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The impact of COVID-19 on Indonesian fisheries conditions: opinion of current status and recommendations

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Abstract. The COVID-19 outbreak has spread rapidly across the world and has affected health, social, and economic impacts in many countries, including Indonesia. This editorial focuses on the implications of the COVID-19 pandemic on the fisheries sector in Indonesia along with recommendations on how we should deal with the current status. The pandemic has resulted in several negative impacts on the Indonesian community that is directly related to a significant decline in the demand for fisheries products. A range of problems has been reported, including marketing disturbances, issues related to post-harvest and cultivation cycles, and the livelihoods of small-scale fishermen. To overcome these issues, we provide recommendations for various stakeholders to rapidly mobilize the fisheries sector by assisting MSMEs and by helping to market fishery products online, thus facilitating the export of fishery products. These recommendations are expected to stimulate the fisheries sector to mitigate the long-term effects of the COVID-19 outbreak.

1. Introduction

Aquaculture production has developed rapidly over the past 40 years and currently, the production has surpassed the capture fisheries, thus become global importance. However, aquaculture operations and production are currently facing a severe threat as a direct result of the Coronavirus disease (COVID-19) pandemic. The COVID-19 pandemic has disrupted the lives and the livelihoods of all individuals across the world. [1] reported that COVID-19 infections spread incredibly quickly, mutated, and changed the economy and livelihoods of the entire population of China. To reduce the risk of global virus spread and mortality, lockdown, travel restriction and border closure were implemented rapidly in many countries. As a result, there was a rapid decline in the export potential of many industries due to decreased demand, as one of many economic impacts of COVID-19, including the fisheries sector. Many aquaculture products have been severely affected, particularly shrimp and lobster exports [2]. COVID-19 is a world-changing event that has caused a severe economic decline in the fisheries sector that will change the lives and livelihoods of countless workers across the world, but particularly those that are associated with small scale fisheries and coastal fishing communities, including Indonesia.



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Lockdown has not been implemented universally to all regions of Indonesia, due to the different severity of COVID-19 spread in Indonesian provinces [3]. However, the Indonesian government has provided a solution by implementing Large-Scale Social Restrictions (PSBB) in several highly-populated cities. This restriction of activity is carried out in certain areas that are suspected to have been infected and has the potential for the wider distribution of COVID-19. The implementation of this policy led to a significant decline in the Indonesian fisheries products for international demand. Unfortunately, this outbreak has come at a time when we would normally be harvesting fish for export and raising juveniles in maintenance ponds. Furthermore, several other important activities have had to stop, including fishing and the processing of fishery products. Countless workers, who normally work long hours in seafood and fisheries operations have also had to stop working to prevent the spread of COVID-19 in their workplaces [4,5]. To put this into perspective, a previous report from The World Bank in 2012 stated that globally, there were around 32 million small-scale fishermen, 76 million workers in the post-harvest sector, and that as many as 81% of these workers were involved in processing fish for consumption by the local community.

The short- and long-term effects of the COVID-19 pandemic have a significant potential to reduce the welfare of small fishermen and coastal communities who are particularly vulnerable due to the loss of product and the reduction in market demand [6]. Therefore, governments, development organizations, NGOs, donors, the private sector, and researchers, must immediately mobilize support for small scale fishermen, coastal communities, and related civil society organizations, so that assistance can be provided immediately to help these groups respond to the COVID-19 pandemic [7]. In this paper, we compiled the data obtained from relevant fisheries organizations, public sources, and mass media to provide insight into the impact of COVID-19 on the fisheries sector in Indonesia.

2. Materials and Methods

This article conducts a literature study on information on the development of the COVID-19 case in Indonesia and its impact on the National Fisheries sector. The database was obtained from electronic data including PubMed, Web of Science, Wiley, Science Direct, Elsevier, Google Scholar, Springer Link, Research Gate and the Official Website of the Republic of Indonesia and international institutions with a keyword using Coronavirus in the fisheries sector, Fisheries sector, Recommendations for COVID-19, and aquaculture commodities. Other information was also obtained from the Ph.D. and MSc thesis.

