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## IMPACT OF THE COVID-19 PANDEMIC ON THE FISHING ACTIVITIES OF SMALL-SCALE FISHERMEN IN SOUTH KALIMANTAN PROVINCE OF INDONESIA

Hidayat Achmad Syamsu\*, Agusliani Erma, Zain Muhammad Adnan

Study Program of Fisheries Socio-Economics, Faculty of Fisheries and Marine Affairs,  
University of Lambung Mangkurat, Banjarmasin, Indonesia

\*E-mail: [syamsu@ulm.ac.id](mailto:syamsu@ulm.ac.id)

### ABSTRACT

This study aims to identify fishing activities and analyze differences in fishing activities patterns in before and during the period of the COVID-19 pandemic because of restrictions implemented. The research was conducted in Tanah Laut and Tanah Bumbu Regency, South Kalimantan Province. Determination of the location of the study with consideration of the area is marine water fishing activities center with a diversity of fishing gear. The number of samples was set at 311 fishermen. This research was carried out from August to October 2021 when the Covid-19 pandemic in the South Kalimantan was still in the status of Enforcement of Community Activity Restrictions (PPKM). Study results explain that fulfillment marine materials for fishing during the Covid-19 pandemic was more difficult than before the pandemic, seasonal fishing fishermen had a 0.093 times more difficult opportunity than one-day fishing fishermen. At the stage of fishing operations, there are no different activities between before and when the Covid-19 pandemic both in one day fishing and seasonal fishing. Fish marketing activities are becoming more difficult, where one-day fishermen are 5.2 times more likely to do marketing compared to seasonal fishing, due to limited opportunities for transactions, limited access of collectors to direct fishermen and reduced operational time to fish markets.

### KEY WORDS

Covid-19 pandemic, restrictive policy, fishing activities, oneday fishing, seasonal fishing, small-scale fishermen.

Since the Covid-19 outbreak began to sweep the world and entered Indonesia in early 2020 which caused many changes in community activities. To contain the pace of development of the Covid-19 pandemic, the Government of Indonesia implements Large-Scale Social Restrictions (PSBB) in several cities in accordance with PP Number 21 of 2020 in the context of handling the Covid-19 outbreak in Indonesia which regulates restrictions on the movement of people, academic and workplace activities, religious activities, activities in public facilities, and the distribution of goods to other regions which are implemented in the form of work from home, Online learning, restrictions on the operating hours of traditional markets, supermarkets and supermarkets, culinary businesses can only provide delivery and take home services, closure of tourist sites and strict rules regarding the requirements for traveling by public transportation.

The Covid-19 pandemic, which has hit almost all regions of the world, has a direct impact on the health and welfare of the public and fishermen, especially on the disruption of the fish market and the very real logistical challenges for fishing workers (Sorensen et al., 2020); (Bennett et al., 2020); (Chanrachkij et al., 2020); (Zhang et al., 2021); (Gonzalez-Pestana et al., 2023).

The implementation of this policy has caused Indonesia's fisheries sector to experience a significant decline, including aquaculture, fishing, and processing of fishery products. Workers who would normally carry out fishing operations had to stop to avoid the spread of Covid-19. The impact of the Covid-19 pandemic on fishing activities in several regions of Indonesia is quite diverse, including the demand for fishermen has decreased, the selling price of fish has decreased, fishermen's income has decreased, the distribution of fishery products has been hampered, the frequency of fishing has decreased, there is an overstock



of fish raw materials, the number of crew members decreases in each fishing activity and the availability of fish decreases as a source of high-protein food (Mardhia et al., 2020); (Hamzah & Nurdin, 2020); (Sari et al., 2021).

