Capturing the Impacts of COVID-19 on the Fisheries Value Chain of Southeast Asia

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The Southeast Asian region has been a major contributor to the world's total fisheries production, and most of the region's fish and fishery products are traded not only in the international markets but also in domestic and local markets. However, the rapid spread of the COVID-19 pandemic starting from the first quarter of 2020 in the region and also throughout the world, has impacted on the region's fish production, especially from marine capture fisheries and aquaculture. Fishing operations at sea had encountered difficulties due to the national lockdown measures in many countries that limit the activities of fishers, especially in going out to sea to fish. Meanwhile, fish farmers have also been constrained to work outside of their homes to halt any further spread of the virus. In order to discuss and assess the impacts of COVID-19 on the fisheries and aquaculture sector of Southeast Asia, the Southeast Asian Fisheries Development Center (SEAFDEC) virtually brought together international, regional and national fisheries agencies, and industry representatives, to share information on the key impacts of the virus on the food supply chain of local, national, regional, and international trade during a Webinar organized in early July 2020. The immediate responses of the private sector to address the issues as well as medium-term mitigation measures to curb the impacts of the coronavirus pandemic on the region's fisheries industry were also shared through the said Webinar.

Since early 2020, the new coronavirus disease 2019 better known as COVID-19 has rapidly spread throughout the globe impacting severely not only on the lives of people but also on the economies of the countries around the world. Transmissions of the COVID-19 from person to person had been very quick, affecting the lives of peoples across the globe. The rapid increase in the number of infected cases from COVID-19 in almost all countries of the world had prompted the World Health Organization (WHO) to declare in early March 2020 a global pandemic, and called on the countries to take necessary actions to stem the spread of the virus. As a result, travel restrictions and nationwide lockdowns were put into force by many countries, notwithstanding the effects of such spread-preventive measures on the socio-economies of the countries worldwide.

As of 16 August 2020, the WHO (2020) confirmed that there have been at least 774,000 confirmed deaths and more than 21.6 million confirmed cases due to the COVID-19 pandemic. The USA is the most affected country with the highest number of cases (about 5.0 million), with some Southeast Asian countries, *i.e.* Philippines, Indonesia, Singapore,

as among the top 50 countries with the highest number of infected cases. The COVID-19 pandemic has also brought unprecedented challenges to all development sectors, as businesses worldwide had been practically shut down as a result of the countries' lockdown measures. Suspensions of most modes of transportation and tourism restrictions, had severely affected the food services sectors including fisheries.

Specifically, the crisis has brought severe impacts on the fisheries sector of the Southeast Asian countries being the major producers of fish and fishery products, and major suppliers of fish to the global market. Fishing operations encounter difficulties due to national lockdown measures that limit the activities of fishers from going out to sea to fish. Meanwhile, fish farmers have been restricted from working outside of their homes to halt any further spread of the virus. The COVID-19 pandemic has therefore severely impacted on countless of livelihoods of fishers in both inland and coastal communities, as well as in the food processing and trading activities throughout the supply chain.

In order to assess the severity of the impacts of the COVID-19 pandemic on the fisheries and aquaculture sector of Southeast Asia, the Southeast Asian Fisheries Development Center (SEAFDEC) organized the Webinar on the "Impacts of COVID-19 on Fisheries and Aquaculture in Southeast Asia" on 2-3 July 2020 in Bangkok, Thailand. With the main objectives of discussing and assessing the impacts, and sharing how the private sector make immediate responses to address the issues as well as the medium-term mitigation of the impacts established by some countries, the Webinar brought in resource speakers from FAO, INFOFISH, WorldFish, and from the private sector. The interest of the stakeholders on the Webinar was quite overwhelming as on the average, 250 attendees joined each day's session (females = 139, males = 115), most of whom represent the SEAFDEC Member Countries, and others from China, the EU, USA, India, Russia, Morocco, and Mozambique.

Southeast Asian region supplying food fish to the world

The fisheries production of the Southeast Asian region during the five-year period from 2013 to 2017 attained average annual increases of 3.2 % in terms of volume and 5.5 % in terms of value (SEAFDEC, 2020). Specifically in 2017, Indonesia was the region's highest producer of fish and fishery products accounting for about 50.3 % of the region's total fisheries production volume, followed by Viet Nam, Myanmar, Philippines, Thailand, and Malaysia at 16.1 %, 12.5 %, 9.5 %, 5.3 %, and 4.2 %, respectively. In terms of value, Indonesia contributed 55.7 % to the total value of the region's fisheries production (**Table 1**).

