> )	51	44	44
Dogol ( <i>Bottom Danish Seinne</i> )	27	27	-
Kapal Non Perikanan dan kapal Andon	-	48	-
Angkutan Bagan ( <i>Raft Lift Net</i> )	21	26	-
KM. Payang ( <i>Pelagic Danish Seinne</i> )	1	-	-
Pancing Tonda ( <i>Troll Line</i> )	77	77	54
Jaring Rampus (Udang) ( <i>Shrimp Entagline Gill Net</i> ) <10 GT	7	-	-
Jaring Rampus (Udang) ( <i>Shrimp Entagline Gill Net</i> ) 11-20 GT	-	2	-
Gillnet/Bubu <10 GT	1	2	-
Gillnet/Bubu 20-30 GT	-	1	-
Jaring Rampus (Udang) ( <i>Shrimp Entagline Gill Net</i> ) 11-20 GT	3	2	-
Jaring Rampus (Udang) ( <i>Shrimp Entagline Gill Net</i> ) 21-30 GT	1	1	1
Cash net 51-100 GT	-	1	-
Rawai Tuna ( <i>Tuna Longline</i> )21-30 GT	3	7	3
Rawai Tuna ( <i>Tuna Longline</i> ) 31-50 GT	14	19	14
Rawai Tuna ( <i>Tuna Longline</i> ) 51-100 GT	7	21	13
Purse Sein >100 GT	-	2	2
Handline Tuna 21-30 GT	-	-	3
Handline Tuna 51-100 GT	-	-	1
<b>Total</b>	<b>480</b>	<b>550</b>	<b>413</b>

Source: Secondary Data processed by the author (2022)

**Table 2. Data on number of trips for 2019-2021**

GT	Catching tool	Number of trips		
		2019	2020	2021
	Payang	803	525	-
	Pancing Ulur	7.793	1.223	17
	Rampus/Jaring Klitik	2.773	222	-
	Angkutan Bagan	467	178	-
	Trammel Net	2.070	236	-
	Bubu	-	404	-
5-10 GT	Angkutan Bagan	1.711	-	-
	Payang	3	-	-
	Pancing Ulur	125	-	-
	Pancing Tonda	362	300	184
11-20 GT	Purse Seine	10	10	-
	Rampus/Jaring Klitik	13	15	-
30 GT	Handline Tuna	-	-	1
21-30 GT	Tuna Longline	14	58	4
31-50 GT	Jala Jatuh Berkapal	1	1	-
	Tuna Longline	89	94	10
51-100 GT	Jala Jatuh Berkapal	1	-	-
	Tuna Longline	46	61	6
<b>Total</b>		<b>16.281</b>	<b>3.327</b>	<b>222</b>

Source: Secondary Data processed by the author (2022)

### 3.3 Fish Production

Fish production landed at NFP Palabuhanratu mostly comes from the catch of domicile fishing vessels and some of the catch is imported by land, the same thing as happened at the Jakarta Ocean Fisheries Port [13] and PPI Muara Angke Jakarta [14]. The catches landed came from fishing fleets based PNFP and immigrant fishing fleets from Cilacap, Binuangeun and Jakarta; while the fish by land came from Jakarta, Ujung Genteng, Cisolok, Cidaun, Binuangeun, Loji and Indramayu.

Total is production from the Palabuhanratu Nusantara Fisheries Port at the peak of the pandemic [11] was 9,952.3 tons which is 74.3 tons less than the previous year (2019) [10], may be due to a decrease in the amount of landed fish. Fish production landed at the in 2020 decreased by 410.3 tons from 5,414.2 tons to 5,003.9 tons. Meanwhile, for fish production that entered by land at the peak of the pandemic (2020) increased by 335.9 tons from 4,612.4 tons to 4,948.3 tons. After the peak of the pandemic (2021) fish production in PPN increased to 10,017.9 tons and the production of fish landed also increased to 5,111.1 tons. Meanwhile, fish production that enters by land has decreased by 41.6 tons at Palabuhanratu NFP.

The production and value of fish distributed by land has increased, may be increasing demand for fish and decrease fish production at the port. Fish production distributed by land at the peak of the pandemic (2020) was 4,948,312 tons, 335,942 tons f more than 2019 (before the pandemic), and fish production after the peak of the pandemic (2021) decreased by 41.578 tons to 4,906.734 tons. Meanwhile, the value of fish production has increased every year, at the peak of the pandemic (2020) from Rp. 114,068,411,500 to Rp. 116,988,567,500 and was followed by an increase in production value after the peak of the pandemic (2021), which was Rp. 120,168,787,000. The largest fish production and production value is in the Jakarta area in 2021, the production is 3,841.51 tons with an average of 320,126 tons/month and the production value is Rp97,483,385,000 with an average of Rp8,123,615,417 /month.

