The impact of the COVID-19 pandemic on fishers in the Indramayu District

Y D Sari1*, Mira1, S H Suryawati1, B O Nababan2, Y Hikmayani1, N P S Putri1

1Research Center for Marine and Fisheries Socio Economics, MMAF, Jln. Pasir Putih 1, Jakarta, Indonesia
2Dewantara Institute of Economic Science, Acropolis Blok LC 19, Jln. Karadenan Jln. Bojong Depok Baru III, Bogor, Jawa Barat, Indonesia

*yesidewita@gmail.com

Abstract. The impact of the COVID-19 pandemic in Indonesia has been perceived by all community. The global economic slowdown has an impact on Indonesia's economic growth. Exports of Indonesian fishery products are delayed due to restrictions on imported products in Indonesia's export destination countries. This study aims to determine the impact of the COVID-19 pandemic on the utilization of fishery resources in the Indramayu District. The data used in this study are primary and secondary. Methods of data analysis using quantitative descriptive. The results showed that fishermen in the Indramayu District continue to catch fish using the same fishing fleet and gear at the same fishing ground. The decline in business income due to the decrease in the selling price of fish causes a decrease in business capital and a decrease in the source of livelihood for small-scale fishermen.

Fishermen's income has decreased by 20-30% per trip. Fishers continue to use the same boat, fishing gear, fishing ground, operational costs, and crew. The adaptation made by small fishermen is to reduce the number of trips to avoid losses when catches are low. The adaptation carried out by large-scale fishermen is to look for alternative sources of capital for operational costs to be still carried out during the fishing season. The government can provide fishing gear assistance and financial assistance to small fishers and provide capital institutions for large-scale fishers in reducing the impact of the COVID-19 pandemic on fishers in Indramayu.

1. Introduction
A disaster is a natural event that destroys settlements and the surrounding environment. Disaster can also be described as an event that disrupts the pattern of people's daily lives [1]. These disturbances generally arise by human activities, come suddenly, never thought of before, and the consequences are alarming to the community. Thus, a disaster is a natural and non-natural event that occurs suddenly that harms the community.

COVID-19 is an infectious and deadly disease caused by SARS-CoV-2, which is a type of coronavirus. Reported by bbcnews.com that this virus first surfaced on December 1, 2019, in China, precisely in the Wuhan area of Hubei Province, China, and then spread to all corners of the world, including Indonesia. COVID-19 is a non-natural disaster that occurs suddenly and causes public losses. Therefore, the government has made a policy to reduce the transmission of COVID-19 in Indonesia, namely by implementing physical distancing. Physical distancing means carrying out independent activities by applying a minimum distance of 1 meter from other humans. The government has also strengthened this policy by establishing the Indonesian Government Regulation Number 21 of 2020
concerning Large-Scale Social Restrictions in the Context of Accelerating the Handling of COVID-19. This policy is carried out to prevent crowds or large-scale community gatherings in one place. As a result, all community activities in Indonesia are disrupted, especially the economic sector.

The COVID pandemic has an impact on health and other aspects of life, especially in the economic aspect [2]. In the article, it was written that for those who were not infected with the virus, economic survival was the main focus. Self-employed or temporary workers may lose their income due to disruption of the business value chain. The COVID-19 pandemic has disrupted the economic continuity of households, worker households, and business households. Households take advantage of the existence of relatives' savings, assets, and/or loans to survive. Working households are relatively more resilient than business households [3]. Business households even have difficulty paying their bills and household installments. If this condition worsens, it will impact the welfare and sustainability of livelihoods which can lead to conflict [4].

In the Marine and Fisheries Sector, the impact of the COVID-19 pandemic can be seen from the decline in demand for fishery products by 20%. The decline in demand was due to a decrease in demand for export products, especially from the United States and China. In addition, the decline in demand for fishery products also came from the closure of restaurants in big cities due to the large-scale social restriction (PSBB) policy set by the government [5]. The decline in demand for fishery products causes catches not to be accommodated, so the price of fish plummets. For the fish caught by fishermen to sell quickly, fishers sell fish at low prices [6]. Selling fish at low prices will cause losses and loss of sources of capital to continue fishing. In this case, fishers can survive in several ways, such as relying on savings during the fishing season, buying only basic food to survive, mortgaging goods, and taking debts [7].