South Kalimantan Province has regional boundaries on the west with Central Kalimantan Province, the east with the Makassar Strait, the south with the Java Sea, and the north with East Kalimantan Province. The area is around 38,744.23 km<sup>2</sup> and has considerable fisheries potential because it has a coastline of 1,330 Km, a public water area of 1 million Ha, ponds of 2,400 Ha, and ponds of 53,382 Ha. The potential of marine fisheries in 2020 has produced 127,139 tons of marine fisheries commodities. There are 6 out of 13 regencies/cities in the South Kalimantan region that have coastal areas so that there are fishing activities by fishermen in this area. Fishermen in the coastal areas of South Kalimantan are classified as small fishermen who carry out one-day fishing operations and who carry out seasonal fishing during the dark month (seasonal fishing) for about 15 days every month. The production of marine fisheries commodities in 6 districts in South Kalimantan is presented in Table 1.

Table 1 – Marine Fisheries Production in South Kalimantan, 2015-2021 (Tons)

Region / City	Volume (ton)						
	2015	2016	2017	2018	2019	2020	2021
Tanah Laut	43.357	50.493	52.050	55.136	73.166	6.538	9.065
Kotabaru	56.315	71.574	60.376	60.427	91.010	64.684	64.799
Banjar	5.645	3.312	1.980	3.381	3.450	5.860	5.874
Barito Kuala	2.876	2.678	3.595	4.214	3.360	3.128	2.700
Tanah Bumbu	40.172	24.883	37.595	34.394	46.914	41.220	18.488
Banjarmasin	22.491	23.564	24.100	28.901	32.225	5.709	2.934
Total	170.856	176.505	179.696	186.453	250.125	127.139	103.860

Source: Central Bureau of Statistics, South Kalimantan, 2015-2021.

In general, from 2015 to 2019 there was an increase in marine fisheries production, but there was a very significant decrease in 2020 and 2021, during which the COVID-19 pandemic occurred and had a major impact on the lives of the community in general and the fisheries community. In line with the decline in marine fishing production as presented in Table 1, the decline in production value also occurred in the last 2 years, namely 2020 by 36% and 2021 by 25% (Central Bureau of Statistics of South Kalimantan Province, 2022).

Fishing activities is an upstream activity of the fisheries sector that can determine how downstream activities can run. Marine commodities are a production input for handling, processing, and marketing of fishery products. Thus, the smooth supply of fish from the fishing sector is an important part that must be a concern to develop the fishing industry. The impact of the Covid-19 pandemic on small-scale fisheries, where many small-scale fish entrepreneurs experience difficulties when social distancing is carried out which hampers the distribution of fish products to consumers and is exacerbated by a decrease in demand and fish prices. The level of welfare in the Indonesian fisheries sector can be seen from the exchange rate of fishermen and fish farmers (NTNP) which decreases every month in quartile I (2020) and drops to below 100 in quartil II (2020). Fishing ports also have the potential to become new hotspots for the spread of Covid-19 because ports are migration points for both fishermen and foreign visitors. Therefore, better access to testing, sanitation supplies, and contact tracing to stop the spread of Covid-19 in the fisheries sector is urgent to provide (Wiradana et al., 2021).

Several points of PPKM (Enforcement of Community Activity Restrictions) rules implemented by the government are estimated to have a significant impact on fishing activities, especially in the distribution flow of fish that are very potentially disrupted. Fishing activities consist of pre-fishing activities, fishing operations and post-fishing. Pre-fishing is related to the fulfillment of needed for fishing activities such as crew (ABK), fuel, preparation of ships and ship engines, preparation of fishing gear and fishing aids and other. Fishing operations are related to the division of labor of fishermen, determination of the location of



capture, time of capture and so on, while post-fishing is related to handling and marketing of fishery products.

Efforts to utilize the large fisheries potential in South Kalimantan need to be maintained and even improved because fishery products are one of the high-protein foods that are useful for maintaining and strengthening endurance as well as a source of livelihood for many fishing households. Based on the above narrative, the following problems are formulated: what is the pattern of fishing activity before and during the Covid-19 pandemic, and whether there are differences in fishing activity patterns between day fishing and seasonal fishing in the period before and during the Covid-19 pandemic.? This study aims to identify patterns of fishing activity before and during the COVID-19 pandemic and to analyze differences in patterns of fishing activity between *one-day fishing* and *seasonal-fishing* before the COVID-19 pandemic due to restrictions imposed by the government. The results of this study can be used as a basis for government policy in the event of another pandemic in the future so that fishing activities remain feasible.