3. Result and discussion

3.1 Current developments and the government's policy response to COVID-19 in Indonesia

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is a causative agent of Coronavirus 19 (COVID-19) in humans and is responsible for the death of more than 29,000,000 people worldwide up to September 2020 [8]. COVID-19 disease first appeared in the city of Wuhan, China in December 2019 and until March 2020 this disease has spread massively throughout the world and became a global pandemic [9]. The COVID-19 positive case in Indonesia occurred on March 2, 2020, which was announced directly by the President of the Republic of Indonesia Joko Widodo at the Presidential Palace. The first COVID-19 case in Indonesia was suspected of two Indonesian citizens that were infected with COVID-19 after contacted with Japanese citizens who visited Indonesia. After this case, COVID-19 infection is gradually spread in various areas in Indonesia. Since the first case was reported, in March (3/3 2020) COVID-19 cases in Indonesia had reached 1,528 patients. For this reason on March 31, 2020, President Joko Widodo signed the Government Regulation No. 21 of 2020 (PP No. 21 of 2020) concerning large-scale social restrictions (PSBB) in response to the COVID-19 outbreak in Indonesia. This regulation includes restrictions on the movement of people, academic activities and workplaces, religious activities, activities in public facilities, and distribution of goods to other regions. At the same time, the President also signed the Presidential Decree Number 11 of 2020 which declared COVID-19 as a national disaster (KEPPRES Number 21 of 2020).

Based on Figure 1, the rate of COVID-19 cases in Indonesia has continuously increased every month. After June 23, 2020, the COVID-19 new cases have always reached more than 1000 cases. One of the causes of the increase in the number of COVID-19 cases is the policy of easing PSBB in several regions in Indonesia. At the same time, the Indonesian government began to implement a "New Normal" policy to stimulate several sectors, especially the economic sector. The policy was carried out based on the data from the Ministry of Manpower of the Republic of Indonesia after Q1 2020 which stated that there were around 3.7 million formal workers who have lost their jobs and have not included those who work in the informal sector. Nine sectors are allowed to open, namely Mining, Petroleum, Industry, Construction, Plantation, Agriculture, Animal Husbandry, Fisheries, Logistics, Transportation of Goods. However, until now the COVID-19 case in Indonesia still shows an increase in the number of positive cases of COVID-19 and increased from the previous month.

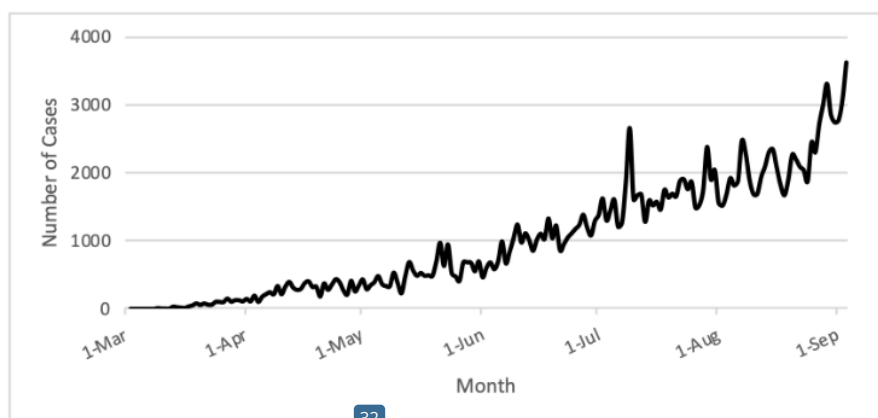


Figure 1. Trends of daily confirmed COVID-19 cases in Indonesia [10]

3.2. The Impact of COVID-19 on Sea Transportation

The national sea transportation sector is also facing severe challenges due to the COVID-19 pandemic. COVID-19 has caused four major impacts on the sea transportation sector [11]. First, there has been a significant reduction in the volume of export and import cargoes by 14 - 18% with regards to countries such as China, Singapore, and South Korea; domestic/national cargo supporting exports and imports have also decreased by 5 - 10%. Second, the clearance process that takes place in ports has increased significantly due to ship disinfections, factors related to crew health, and the inspection of vessel travel histories. Third, there has been a decline in crew performance as a result of implementing the Physical Distancing and Work from Home (WFH) policy. Fourth, the process of ship docking has become slower due to the decreasing number of workers available to assist. This has also caused a decline in the performance of other related industries, including logistics, insurance, shipyards, the spare parts industry, and marine transportation education and training agencies in Indonesia.

The marine transportation industry plays a highly important role in keeping the flow and the operation of supply chains. Indeed, 80% of global trade is based on volume and more than 70% of this volume is transported by sea [12]. According to a report from the [13], the value of Indonesian exports via sea transportation in 2018 was 600.8 million tons, increased by 11.89% from 2017 (536.9 million tons).