### 3.4 Fish Price

Fish Benchmark Price (FBP) is fish price or value in rupiah for calculating fishery product levies determined by the Minister of Industry and Trade based on information on fish prices in the domestic market and in the international market. The price of the catch in the Palabuhanratu NFP for each type of fish is different, both pelagic and demersal fish. The dominant catches in

**Table 3. Total production and value of fish production at the port in 2019-2021**

Year	Landed at the Port		Entering the Port		Total	
	Production (Ton)	Value (Rp)	Production (Ton)	Value (Rp)	Production (Ton)	Value (Rp)
<b>2019</b>	5.414,2	111.363.857.750	4.612,4	114.068.411.500	10.026,6	225.432.269.250
<b>2020</b>	5.003,9	110.449.972.184	4.948,3	116.988.567.500	9.952,3	227.438.539.684
<b>2021</b>	5.111,1	97.771.690.500	4.906,7	120.168.787.000	10.017,9	217.940.477.500

Source: Secondary Data processed by the author (2022)

**Table 4. Fish production and value per region distributed by land to the Palabuhanratu Nusantara Fisheries Port**

Area	Year					
	2019		2020		2021	
	Production (Ton)	Value (Rp)	Production (Ton)	Value (Rp)	Production (Ton)	Value (Rp)
Jakarta	3.841,51	88.749.150.000	4.086,54	94.260.162.500	4.119,09	97.483.385.000
Palampang	-	-	5,275	79.125.000	2,65	39.750.000
Blanakan	-	-	-	-	5,325	86.487.500
Indramayu	4,4	120.025.000	3,2	59.375.000	3,35	56.150.000
Ujung Genteng	213,095	8.659.715.000	199,19	8.365.980.000	254,346	10.897.783.000
Pangandaran	225,33	9.299.140.000	34,365	1.443.330.000	32,52	1.376.840.000
Karawang	42,104	1.226.528.000	33,13	1.490.850.000	20,788	935.460.000
Eretan	2,75	21.000.000	3,5	52.500.000	1,425	18.762.500
Cianjur	164,65	2.593.125.000	166,453	2.676.050.000	194,825	3.191.700.000
Cilacap	-	-	51,4	915.200.000	8,075	344.250.000
Tegal	25,55	471.050.000	18,475	564.700.000	41,655	669.155.000
Prigi	-	-	17,4	295.850.000	7,4	125.850.000
Labuan Caringin	47,875	608.675.000	213,225	2.637.580.000	128,77	1.687.995.000
Binuangeun	45,106	1.647.053.500	48,897	1.738.985.000	36,995	1.357.495.000
Panimbang	-	-	67,28	2.408.880.000	49,52	1.897.760.000
<b>Total</b>	<b>4.612,37</b>	<b>114.068.411.500</b>	<b>4.948,312</b>	<b>116.988.567.500</b>	<b>4.906,734</b>	<b>120.168.787.000</b>

Source: Secondary Data processed by the author (2022)

**Table 5. Fish price data at the Palabuhanratu Nusantara Fishery Port 2019, 2020 and 2021**

Date	Type of fish	Fisherman level (Kg) (Rp)
2/2/2022	Yellowfine Tuna (big)	25000
	Yellowfine Tuna (small)	20000
	Albacor	18000
	Setuhuk/Marlin	38000
	Lemadang	14000
	Cakalang	14000
	Layur	33000
	Swangi	20000
	Bentrong	20000
	Tenggiri	40000
	Layang anggur	17000
	Udang Krosok	85000
	Udang jerbung	110000
	Ikan sebelah	17500
	Kurisi	17500
	Tembang	7000
	Peperek	3000
	Tongkol salur	13000
	Tongkol Banyar	13000
	Semar/Koyo (small)	5000
	Semar (big)	17500
	Kakap merah	40000
	Bawal Hitam	35000
	Kakap hitam	25000
	Selar ekor kuning	12500
	Tongkol Kwee	35000
	Kembung	25000
	Talang-talang	13000
	Cengker	14000
	Waho	35000
	Bawal Putih	150000
	Marlin/Gelang Payung	25000
	Cendro	10000
Manyung	12000	
Serepet	30000	
T. Lisong	12000	
Gelang Sadap	6000	
Ikan Lidah	7000	
Kuro	5000	

Source: Secondary Data processed by the author (2022)

Palabuhanratu NFP are tuna, tuna, layur fish, Selayang fish and squid.