Fisheries production of Southeast Asia comes from three sub-sectors: marine capture fisheries, inland capture fisheries, and aquaculture. In 2017, aquaculture contributed about 54.8 % to the region's total fisheries production volume while marine capture fisheries accounted for 38.1 % and inland capture fisheries 7.1 %. In terms of value about 50.0 % was contributed

Table 1. Total fisheries production of Southeast Asia (by country): Volume (million t) and Value (US$ billion)

Country	2013		2014		2015		2016		2017	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Brunei Darussalam	-	0.01	-	0.02	-	0.02	0.01	0.05	0.02	0.06
Cambodia	0.73	-	0.75	-	0.73	-	0.81	-	0.86	-
Indonesia	19.25	20.09	20.60	18.24	22.15	17.53	23.17	19.43	22.85	28.23
Lao PDR	0.16	-	0.15	0.42	0.16	-	0.17	-	0.18	-
Malaysia	2.02	3.44	1.99	5.99	2.00	3.21	1.99	3.18	1.90	3.59
Myanmar	4.72	7.77	5.04	8.39	5.32	8.76	5.60	9.36	5.68	9.38
Philippines	4.70	5.39	4.68	5.14	4.65	5.06	4.35	4.53	4.31	4.55
Singapore	-	0.04	-	0.05	-	0.05	-	0.07	-	0.04
Thailand	2.82	5.16	2.57	4.48	2.43	4.12	2.43	4.37	2.39	4.72
Viet Nam	6.02	-	6.33	-	6.55	-	6.80	-	7.31	-
TOTAL	**40.42**	**41.89**	**42.12**	**42.72**	**44.00**	**38.75**	**45.34**	**41.16**	**45.50**	**50.57**

Source: SEAFDEC (2020)

Table 2. Fisheries production of Southeast Asia (by sub-sector): Volume (million t) and Value (US$ billion)

Fisheries sub-sector	2013		2014		2015		2016		2017	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Marine capture	16.14	20.58	16.58	21.65	16.76	19.48	17.03	19.94	17.33	25.29
Inland capture	2.87	3.30	3.00	3.66	3.06	3.53	3.13	3.70	3.23	4.03
Aquaculture	21.41	18.01	22.54	17.41	24.18	15.74	25.18	17.52	24.94	21.25
TOTAL	**40.42**	**41.89**	**42.12**	**42.72**	**44.00**	**38.75**	**45.34**	**41.16**	**45.50**	**50.57**

Source: SEAFDEC (2020)

Table 3. Marine capture fisheries production (2018): major producing Southeast Asian countries

Southeast Asia's top fish producing countries	Average production/year (million t, live weight)			Total production (million t, live weight)				% of total (2018)
	1980s	1990s	2000s	2015	2016	2017	2018	
Indonesia	1.74	3.03	4.37	6.22	6.11	6.31	6.71	8.0
Viet Nam	0.53	0.94	1.72	2.71	2.93	3.15	3.19	3.8
Philippines	1.32	1.68	2.08	1.95	1.87	1.72	1.89	2.2
Thailand	2.08	2.70	2.38	1.32	1.34	1.31	1.51	1.8
Malaysia	0.76	1.08	1.31	1.49	1.57	1.47	1.45	1.7
Myanmar	0.50	0.61	1.10	1.11	1.19	1.27	1.14	1.4
World's Total Marine Capture Fisheries Production	**72.10**	**81.86**	**81.56**	**80.51**	**78.27**	**81.21**	**84.41**	

Source: FAO (2020)

by marine capture fisheries, 42.0 % by aquaculture, and 8.0 % by inland capture fisheries (**Table 2**). The tuna groups have been the most economically important marine species in 2017 in terms of production value, and ranked the highest in value accounting for about 4.2 % of the total production value.

In the State of World Fisheries and Aquaculture (SOFIA) published by FAO in 2020, the top 25 marine capture fisheries producing countries, based on the percentage of total in 2018, included seven Southeast Asian countries, namely: Indonesia, Viet Nam, Thailand, Philippines, Thailand, Malaysia, and Myanmar (**Table 3**).