Indramayu District is one of the largest fish-producing districts in West Java. The fisheries subsector in Indramayu District contributes the third-largest GRDP after the wholesale, retail trade, and food crops subsector (excluding the mining sector). This sector can contribute to local revenue (PAD) of up to tens of billions of rupiahs per year [8]. The high PAD in the fisheries sector is contributed by the high production of marine capture fisheries. The total number of ships in the Indramayu District is 6,074 units, with sizes ranging from >0–5 GT to >100–200 GT. The COVID-19 pandemic has had a significant impact on the economy, including the Marine and Fisheries Sector. This study aims to determine the impact of the COVID-19 pandemic on the utilization of fishery resources in the Indramayu District in terms of input and output aspects of fishing.

2. Materials and methods
This research was conducted in Indramayu District in July-August 2020. The data used consisted of primary data and secondary data. Primary data were obtained from fishers, both fisher with small and large boats—primary data collection with the help of a questionnaire. The population in this study were fishermen in Indramayu District. Samples were taken with the representation of fishers from small boats and large boats. The sampling method was done by purposive sampling to represent all fishermen in Indramayu based on the type of fishing gear. The number of respondents from large-scale fishers is minimal because fishing vessels are currently fishing in WPP 718 with a trip duration of 3-4 months. The total number of samples in the study were 35 respondents consisting of 30 fishers using millennium gillnet fishing gear and 5 respondents using oceanic gillnet fishing gear.

This study uses descriptive analysis with a quantitative approach. Descriptive statistical research is statistics used to analyze data by describing or describing the data that has been collected as it is without intending to make conclusions that apply to the public or generalizations [9]. This study aims to explain the phenomenon of the COVID-19 pandemic in the Marine and Fisheries sector in the Indramayu District by using numbers to standardize the characteristics of individuals or groups [10].

3. Results and discussion
3.1. Fishery overview of Indramayu District
Indramayu District is very potential to be developed as a fishery production center. Based on research by [11], that two main sectors become the main potential of the coastal area of Indramayu, namely the
oil and gas sector (24.6%) and the fisheries subsector (24.4%). Total fishery production in Indramayu District in 2011 reached 266,392.37 tons, consisting of capture fisheries of 107,989.60 tons (40.54%), pond/brackish water fisheries of 101,454.95 tons (38.08%), pond fisheries of 101,454.95 tons (38.08%) 51,214.62 tons (19.23%), and river fisheries 5,733.20 tons (2.15%). Regarding regional development, the fisheries subsector in Indramayu District is still very potential to be developed. Based on data from the Department of Fisheries and Marine Affairs (2012), Indramayu District has the potential to develop capture fisheries with a beach length of 147 km with an estimated MSY (Maximum Sustainable Yield) of 49,395 tons, the area suitable for ponds is 39,911.60 ha (potential product of 142,819 tons). And an area for freshwater/pond cultivation of 25,000 ha (125,000 tons of potential product).

Indramayu District is the second poorest District/City in West Java. The poverty rate in Indramayu District reached 16.58%, above the average poverty rate of West Java Province (11.27%) and the national (13.33%). The open unemployment rate in Indramayu District is 11.29% of the total workforce, above the average open unemployment rate of West Java Province (10.33%) and national (7.14%). The number of poor people in the Indramayu District is generally concentrated in coastal areas. The poor in coastal areas are spread over 11 subdistricts, with 38% of the total poor population in the Indramayu District. Development disparities between regions in coastal districts are high. This is reflected in BPS data, where the difference in GRDP per capita between subdistricts is very high. There are subdistricts with a per capita income above 24 million/capita/year (example: Indramayu Subdistrict), and subdistricts have an income of around 5 million/capita/year (example: Krangkeng and Balongan Subdistricts). This data shows that development has not touched the welfare of its people. This is also evidenced by the low HDI value of the coastal subdistricts, which on average are below 70. The development of the fisheries subsector can be one solution to overcome the problems of poverty and unemployment in the coastal areas of the Indramayu District. This is based on data from BPS Indramayu District in 2012; coastal areas have the largest contribution in the fisheries subsector. The total production of fish produced in the coastal area of Indramayu District is through capture fisheries (40.54%). Pond/brackish water fisheries (38.08%) with a fishpond exploitation area of 10,013 ha (97%) of the total 10,345 ha and a pond concession area, an area of 3,473 ha (78%) of the total 4,462 ha is in the coastal area.