The price determination is carried out without a fish auction process at the TPI. The determination of the price is carried out between the selling fishermen and the buyer traders/processors. Every fisherman who has just returned from the sea has to deal directly with many buyers at once or pay a fee to hire a manager to sell them, as well as pay an auction fee to the TPI manager even without an auction.

In the absence of a fish auction, there is no price labeling at the time of the fish sale transaction between the seller's fishermen and the buyer's traders/processors. If there is a fish auction, the role of fishermen in selling is replaced by auction officers who, with the auction system and mechanism, are able to deal with many buyers at once. The auction has been held at TPI since the operation of this port and has been stopped since 2005 [15]. Since the Covid-19 pandemic, fishermen have also experienced price fluctuations and high competitiveness, especially

the small fishermen. The factors causing the lack of high competitiveness are the high price of fish at the TPI level, but the absence of fish auctions and the lack of attention to KHT and its components at this port [16].

### 3.5 Fish Distribution

Marketing fishery products from the Palabuhanratu Nusantara Fisheries Port in the form of fresh fish products and processed fish (salted fish and pindang). Distribution destinations include local and inter-city distribution includes Sukabumi, Jakarta, Bandung, Bogor, Cicurug and Cianjur. The inter-provincial distribution destinations include Banten and Surabaya. To meet the fish needs at the Palabuhanratu Nusantara Fisheries Port, there are also fish imported from other areas by land including from Jakarta, Cisolok, Loji, Ujung tile, Binuangeun and Muncar, Central Java.

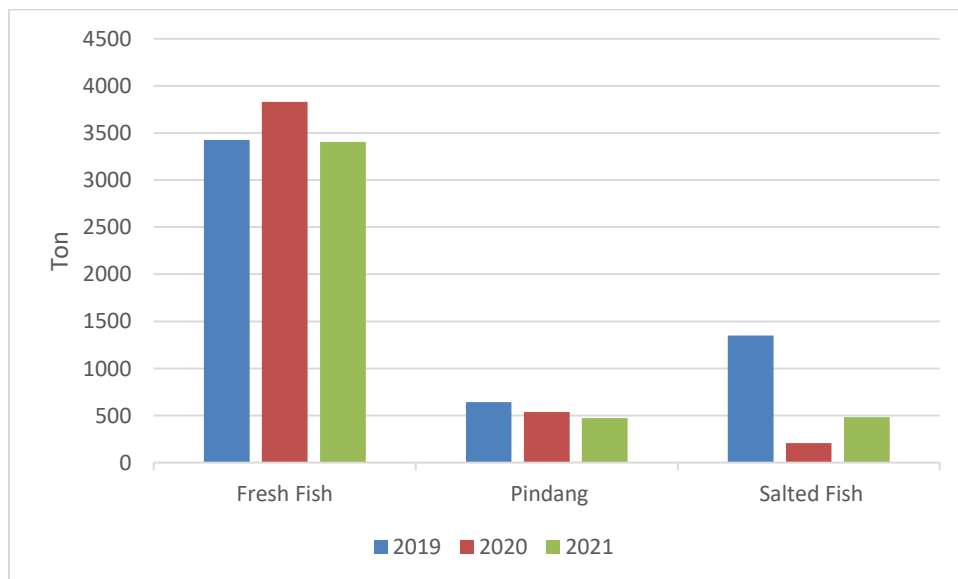
The distribution of fresh fish at the peak of the pandemic (2020) which was 3,828.55 tons increased by 402.89 tons, while after the peak of the pandemic it decreased by 424.14 tons, which was to 3,404.41 tons in 2021, the distribution of pindang fish at the peak of the pandemic (2020) which was 536,562 tons decreased by 104,452 tons while after the pandemic experienced the same thing, namely a decrease of 62,759 tons and the distribution of salted fish at the peak of the pandemic (2020), namely 206,268 Tons experienced a very drastic decrease of

1,141,302 Tons, while after the peak of the pandemic (2021), which was 484,369 Tons, there was a slight increase of 278,101 Tons. According to Yunanda [17] during the pandemic, tuna exports from Indonesia fell by 75%, there was an increase in tuna export costs, excess *cold storage* due to declining demand and excess supply of frozen tuna in the canning industry.