3.3. The Production and Distribution of Seafood during COVID-19 pandemic

The consumption of seafood can fulfill the protein requirements of 3.2 billion people and contributes around 35 - 38% of the global fisheries sector, which reached an export value of US \$ 152 million in 2017 [12]. The COVID-19 pandemic has impacted national fisheries products, reduced the market value of seafood, and decreased the demand of consumers, including restaurants and hotels. It has also caused many retail businesses to close, disrupted trade routes, and increased the potential for pollution with regards to unsold fish products and excessive packaging to avoid the transmission of COVID-19 during transportation. Also, many airlines have canceled their flights, which has directly affected the trade of seafood and high-end fresh fishery products, which are mostly transported by air.

In Indonesia, COVID-19 has caused a 30 – 40% reduction in export demand. Currently, the capture fisheries industry is experiencing significant pressure due to the difficulties in shipping raw materials by domestic and overseas sea and air transportation, which is a direct result of the regulations related to the COVID-19 pandemic.

Several Indonesian fisheries sectors that have experienced a decline and have the potential to remain developed during the COVID-19 pandemic period is described in this article. Based on Figure 2, live ornamental fish products have the potential for production and export. However, when compared to the number of exports in the first quarter of previous years, the performance of ornamental fish exports in the first quarter of 2020 decreased to \$ 6.41 million or decreased by 24.77% when compared to the first quarter of 2019.

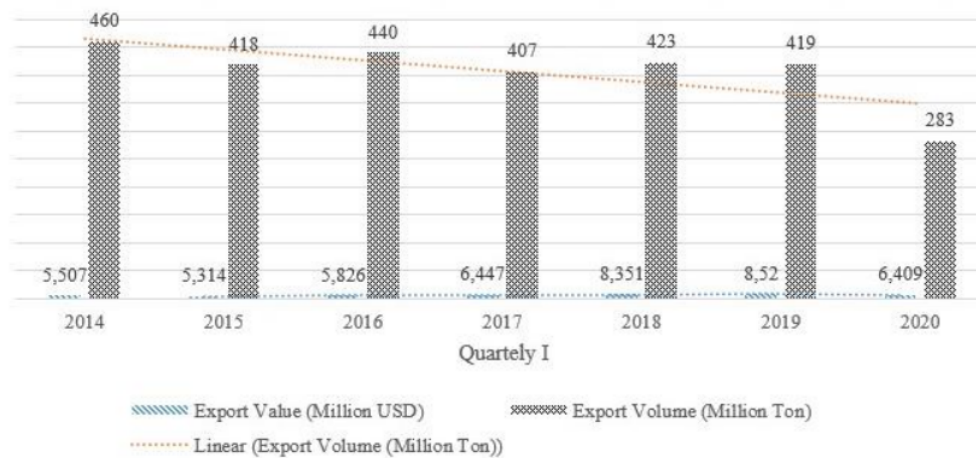


Figure 2. Value and Amount of National Ornamental Fish Exports in the First Quarter [20]

According to [14], the national ornamental fish products should be able to continue to be distributed nationally and internationally during the COVID-19 pandemic with an attractive campaign, for instance as an object of home entertainment that can reduce the stress resulted by lockdown and travel restriction. It is hoped that the Indonesian government and air transport actors can provide better policies and regulations to reduce the cost of Indonesian ornamental fish cargo. Similar observation with the national grouper commodity, that the decline of live grouper export volume in the first quarter of 2020 that only reached 295 tons, significantly lower than that of the 2019 export which reached 793 tons (Figure 3) [16].

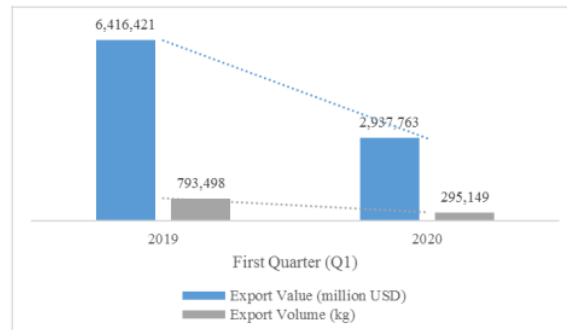


Figure 3. Value and Amount of National Live Grouper Fish Exports in the First Quarter [14]

If compared to the pre-pandemic situation of COVID-19, the value of national live grouper exports increased during the Chinese New Year season with Hong Kong and China as the main export destination countries [16]. Furthermore, the Indonesian government should support to the national grouper farmers more, especially in areas that have decreased exports above 50-100%, by ensuring the availability of grouper feed at an affordable price, facilitating access to capital, reducing the cost of transporting live fish, initiating the formation of new markets in the domestic and international markets, and strengthening the intelligent market system for fishery products. Other national fishery products that have the potential to experience growth during the COVID-19 (Figure 4).