## METHODS OF RESEARCH

The research area was determined purposively, at Tanah Laut Regency and Tanah Bumbu Regency, South Kalimantan Province. Tanah Laut Regency includes Takisung District (Takisung Village and Tabanio Village) and Kintap District (Muara Kintap Village). Tanah Bumbu Regency includes Sungai Loban District (Sungai Dua Laut Village), and Kusan Hilir District (Betung Village and Wiritasi Village). Determination of the location of the study with consideration of the area is marine water fishing activities center with a diversity of fishing gear based on the length of the fishing trip. The number of samples was determined as many as 311 fishermen as respondents. This amount is considered sufficient for data stability and data analysis purposes. This research was carried out from August to October 2021 where at that time the Covid-19 pandemic in the South Kalimantan Province area, including the research area, was still in the status of Enforcement Community Activity Restrictions (PPKM). From August 10 to August 23, the determination of PPKM Level 4 status even increased in addition to Banjarmasin City and Banjarbaru, adding Tanah Laut, Tanah Bumbu, Barito Kuala and Kotabaru regencies. Data collection was carried out with the application of rules set by the government at the time.

The data collected is in the form of primary data and secondary data. Primary data sourced from RTP (Fishery Household) respondents include fishermen, processing, and marketing of fishery products. Respondents in this study were divided into 2 groups in fishing activities, namely fishermen with daily trips (*oneday fishing*) and fishermen with monthly trips / kalam (*seasonal fishing*). Data collection was conducted through interviews using interview guidelines (questionnaires) and observations. Secondary data were obtained from documentation of the Fisheries and Marine Service in the research area, Village Profile and Annual Report of the Central Bureau of Statistics.

Data analysis uses descriptive methods which include how to calculate, describe, and conclude data and information using graphs, tables, curves, time series so that they can be understood logically using non-parametric statistical tests (*Chi-Square*). Descriptive analysis describes how a particular phenomenon or state through explanation and description (Vetter, 2017); (Nasution et al., 2020)7; (Kinasih et al., 2022).

Identification of fishing activities patterns before and during the Covid-19 pandemic was carried out by making direct observations and discussions on the object of research on fishing business activities starting from pre, activities and posts in conditions before the Covid-19 pandemic and during the Covid-19 pandemic. The data obtained is then tabulated and grouped based on conditions before and during the Covid-19 pandemic. Each group will be presented in the form of tabulations and graphs.

Analyzing the comparison of patterns and dynamics of fishing business before and during the Covid-19 pandemic, the following tests were used:

1. Data that have been obtained and classified based on the following variables:



- Pre-fishing activities, namely the fulfillment and provision of production inputs (ABK, fishing needs, improvement of fishing infrastructure)
  - Fishing activities (determination of fishing locations, division of labor of fishermen, implementation of fishing operations, handling, and processing of fish during fishing activities and types of fish caught and fish for the purpose of fishing)
  - Post fishing activities (Marketing of marine commodities, how to sell/transaction, price of caught fish, types of fish requested by consumers, types of fish that are not caught/less desirable, forms of fish sold, wages from fishing activities and processed forms)
2. Values in the data based on the classification of the answers obtained and then marked, then each variable will be tested against 2 conditions, namely conditions before the Covid-19 pandemic and Covid-19 pandemic conditions.
3. Then the Chi Square Test is used with the formulation of the following hypothesis:
- Pre-fishing activities hypothesis:  
H0: There is no difference in pre- fishing activities before the Covid-19 pandemic and during the Covid-19 pandemic;  
H1: There are differences in pre- fishing activities before the Covid-19 pandemic and during the Covid-19 pandemic.
  - Fishing activity hypothesis:  
H0: There is no difference in fishing activities before the Covid-19 pandemic and during the Covid-19 pandemic;  
H1: There are differences in fishing activities before the Covid-19 pandemic and during the Covid-19 pandemic.
  - Post-fishing activities hypothesis:  
H0: There is no difference in post- fishing activities before the Covid-19 pandemic and during the Covid-19 pandemic;  
H1: There are differences in post- fishing activities before the Covid-19 pandemic and during the Covid-19 pandemic.