Fish production in Indramayu was obtained from fish production data recorded at the Mina Sumitra Marine Fisheries Cooperative (KPL Mina Sumitra) in 2019 and 2020 for the period from January to June. Fish production in Indramayu in 2020 is generally lower than fish production in 2019. Fishers already know that fish prices are falling, so fishers decide to catch fish for a longer time so that the storage area is full. Fish production in May 2020 was the highest due to a large number of fishing vessels with fishing ground WPP 718 landing their catch in Indramayu.

Figure 1. Fish production in the Indramayu for January–June 2019 and 2020.

3.2. Oceanic gillnet fishing business
The impact of COVID-19 on the gill net oceanic fishery business in Indramayu can be seen in Table 1. The catches of fishers include white sharks, red snapper, lingam, and layer. In the gill net oceanic
fisheries business, the impact of COVID-19 is felt in changes in output, where the variables that are most affected by COVID-19 are volume, price, catch value, and catch receipts.

During the COVID-19 season, the volume of fish was only 60 tons, whereas previously, it could reach 70 tons. During the famine season, there was no difference in catches. Before COVID-19, the catch volume was 70 tons, but during COVID, especially in March, it only 60 tons. The price of the catch in the form of white shark, red snapper, lingam, and layer, at the time of COVID was different from before COVID. For example, the average price of fish in the fish season before COVID-19 was IDR 31,600, when COVID decreased by IDR 21,600. During the famine season, before COVID-19, the average price of fish reached IDR 35,800, but during COVID, especially in March, it was only IDR 25,800. A decrease in fish prices causes a decrease in fishers income. The impact of the COVID-19 pandemic has caused a decrease in the income of farmers in rural areas [12].

Table 1. Performance of fishing output using gillnet oceanic before and during COVID-19, 2020.

| Items               | Unit | Before COVID-19 | During COVID-19 |
|---------------------|------|-----------------|-----------------|
| Catch volume        |      |                 |                 |
| Fish season         | Tons/trip | 70              | 60              |
| Bad season          | Tons/trip | 60              | 60              |
| Fish price          |      |                 |                 |
| Fish season         | Rp/kg | 31,600          | 21,600          |
| Bad season          | Rp/kg | 35,800          | 25,800          |
| Value of fish caught|      | 2,212,000,000   | 1,296,000,000   |
| Kind of fish caught |      | white shark, red snapper, lingam, and layer | white shark, red snapper, lingam, and layer |

This study also observed changes in fishing business inputs made by fishermen due to the COVID-19 pandemic. Fishers or business actors using an oceanic gillnet with WPP 718 fishing ground did not make any changes to business inputs regarding the type of fishing gear, ship size, fishing round, fishing distance, number of trips, and also the cost of fishing used. Some fishermen with minimal business capital experience delays in their fishing trips due to delays in paying for the fish that have been handed over to collectors. However, fishers or business actors who have sufficient capital will continue to make fishing trips according to the schedule.

Table 2. Performance of fishing input using gillnet oceanic before and during COVID-19, 2020.

| Items               | Unit          | Before COVID-19 | During COVID-19 |
|---------------------|---------------|-----------------|-----------------|
| Fishing gear        | Gill net oceanic | 100             | 100             |
| Vessel size         | (GT)          | 100             | 100             |
| Fishing ground      | days          | 15              | 15              |
| Long journey to fishing ground | days | 15              | 15              |
| Fishing cost        | Rp millions/trip | 500            | 500             |
| Number of trip/year | Trip/year     | 1–2             | 1–2             |
| Number of month at sea | month/trip | 4               | 4               |
| Fuel                | tons/trip     | 32              | 32              |
| Fishing crew        | person/trip   | 16              | 16              |

3.3 Millennium net fishing business

Indramayu fishers use millennium net fishing gear with 10 GT boats. Catching using millennium nets obtained types of fish caught such as kawung, mackerel, red snapper and shark. Most of the fish caught by fishermen have an export destination market. The COVID-19 pandemic has disrupted distribution
to export destination countries, making it difficult for the fish to be marketed. As a result, domestic fish prices have decreased. The average price of mackerel before COVID-19 was IDR 59,500 per kg, to IDR 37,750 per kg during the COVID-19 (Table 3).