FAO (2020) also reported that Viet Nam ranked third among the major fish exporting countries of the world, accounting for 5 % (by value as of 2018), contributed mainly by the country's growing trade of the Pangasius catfish produced through its aquaculture sector and a booming processing and re-exporting industry. Meanwhile, Thailand came as the sixth major fish exporting country in the world in 2018, notwithstanding the significant decline in exports which the country had experienced since 2012, mainly as a result of its reduced shrimp production due to disease outbreaks eroding its competitiveness at the global market.

Moreover, FAO (2020) added that many Southeast Asian countries are also known key producers (in top 25) of fish from inland capture fisheries, namely: Myanmar, Cambodia, Indonesia, Thailand, Philippines, and Viet Nam. In aquaculture, Southeast Asia ranked as the second highest major producer, accounting for 13 % of world's total aquaculture production. More importantly, the region also plays important role in fish processing. Currently, the Philippines and Thailand are engaged in tuna processing and re-exporting of tuna products, especially canned tuna as well as fresh and frozen tuna, where the USA, the EU, and Japan are their important importing countries.

Impacts of COVID-19 on the fisheries sector of Southeast Asia

The COVID-19 pandemic has caused heavy impacts on the fisheries sector, especially on the socio-economic conditions of the stakeholders, *e.g.* fishers, fish farmers, traders, as well as consumers, as the shutdown of food services along the supply chain puts much stress on them not only on the production aspect but also in marketing and trade. For example, the hotel, retail, and catering (HORECA) services is one of the most affected links in the fish supply chain.

Nonetheless, the effect of the coronavirus pandemic is not only in terms of human dimension but also on the health of the resources. In capture fisheries for example, fish catch has considerably been reduced as fishing activities are restricted and many fishers are prohibited from going to sea to fish resulting in negative impacts on the human well-being in the fisheries sector. Nevertheless, as far as the resources are concerned, such restrictions could have led to reduction in fishing pressure allowing the fishery resources to recover from depletion and collapse, and rebuild the resources. The impact on aquaculture is altogether another story as its production is largely influenced by the demand from the food service sectors, processing factories, and export. As a result of the preventive measures such as movement restrictions of fish farmers and less demand from consumers, maintaining the stocks of cultured commodities becomes more expensive as most of the products could not be harvested. Moreover, increased prices of aquaculture inputs due to limited supply also add to the exorbitant cost of sustaining the aquaculture operations. In general, the seafood supply chain has been disarrayed due to transport restrictions and shortage of workers not only in fish production but also in processing.

Large-scale fisheries

As the entry of migrant workers in many countries had been restrained to prevent further spread of the virus, activities with respect to large-scale fishing operations had become minimal due to shortage of crew members in commercial fishing vessels. Nonetheless, where fishing operations are viable, transshipment of catch at sea becomes impossible due to the pandemic control measures. Moreover, unloading of catch at ports could be limited not only because of increased restrictions, but also due to the full capacity of cold storage considering that the demand of raw materials by processing factories and for export are reduced to minimum because of limited operations and workers. On the other hand, movement of products for consumers is limited due to the inability to transport products across provinces and borders as a result of the lockdowns.

Small-scale fisheries

In Southeast Asian fisheries, more than 50 % are small-scale or artisanal fishers and are among the groups who are most vulnerable to the impacts of the COVID-19 pandemic. Restrictions in fishing activities when fishers are controlled to go to the sea to fish, limitations of transportation and movements, as well as tourism disruptions have directly affected the small-scale fisheries. These situations lead to reduced family incomes brought about by decreased fish production on one hand, and low demand for fish and fishery products on the other hand, resulting in lower fish prices or even unsold quantities of fresh fish catch. Nevertheless, the situation could also offer opportunities for family members who lost their jobs and are returning home, for this could provide the chance for them to enhance their involvement in small-scale fisheries, especially the young ones who could continue supporting their families not only in their backyard processing of fishery products but also in utilizing their skills in e-marketing and product promotion through the social media. Thus, improvement of fish processing in terms of safety and quality, and introduction of e-commerce could be some possible areas to be explored to enhance the capacity of small-scale fishers, especially the women and youth.