Decision criteria:

- If the value is Asymp. Sig (2-sided) < 0.05, then H0 is rejected and H1 is accepted;
- If the value of Asymp. Sig (2-sided) > 0.05, then H0 is accepted and H1 is rejected.

*The Risk Estimate test* is used to see the difference in opportunities between *one-day fishing* and *seasonal fishing* by considering the *Odds Ratio* value.

## RESULTS AND DISCUSSION

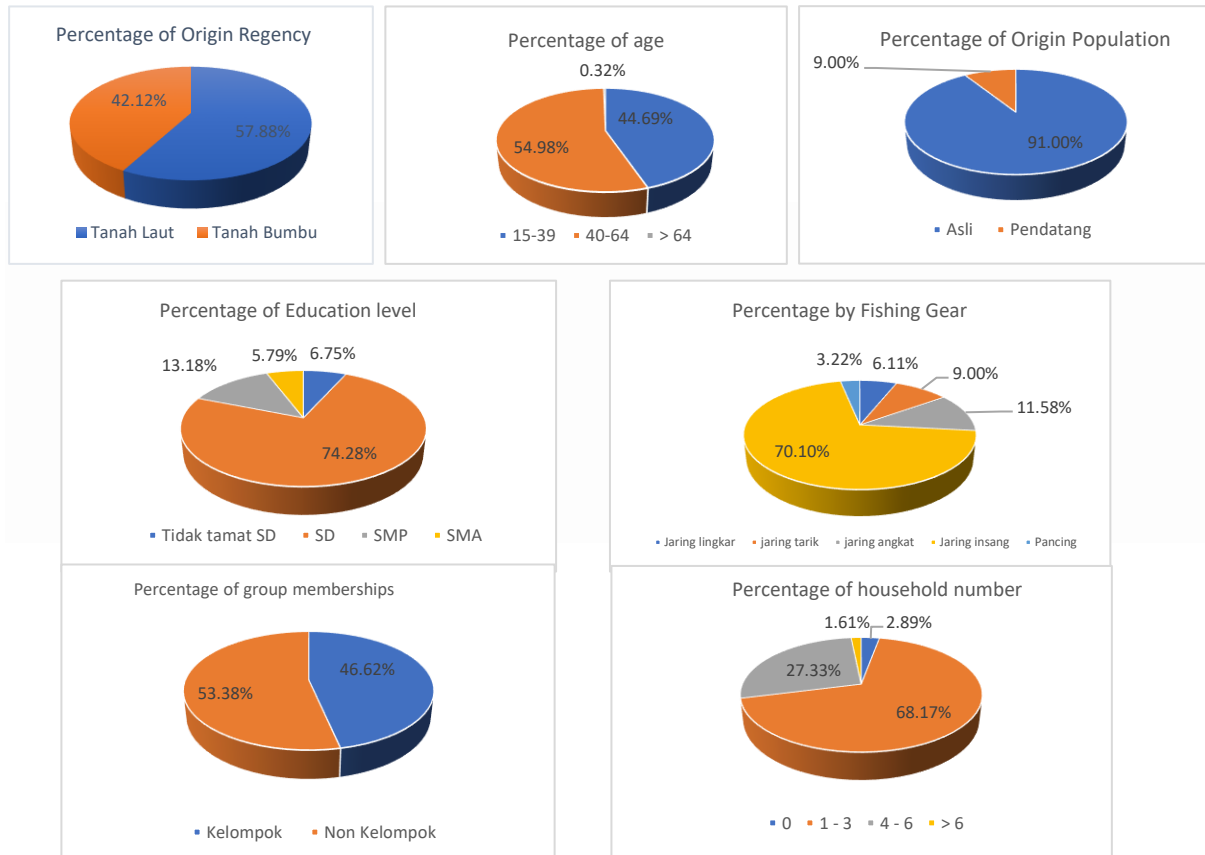
The respondents in this study were 311 people consisting of 131 people (42.12%) from Tanah Laut Regency and as many as 180 people (57.88%) from Tanah Bumbu Regency, South Kalimantan. Most (91%) of them are local natives and only 9% of the population is immigrants from other regions.