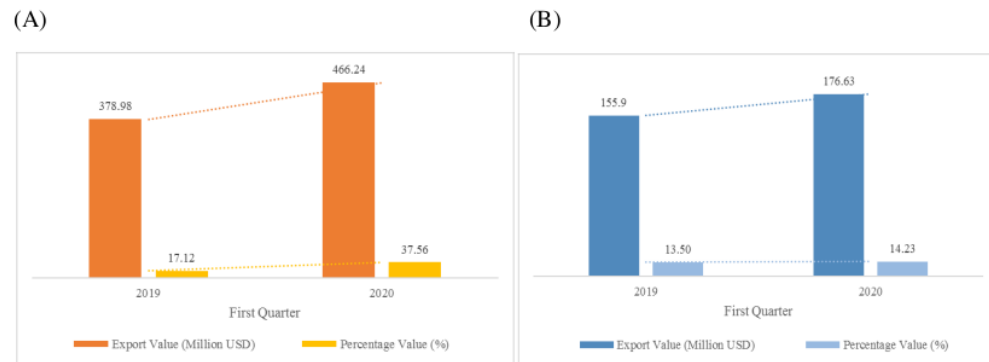


Figure 4. A) Value and Percentage of National Shrimp Product Exports; B) Value and Percentage of National Tuna-Cob-Cakalang (TTC) Export [17]

The value of Indonesian crab products exported in the first quarter of 2020 was US\$ 70 million, higher than the beginning of 2019, which was about \$ 65million (Table 1). However, the export volume of crab exports from January to February 2020 decreased by 1.75% to 4,462 tons compared to that of 2019, which reached 4,542 tons. The export volume and value of live crab products has decreased by 30.65% and 39.29%, respectively, in the period of January-February 2020. Looking at the declining value of live crab products, [18] stated that the national crab exporters should consider other export-quality processed crab products.

Table 1. *Rajungan* Crab Exports in Indonesia by Product Type in the January-February Period (Adapted from Suhana (2020b))

Product	Value (USD)		Volume (Kg)		Percentage Change	
	2019	2020	2019	2020	Value (%)	Volume (%)
Crab prepared or preserved in airtight containers for retail sale	30.230.019	34.723.986	1.402.852	1.734.576	14.87	23.65
Crab prepared or preserved not in airtight containers for retail sale	19.239.216	21.983.163	948.733	1.063.657	14.26	12.11
Crabs live, fresh or chilled	10.317.001	6.263.523	1.790.166	1.241.546	39.29	30.65
Crabs in not airtight containers for retail sale	1.008.000	2.953.541	87.378	156.131	193.01	78.68
Not smoked crabs in airtight containers for retail sale	1.227.411	2.791.557	51.020	112.669	127.43	120.83
Other crabs, frozen fit for human consumption	3.436.334	1.349.249	239.717	154.201	60.74	35.67
Soft shell crabs, frozen fit for human consumption	140.990	-	22.270	-		
Grand Total	65.598.971	70.065.009	4.542.135	4.462.780	(100.00)	(100.00)

The national fishery products of shrimp showed that the export value of national shrimp products in the first quarter of 2020 reached the US \$ 466 million or 37.56% higher compared to the same quarter in 2019 which was \$ 379 (17.12%), as seen in the Figure 4A. Likewise, the export of national tuna-tongkol-cakalang (TTC) products in the first quarter of 2020 reached \$ 177 million, 14.23% higher than the first quarter of 2019 which was \$ 156 million (13.20%), as seen in the Figure 4B. These positive trends can be utilized by related stakeholders to boost the productivity of shrimp and TTC in the global market during the COVID-19 pandemic, to maintain national economic stability.