**Table 3.** Performance of fishing output using millenium net before and during COVID-19, 2020

| Items                      | Unit  | Before COVID-19 | During COVID-19 |
|----------------------------|-------|-----------------|-----------------|
| Catch volume               |       |                 |                 |
| Fish season                | kgs/trip | 1,880          | 1,880           |
| Bad season                 | kgs/trip | 1,200          | 1,200           |
| Fish price                 | IDR/kg | 34,766         | 24,879          |
| Fish season                | IDR/kg | 38,600         | 38,600          |
| Bad season                 | IDR/kg | 38,600         | 38,600          |
| Value of fish caught       | IDR/trip | 36,562,500     | 26,875,000     |
| Fish season                |       | 27,421,000     | 22,800,500     |
| Bad season                 |       | 27,421,000     | 22,800,500     |
| Kind of fish caught        |       | mackerel, red snapper, shark | mackerel, red snapper, shark |

The fishing ground for fishing by millennial net fishers with a distance of 1 day's journey from the fishing base. The duration of the fishing trip is 15 days or 2 trips per month. The fuel used is 1,390 litres per trip. The number of crew fishing using millennium nets is 8 person (Table 4).

**Table 4.** Performance of fishing input using millenium net before and during COVID-19, 2020

| Items                      | Unit  | Before COVID-19 | During COVID-19 |
|----------------------------|-------|-----------------|-----------------|
| Fishing gear               |       | Millenium net   | Millenium net   |
| Vessel size                | (GT)  | 10              | 10              |
| Fishing ground             |       | 712             | 712             |
| Long journey to fishing ground |       | 1               | 1               |
| Fishing cost               | Rp millions/trip | 11.6   | 11.6           |
| Number of trip/year        | Trip/year | 1–2            | 1–2            |
| Number of day at sea       | days/trip | 15             | 15             |
| Fuel                       | litres/trip | 1,390         | 1,390          |
| Fishing crew               | person/trip | 8              | 8              |

In general, the impact of the COVID-19 pandemic on fishers in the Indramayu District has reduced revenue due to low fish prices. On the other hand, small-scale fisher, namely fishermen using 10 GT vessels, have no change in fishing inputs, namely using the same boat and fishing gear, fishing location, fishing costs, and fishing trips. However, some fishers reduce the number of trips due to late payments of fish caught by buyers. Changing the target of the fish caught by changing the type of fishing gear used is one strategy that can do to avoid the low acceptance of fishers. However, this strategy can only be carried out by fishermen who already have 2 or 3 types of fishing gear, and not all fishermen have more than 1 type of fishing gear. Limited ownership of fishing gear, low education, and limited income show that fishers belong to the poor community [13].

Fisher with vessels size >30 GT in the Indramayu experienced a decline in revenue due to lower fish prices. The fish price caught by fishermen using fishing ground in WPP 718 has decreased by IDR 10,000 per kg. Thus, there was a 20-30% decrease in revenue than receipts before the COVID-19. Another problem faced by fishermen or business actors with vessels >30 GT is the delay in fish payments made by buyers/toke due to the difficulty of marketing fish, especially fish for export. The fishermen's response at the COVID-19 was the delay in catching trips for vessels that had landed fish caught during this pandemic. This delay is due to reduced operational costs for the next trip because the
fish value has not been fully paid for by the buyers. Another response from fishers is to extend the fishing trip, usually only 3-4 months, to avoid landing fish with low prices. However, the extension of the fishing trip is limited to the full freezer of the fish storage area in the vessel.

Fishing in WPP 718 can only be done during certain seasons or not throughout the year. Fishers try to get paid at the start of the fishing season. Fishers need capital institutions for their operational fishing costs. In this COVID-19 condition, fishers continue to make arrests because vessels that are leaning still need money for maintenance so that the vessel is not damaged. Fishermen's losses are multiplied if the ship does not carry out fishing operations. Fishing is still carried out even though revenue decreases because the total revenue can still meet operational costs and crew wages.

This condition will reduce the interest of fishers to continue their fishing business. The amount of income has a significant effect on farmers' interest in doing farming [14]. Small-scale fishers try to arrange fishing schedules so that the catch is more significant so that income does not decrease even though the price of fish is low. The adaptation of small-scale fishers is to change fuel to cheaper fuel so that operating costs are low and profits are not reduced [15]. Another adaptation made by fishermen is to bind themselves to the patron-client system to reduce the risk of failed catches and low fish prices. One of the adaptation strategies carried out by fishermen in overcoming the economic problems they face is to maintain a patron-client relationship [16]. Adaptation strategy is an action taken by a particular community to respond to various forms of pressure on economic, social, and environmental aspects both internally and externally [17].