### 3.6 Fisherman's Income

Fisherman's income is used to meet the needs of life and livelihood of fishermen. Fishermen's income comes from fishing and non-fishing income as farmers or ship cleaning services. Fishermen receive wages with a profit-sharing system (Alpharesy 2012). Profit sharing between owner fishermen and labor fishermen in Palabuhanratu NFP for each fishing gear is different, based on the results of the study as follows:

- a) The profit sharing of the fisherman who own the boats and the fisherman of the chart is 60% : 40%
- b) The profit sharing of the fishing boat owners with the fishing rods is 50% : 50%
- c) The profit sharing of the fisherman who own the boats and the fisherman of the payang is 70% : 30%
- d) The profit sharing of the fisherman who own the boats and the fisherman of the chart is 60% : 40%



**Fig. 1. Fish distribution data at the Palabuhanratu Nusantara Fisheries Port**  
 Source: Secondary Data processed by the author (2022)



**Table 6. Average fisherman's income by fishing tool**

Catching tool	Average monthly income	
	Before the pandemic (Rp)	After the pandemic (Rp)
Payang	650	600
Pancing	650	550
Bagan	500	450
Jaring	400	350

Source: Secondary Data processed by the author (2022)

**Table 7. Average fisherman's expenditure by fishing tool**

Catching tool	Average monthly expenses	
	Before the Pandemic (Rp)	After the Pandemic (Rp)
Payang	2.250	2.250
Pancing	1.800	1.700
Bagan	1.500	1.500
Jaring	2.000	2.000

Source: Secondary Data processed by the author (2022)

In Table 6, it can be seen that the income of fishermen for each fishing gear has decreased after the peak of the pandemic (2021). Fishermen's income is the result of income from activities in one goes to sea before the pandemic, which generates a maximum of IDR 650,000 for payang and fishing line fishermen, while the minimum after the peak of the pandemic is IDR 350,000 for net fishermen. In Table 6, the income of fishermen after the peak of the pandemic (2021) has decreased relatively, for Payang fishermen decreased by 7.7%, fishing rods decreased by 15.4%, Bagan fishermen decreased by 10% and net fishermen decreased by 12.5%. Capital is very influential on the decline in income because more capital will increase the production of fish caught by fishermen at sea, so that fishermen have the opportunity to increase fuel supplies, replace damaged engines, stock ice blocks and repair ships so that they are fit to be taken to sea and have fishing gear with technology.

### 3.7 Fisherman's Expenditure

Household expenditure is expenditure on goods and services by household for consumption purposes [18]. In general, PNFP fisherman's household expenditure can be grouped into two groups, namely food and non-food expenditure. Thus, at a certain income level, households will allocate their income to meet their needs or expenses.

Most of the fishermen stated that the average household expenditure before and after the pandemic did not change much. However, during

the pandemic, fishermen's income was less while household expenditures did not decrease, so most fishermen covered their household needs by borrowing from banks or corporations. This is a problem in the fishermen's economy, namely the imbalance between income and expenditure. Household expenditure for fishing rods decreased by 5.6% while for payang, bagan and net fishermen it did not experience a decrease. For the largest expenditure before and after the peak of the pandemic, there were payang a fisherman with an average of Rp. 2,250,000/month and the smallest expenditure before and after the peak of the pandemic was found in Bagan fishermen with an average of Rp. 1,500,000/month. The types of household food expenditure commodities for PNFP fishermen are side dishes, rice, coffee, cigarettes and cooking oil. Meanwhile, non-food expenses are house rent, electricity, motorbike installments, school fees and health costs. For capital expenditures for fishing based on the results of interviews, it is financed by the ship owner. In the scope of NFP fishermen, most of the fishermen do not have health insurance and fisherman's life insurance due to poor management. The fishermen's health insurance is BPJS Kesehatan (Social Security Administering Agency) and the life insurance provided to fishermen is Kusuka.

### 4. CONCLUSION

Operational conditions of fish production and distribution at the Palabuhanratu Nusantara Fisheries Port (NFP) before and after the Covid-19 pandemic changed in the volume of fish

landed on port. Catch per fishing gear also experienced a significant decline from gillnet, long line, fishing rods, trammel net, hand line and purse turn signal. The distribution of fresh fish at the peak of the pandemic (2020) has increased but pindang fish and salted fish has decreased as the fish production at the peak of the pandemic (2020) has decreased. Determination of fish prices is carried out without a fish auction at the TPI, but the price determination is carried out between the selling fishermen and the buyer traders/processors directly at the time of setting the catch.

Based on the results of the study, fishermen's income for each fishing gear decreased after the peak of the pandemic. The income of fishermen in one fishing trip before the pandemic was Rp. 650,000 at most for payang and fishing line fishermen, while the least after the peak of the pandemic was Rp. 350,000 for net fishermen. Most fishermen state that there is an imbalance between income and expenditure. For the largest expenditure before and after the peak of the pandemic, there were payang fishermen with an average of Rp. 2,250,000/month and the smallest expenditure before and after the peak of the pandemic were found in Bagan fishermen with an average of Rp. 1,500,000/month.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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