3.4. Small-Scale Fisheries

The impact of the COVID-19 pandemic on the small-scale fisheries sector in Indonesia is becoming increasingly apparent. Many small-scale fish entrepreneurs experienced several difficulties when social distancing restrictions began. Measures to maintain social distance have prevented many fishermen from going fishing or trading to bring fishery products to the market [19]. The small-scale fishermen also experienced economic constrain due to market disruption as they are unable to take their fish catches to the market; this is exacerbated by the fact that there is a decline in demand and falling fish prices [7]. This decline in demand was also caused by restrictions on market operating hours and the PSBB which could hamper the distribution of fish products to the consumers. In many cases, access to restaurants and markets is also controlled by middlemen, preventing the direct sale of fish products by small-scale fish entrepreneurs.

The welfare level in the Indonesian fisheries sector can be observed by the exchange rate of fisher and fish farmers (NTNP), which in the first semester of 2020 has declined gradually each month (Figure 5). The fisher and fish farmer exchange rate in the second quarter of 2020 was decreased to less than 100. In theory, when fishers fish farmers exchange rates are below 100, the fishers and fish farmers are in a critical condition due to the decreasing amount of income compared to expenditure figures both to meet family needs or production capital [20].

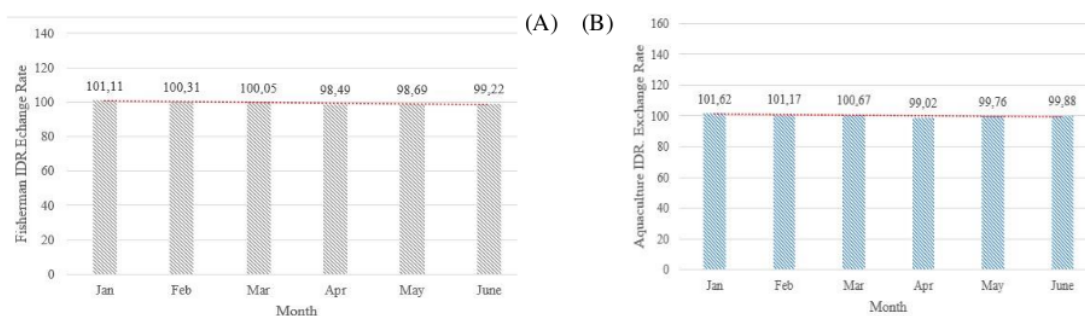


Figure 5. Indonesian Fisher Exchange Rate (A); Fish Farmer Exchange (B). Adapted from BPS-RI No. 45/06/Th. XXIII (2020) [20]

Fishermen, fishery product processors, and fishmongers are vulnerable to facilitate the spread of COVID-19, making it difficult for these personnel to feed their families without transmitting the infection [7]. Also, fishing ports have the potential to become a new hotspot for the spread of COVID-19 because the ports represent the points of migration of both fishermen and foreign visitors [21]. Currently, access to health services in the fishing communities of rural areas also faces extreme difficulties, as these communities struggle even to stay in normal conditions [20]. Consequently, it is urgent to give better access to testing, sanitation supplies, and contact tracing to halt the spread of COVID-19 in the fisheries sector.

3.5. Materials and Methods Recommended Action for COVID-19

3.5.1. Promote the Importance of Consumption of Products from National Fisheries

Indonesian fishery products have several advantages in that they are a source of healthy macro- and micronutrients. Furthermore, these products are relatively cheap, involve short production processes, and can be supplied readily [22]. According to INPRES No. 1 of 2017, the Healthy Living Community Movement (GERMAS) from the Indonesian Ministry of Health has emphasized the importance of consuming fishery products as this practice can provide many health benefits for the community, especially in Indonesia. The interaction between nutrition sufficiency and the body's immune system has been well established by previous studies, which indicated that fisheries products from both aquaculture or capture fisheries can fulfill the protein requirements of the community [23]. According to [12, 24], seafood contains functional components that are not present in terrestrial organisms, including n-3-polyunsaturated fatty acids (e.g. eicosapentaenoic acid and docosahexaenoic acid), which are well-known to prevent arteriosclerotic and platelet diseases. Also, seafood is superior in terms of nutrients adequacy, such as protein, amino acids, fiber, vitamins, and minerals. The use of social media, print media, and TV programs is highly recommended to promote public awareness of consuming fisheries products, to mitigate the effect of the COVID-19 pandemic [25].