Although most fish catch from small-scale fisheries are sold in wet and local market for local consumption and tourism, but such form of marketing are constrained by transport limitations while local trading of catch although increasing through long-distance marketing is also becoming impossible because of the imposed curfew. Nonetheless, the overall effect would be the amount of resources becoming available for small-scale fishing activities due to less competition from large-scale fisheries. In the end, small-scale and subsistent fisheries would be capable of enhancing food security and livelihood opportunities for fishers.

Furthermore, through its on-going regional projects, SEAFDEC also continues to support the AMSs in enhancing the capacity of local, inland, and coastal communities for improved livelihood opportunities in fisheries communities with due consideration given to gender equality in anticipation during and post pandemic crisis. In addition, as SEAFDEC continues to enhance the contribution of inland fisheries on food security and livelihoods, the stakeholders are assured that the well-being of the fishery resources and stakeholders are taken into consideration when SEAFDEC undertakes development projects that aim to provide positive impacts on the sustainability of inland fisheries.

Aquaculture sub-sector

The aquaculture sub-sector suffers from the restrictions on fish farmers' movement and the dwindling demand for fish that necessitates the postponement of harvesting the cultured stocks, and in the end incurring high maintenance costs for keeping the stocks. Restrictions on transportation affects the aquaculture industry not only causing decreases in terms of demand by the food services sector but also shortage of seeds and feeds, and therapeutics, as these imported aquaculture inputs are becoming more costly due to limited supply. In the case of Viet Nam for example, as the world's biggest producer of the Pangasius catfish and supplier of food fish to the international market, cancellations of purchasing orders had been experienced due to transport limitations and as a result the products are sold in domestic markets at lower prices. It is therefore likely that the economies of aquaculture producing countries would deteriorate amidst this coronavirus pandemic. In Thailand, the shrimp farming industry had been advised to scale down their operations by 50 % due to the foreseen low demand of shrimps as most consumers are

opting for the cheaper protein sources (Asian Agribiz, 2020). Similarly, Indonesia (KNTI, 2020) also assessed the viability of its aquaculture industry as it continues to suffer from decline in prices of fish forcing its production to slow down.

Impacts of COVID-19 pandemic on fish trade, marketing, and food security of Southeast Asia

Based on the assessment of the impacts of COVID-19 on trade and marketing of fish and fishery products, which focused on the experience of Thailand from its tuna industry, surimi and surimi-based products, fresh seafood from small-scale fisheries, frozen seafood; and from the Pangasius industry of Viet Nam, during the aforesaid Webinar, representatives from the private sector suggested the ways and means of addressing such impacts as shown in **Box 1**. Moreover, they also advocated the need to establish the trust of consumers that seafood is safe from COVID-19 infection for there has been no evidence to associate seafood with the spread of COVID-19 or to insinuate that COVID-19 could contaminate fresh fish.

Impacts of COVID-19 pandemic on regional MCS activities and efforts to combat IUU fishing

National preventive measures such as imposition of curfew could increase the incidence of IUU fishing as surveillance is limited because of reduced number of personnel. In fact, the number of IUU cases is reported to have been increasing in some Southeast Asian countries. Therefore, many countries are adjusting their respective national MCS systems through the use of online communications and electronic systems. In Thailand for example, although national measures such as lockdown and curfew are being imposed, fishing operations at sea during the night had been allowed following certain restrictions. Through the Department of Fisheries, operations of fishing vessels are monitored by responsible units, *i.e.* Fisheries Monitoring Center (FMC), Port-in Port-Out (PIPO), and implementation of Port State Measures (PSM) is sustained through the use of electronic systems and online communications. Procedures for controlling IUU fishing have been continued as before the lockdown but following social distancing. Assigned officers monitor all fishing operations from their equipment on land and report using the applications notwithstanding the reduced number and restricted movements of personnel. Thailand has also developed its national mitigation plans for the fisheries sector that include the extension of seaman's book of foreign crew of fishing vessels until 31 December 2020, and financial support of THB 5,000 (US$ 167) per month for every registered fishers.