4. Conclusions
The COVID-19 pandemic has caused a decrease in fishermen's income because the price of fish is lower than the price of fish before COVID-19. Fishermen's income has decreased by 20-30% per trip. Fishers continue to use the same boat, fishing gear, fishing ground, operational costs, and crew. Adaptations that small-scale fishers can make to avoid falling fish prices are changing fishing gear to produce fish with a target domestic market and reducing trips when the weather is not good to avoid greater losses. The adaptation carried out by large-scale fishermen is to look for alternative sources of capital for operational costs to be still carried out during the fishing season. To reduce the pressure of the COVID-19 pandemic on small-scale fishers, one alternative policy that the government can implement is to provide fishing gear assistance to catch fish according to the season. As well as providing support to meet the daily living costs of fishers with social assistance. Large-scale fishers can continue their fishing activities; The government can provide capital institutions that help fishers get additional capital when the fish buyer is late in payment.

References
[1] Poerwadarminta 2008 Kamus Besar Bahasa Indonesia (Jakarta: Balai Pustaka)
[2] Pistor K 2020 Why Debt Relief Should Be the Answer to This Coronavirus Crash The Guardian
[3] Nugroho 2020 Survei Dampak Pandemi Covid-19 terhadap Ekonomi Rumah Tangga Indonesia Lembaga Ilmu Pengetahuan Indonesia
[4] Ohlsson L 2000 Livelihood Conflicts - Linking Poverty and Environment as Causes of Conflict (Stockholm: Environmental Policy Unit)
[5] Yunianto T K 2020 Banyak Restoran Tutup Terimbas Corona, Permintaan Ikan Anjlok 20% Katadata
[6] Efrizal R 2020 Dampak Covid-19, Nelayan di Sumsel Jual Ikan dengan Harga Miring IDN Times Sumsel
[7] Yoserizal, Yusri A and Ramli Z 2016 The study towards the traditional fisherman survival mechanism in facing famine season in Meskom Village of Bengkalis Regency, Indonesia Mediterr. J. Soc. Sci. 7 363–71
[8] Dinas Kependudukan dan Pencatatan Sipil Kabupaten Indramayu 2020. PAD Sektor perikanan capai belasan milyar Dinas Kependudukan dan Catatan Sipil Kabupaten Indramayu
[9] Sugiyono 2012 Metode Penelitian Kombinasi (Mixed Methods) (Jakarta: Alfabeta)
[10] Syamsuddin and Damayanti 2011 *Metode Penelitian Pendidikan Bahasa* (Bandung: Remaja Rosdakarya)

[11] Ruswandi. 2009. *Model kebijakan pengembangan wilayah pesisir yang berkelanjutan dan berpekspektif mitigasi bencana alam di pesisir Indramayu dan Ciamis* Disertasi (Bogor: Sekolah Pasca Sarjana IPB).

[12] Adani F, Sukayat Y, Setiawan I, Judawinata M G 2021 Pandemi Covid-19: Keterpurukan dan kebangkitan pertanian strategi mempertahankan ketersediaan pangan pokok rumah tangga petani padi pada masa pandemi Covid-19 (studi kasus: Desa Pelem, Kecamatan Gabus, Kabupaten Grobogan, Jawa Tengah) *J. Penikir. Masy. Ilm. Berwawasan Agribisnis*. 7 309–19.

[13] Listyawati, A. 2016. Strategi Penanganan Kemiskinan Nelayan Tradisional. *Media Inf. Penelit. Kesejaht. Sos.* 40 61–70

[14] Muhammad A, Agustono dan Wijanto A 2016 Faktor-faktor yang mempengaruhi minat petani dalam berusahatani padi di Kecamatan Kebakkramat Kabupaten Karanganyar *SEPA* 12 205–13

[15] Wiyono S 2008 Strategi adaptasi nelayan Cirebon, Jawa Barat *Bul.PSP* 17 356–61

[16] Sinaga H, S. Widiono dan Irnad. 2015. Pola Hubungan Patron- Klien Pada Komunitas Nelayan di Kelurahan Malabro Kecamatan Teluk Segara Kota Bengkulu *Agrisep* 15 167–176

[17] Nurlaili 2012 Strategi adaptasi nelayan bajo menghadapi perubahan iklim: studi nelayan Bajo di Kabupaten Sikka, Flores, Nusa Tenggara Timur *J. Masy. Budaya* 14 599–624