3.5.2. The Marketing of Processed Fisheries Products through Micro, Small, and Medium Enterprises (MSMEs)

Good product marketing can support the increase in fish consumption per capita throughout the world. However, the success of MSME activities relies upon the availability of targeted markets for MSME products [26]. The development of MSME during the COVID-19 pandemic is highly important because it can provide benefits for SMEs. However, until now, the product marketing has not been optimized. For example, the development of boiled fish products in Bogor Regency has not been optimized due to limited capital and inadequate capacity building in production and post-production practices, such as low sanitation and hygiene, packaging techniques, management, and marketing [27].

Therefore, the role of government institutions, fisheries instructors, and academics is vital to provide targeted funding and to provide training through webinars and virtual workshops. This year, the Indonesian Ministry of Marine Affairs and Fisheries has launched a free online learning platform called e-Jaring, which covers various workshops related to good fisheries production and post-production. Online media can also help the marketing of fishery products, to the sellers in remote areas [25].

3.5.3. Supporting Small-Scale Fishermen

The COVID-19 pandemic has presented a major challenge for small-scale fishermen across the world [7], particularly in Indonesia. Sociologically, there are distinct differences between fishers' communities that live in the coastal area and other communities that live in the agrarian area. For example, the sea cannot be controlled; consequently, the management of fishery products originated from the sea is highly uncertain [28]. Consequently, the welfare of human resources (fishermen) is vital for the fisheries sector. Furthermore, capital and technology are both highly strategic factors for implementation and further development [29]. Several actions can be taken during the current COVID-19 pandemic to support small-scale fishermen. These actions can originate from the local and national governments, organizations, NGOs, donors, private sector, and academics, by creating targeted economic assistance packages for small-scale fishermen and coastal fishing communities, providing relief loans for small-scale fishers and fish workers in the post-harvest sector, maintaining health services, increasing food supply in rural areas, and providing market access and assistance for fishery products caught by fishermen [7].

3.5.4. Facilitate the Export Bureaucracy of Fishery Products in Indonesia

The COVID-19 outbreak has certainly resulted in a decline in exports from the fisheries sector. However, the decline of the export value was not only due to COVID-19, but also the bureaucratic decisions made by the Indonesian government, which is difficult to implement. Indonesia is a country that has a high abundance of fisheries resources, both in terms of capture and aquaculture subsectors [30]. Consequently, Indonesia has a significant contribution to global fish product demand. Indonesia must be able to compete with other countries to get the benefit from the export of fishery products, particularly during the COVID-19 outbreak. The export value of Indonesian fishery products in 2019 reached Rp 73,681,883,000, increased by 10% compared to that of 2018 (Rp 66,487,580,000) [31].

3.5.5. Supporting the availability of Independent Seed and Feed for the sustainability of Aquaculture (GERPARI)

The availability of quality seeds and fish feed is a vital aspect of fish and shrimp growth [32]. The availability of seeds and feed has become a critical issue during the COVID-19 pandemic. The role of government and related institutions can provide cost relief for the fish farmers who consider feed as their main expense. In order to reduce costs, fish farmers can alternatively increase the use of independent fish feed by using raw materials that are relatively inexpensive and easily available from the environment; these materials are also environmentally friendly. Such materials might include maggots [33], palm kernel [34], and vegetable waste [35]. The use of independent feed that focuses on these ingredients could act as a modulator of immunological and physiological responses, anti-stress factors, antioxidants, and could promote the health of the digestive tract in aquaculture animals [36]. Recommendations that can be made during the COVID-19 outbreak in the fisheries sector in Indonesia as seen in the Figure 6.



Figure 6. Examples of recommendations that can be made during the COVID-19 outbreak in the fisheries sector in Indonesia.

4. Conclusion

Our analyses clearly showed that the COVID-19 pandemic has created a major challenge for the national marine and fisheries sector in Indonesia. Assistance and collaborative actions are urgently required from the government, regional fisheries institutions, researchers, and academics; such assistance may reduce the burden on the national fisheries sector. Nationally and globally, the fisheries sector plays an important role in maintaining food security, the livelihoods of countless workers and plays a key role in fulfilling the needs of humans for protein. There is an urgent need to increase the distribution of fishery products to mitigate the effects of the COVID-19 outbreak. Efforts must also be made to increase the value of products to stimulate the national economy, for instance by supporting the fishers and fish farmers to certify their products into international certification organizations, such as Marine Stewardship Council (MSC), Best Aquaculture Practices (BAP) and Aquaculture Stewardship Council (ASC), so it is hoped that in the future, more Indonesian fisheries products can be marketed in the international major retailers.

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