Almost all respondents (99%) respondents are classified as productive age, namely between 15 to 64 years and 44.69% are still classified as young (15-39 years). Based on their education level, they are still very low, namely 74.28% graduated from elementary school (SD), 13.18% graduated from junior high school (SMP) and 6.75% who graduated from high school (SMA). The number of dependents of the head of the family mostly ranged from 1-3 people as many as 68.17% of respondents and ranged from 4-6 people of 27.33% of respondents and only 46.62% of respondents who participated in the fishermen group.

Fishing activities by fishermen in this study area are grouped into two groups based on the time/duration of fishing activities, namely: *Oneday fishing* and *Seasonal fishing*. *Oneday fishing* is a fishing activity carried out by fishermen routinely every day except for bad water or weather conditions and Fridays. Fishermen will depart from the fishing base to the fishing ground at dawn and return to the fishing base in the afternoon to regularly evening every



day. The size of the fishing vessel used ranges from 1 to 4 GT (Gross Tonnage) with wood material. One boat is filled with 1 to 2 people including the captain.



Fishing gear used in fishing activities is in the form of fishing rods (handline), crab nets (set bottom gill nets), lift nets (lift nets) and mini bottom lampara (mini trawl). The number of tools used for fishing activities for fishing rods is 4 to 5 units, crab / shrimp nets as much as 20 to 150 sucks (net sheets) with a net size of 2 to 4.5 inches.

Seasonal fishing is a fishing activity carried out in a certain period (dark moon) taking place on the 17th of the calendar until the 3rd of the dark moon calendar, fishermen will depart from fishing base to fishing ground on the 17th and return to fishing base on the 3rd or 5th, then fishermen will prepare to carry out fishing activities again on the 17th. The size of the fishing boat used ranges from 7 to 18 GT with wood material. The number of workers is 5 to 6 people with 1 person appointed as the captain of the ship, the duration of fishing activities ranges from 6 to 2 hours starting from setting gear, hauling, and handling of fish everyday while at sea.

The implementation of fishing activities begins with the preparation of fishing activities starting from preparing and inspecting ships, machinery and fishing gear that will be used in fishing operational, crew members who will participate in fishing activities. In addition, preparation for fishing activities such as the provision of fuel, oil, kerosene/firewood, clean water, salt, and fishing needs (food, beverages, and other needs) for 10 to 15 days of capture. The implementation of fishing activities is that the fishing boat departs from the fishing base to the fishing ground which is 1-2 days away from the fishing base location. The fishing ground area is 2-4 nautical miles away.

The location of fishing grounds is influenced by the movement of fish that are the destination of fishing. Fishing activities were carried out at 18.00 starting with casting nets in the waters. At 00.00, the net will be lifted, and the crew will immediately handle the fish by cleaning and processing the caught fish. During the day, ABK will carry out activities such as



repairing nets damaged by being stuck on corals and checking fish that have been caught at night.

Marine commodities will be brought back to the fishing base after the fishing activity period ends. The commodities will be sold to collectors at the fishing base location, or it is marketed by the owner himself to markets and collectors outside the village. However, what often happens is that collectors make transactions with fishermen on the boat by going directly to the location where fishermen carry out fishing activities

A comparative analysis of fishing activities patterns by fishermen in the study area before and during the Covid-19 pandemic was carried out by examining differences in fishing activities both at the pre-fishing, operational and post-fishing stages or marketing of marine commodities by fishermen because of restrictions imposed by the government. The test was conducted using *Chi Square* test on 311 respondents.

The discussion that the author conveys in this article is only on activities that have proven to be statistically significant. The results of the analysis prove that in the activities of fulfilling marine needs, namely the needs of fuel (diesel), olie, kerosene/firewood, ice, and salt (pre-fishing), and marketing of fish (post-fishing) there was a significant difference between before the pandemic and during the pandemic.

The results of the statistical test using SPSS Statistics 24 software found that there were no cells that had an expected count value of less than 5, so to answer the *Chi Square* test crosstabs with a 2x2 table using the Continuity Correction value (65,607). Asymp value. Sig (2-sided) < 0.05, then the decision H<sub>0</sub> was rejected and H<sub>1</sub> was accepted, which means that there is a difference in meeting the needs of marine materials during the Covid-19 pandemic with before the pandemic. The *Odds Ratio* value obtained in the *Risk Estimate Test* is 0.093 which means that *seasonal fishing* fishermen have a more difficult opportunity of 0.093 times to meet the needs of marine materials than *oneday fishing* fishermen.

Fishermen's difficulties in fulfilling marine needs include fuel-diesel, foodstuffs, salt, and other materials during the pandemic compared to before the pandemic due to restrictions on mobility to obtain these materials. The most difficult need to go to sea is to get subsidized diesel fuel to carry out fishing activities. The availability of fuel-subsidies is limited so that every fisherman who buys subsidized fuel is limited to 2 drums (for *seasonal fishing*), and not all fishermen can directly buy at *Solar Packed Fishermen Dealer* (SPDN), so that in fulfilling diesel fuel, fishermen must buy outside SPDN at a more expensive price of Rp 1000–1500/liter.

At the stage of fishing activities or operations at sea, there are no different activities between before and when the Covid-19 pandemic took place. This lack of difference applies to both *one day* and *seasonal* fishers. This is in line with several previous studies conducted by (Mardhia et al., 2020); (Sari et al., 2021); (Menhat et al., 2021); (Suherman et al., 2022).

*Chi Square* test at the marketing stage of the marine commodities obtained Asymp value. Sig (2-sided) < 0.05) then the decision H<sub>0</sub> was rejected and H<sub>1</sub> was accepted, which means that before the Covid-19 pandemic there was a significant difference from the pre-pandemic period. The restrictions imposed by the government have limited space for transactions, collectors limited access to direct fishermen and reduced operational time to market fish. The *Odds Ratio* obtained in the *Risk Estimate* test is 5,293, which means that *one-day fishing* fishermen have a 5,293 times more difficult opportunity to market their fish than *seasonal fishing* fishermen. *Seasonal fishing* fishermen market their results more flexibly because of their habit of conducting transactions at sea using radio communication facilities available on ships while one-day fishing fishermen must bring their fish to the fishing base or fish landing place that undergoes access restrictions.

The disruption of marketing of fish from fishermen during the Covid-19 pandemic did not only occur in the South Kalimantan region but almost throughout the archipelago and even throughout the world. As with other study results, the closure and restrictions not only have an impact on export-oriented fisheries such as limited port activities, access to cool storage and cessation of shipping, but also have an impact on small-scale fishery, namely reduced demand and falling prices and have disrupted the relationship between fishermen,



traders, and customers, which ultimately makes the livelihoods of fishermen and fish traders decrease (Bennett et al., 2020b); (Nurhayati, 2020); (Lau et al., 2021).

Strengthening small fishermen so that they can continue to carry out fishing operations is very necessary so that fishing efforts can still be used as a source of livelihood for fishermen who are decent, because there are not many other livelihoods that can be used as alternative income (Campbell et al., 2021). Certainty of access to marketing channels such as supply chain and location reorganization and auction systems is a very feasible recommendation made by the government, this is in line with the results of various studies conducted by (Soares et al., 2022); (Gonzalez-Pestana et al., 2023).

## CONCLUSION

The pattern of fishing activities at the stage of fishing operations starting from departure to sea, fishing operations, determining fishing ground and handling marine commodities by fishermen in South Kalimantan is no different between before and during the Covid-19 pandemic. The restriction policy (PPKM) implemented by the government during the Covid-19 pandemic in the study area has proven to significantly make preparation activities for the fulfillment of materials for fishing more difficult during the pandemic than before the pandemic, where seasonal fishing groups felt a little more difficult, especially in fulfilling fuel at SPDN. Restrictions have also been proven to significantly make marketing activities more difficult, with one-day fishing groups 5.2 times more likely to do marketing.

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