Box 1. Ways and means of addressing the impacts of COVID-19 pandemic on the market and trade of fish products
(Compiled from the discussions during the SEAFDEC Webinar on Impacts of COVID-19 to Fisheries and Aquaculture, 2-3 July 2020)

Impacts	Suggested measures
General	
• Distrust of consumers on safety of products	• Improve quality and safety of products based on international standards
• Shortage of raw materials for processing	• Explore market diversion and diversification, and new markets
• Trade limitations to international market	• Strengthen domestic marketing, diversify product forms, and market channels, and make prices affordable to local consumers
• Socio-economic instability	• Enhance knowledge and skills of sellers who are mostly women, support knowledge exchange and access to information, credit, and finance
Tuna industry	
• Dwindling demand for tuna products, *e.g.* unstable demand for frozen tuna	• Sustain production as there is no shortage of raw materials for processing, and maintain good quality and safety of products
Surimi and surimi-based products	
• Sales dropped due to cancellation of orders from importing countries (*e.g.* Korea, Japan)	• Increase supply to domestic markets, *e.g.* convenience stores, restaurants, that have restored operations
Fresh seafood from small-scale fisheries	
• Decreased demand for seafood from tourists	• Strengthen promotion of products to local consumers, make prices affordable to local consumers
• Insecurity of household incomes	• Enhance skills of women and youth in e-commerce, online marketing, etc., and ensure safety and quality of products to improve consumerism
Frozen food	
• Low consumers' confidence on products	• Ensure quality of products in supply chain by adopting traceability systems
Pangasius industry (Viet Nam)	
• Decreasing demand from importing countries (*e.g.* China, USA, EU, Thailand)	• In the meantime, supply domestic markets and later on continue supplying the importing countries

Initiatives that aim to address the impacts of COVID-19 pandemic on Southeast Asian fisheries

For long-term and at the regional level, the AMSs could continue to avail of the technical expertise of SEAFDEC in different areas as its activities has only been slightly affected by the coronavirus pandemic. The conduct of projects and activities towards the sustainable development of fisheries and aquaculture in the Southeast Asian region has been sustained, in line with the international fisheries related policies and instruments, such as the 2030 UN Sustainable Development Goals, FAO Code of Conduct for Responsible Fisheries (CCRF), Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines), Port State Measures Agreement (PSMA), Catch Documentation Schemes (CDS), and so on.

Box 2. SEAFDEC Regional Policy Frameworks and Tools

- Regional Guidelines on Responsible Fisheries in Southeast Asia
- ASEAN RPOA for the Management of Fishing Capacity
- RPOA-Neritic Tunas
- Resolution and Plan of Action for Food Security for the ASEAN Region Towards 2030 (updated from RES&POA-2020)
- ASEAN-SEAFDEC Joint Declaration on Regional Cooperation for Combating Illegal, Unreported and Unregulated Fishing and Enhancing the Competitiveness of ASEAN Fish and Fishery Products
- ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain
- ASEAN Catch Documentation Scheme for Marine Capture Fisheries
- Regional/ASEAN standards (*e.g.* ASEAN Good Aquaculture Practices (ASEAN GAqP), ASEAN Shrimp Good Aquaculture Practices (ASEAN Shrimp GAP), and ASEAN Policy Guidelines on Standards and Conformance)
- SEAFDEC Gender Strategy
- Policy Brief on Applying Human Rights-based and Gender Equality Approaches to Small-scale Fisheries in Southeast Asia
- Regional Guidelines on Cold Chain Management of Fish and Fishery Products in ASEAN Region
- Regional Guidelines on Traceability System for Aquaculture Products in the ASEAN Region

The number of regional policy frameworks and tools that are available as listed in **Box 2**, could serve as fundamental guidance for the countries to continue their efforts in implementing their projects and activities. SEAFDEC would continue to support the AMSs through the ASEAN-SEAFDEC Strategic Partnership in achieving their long-term goals towards the sustainable development and management of fisheries.

Conclusion and Recommendations

EAFM: human well-being dimension in focus

Over the past couple of years, SEAFDEC has been introducing the capacity building on the ecosystem approach to fisheries management (EAFM) concept, aimed at striking a balance between ecological well-being and human well-being through good governance (Weerawat & Worranut, 2019). The main issues had been identified even before the COVID-19 crisis on the low income of fishers (SEAFDEC, 2020) because the prices of fish are often dictated by middlemen, and in many Southeast Asian countries, *e.g.* Cambodia, Lao PDR, and Myanmar, fish processing and market facilities are found to be inadequate. The spread of COVID-19 has therefore severely affected the small-scale fishers, especially those who rely on tourism including the fishers from the aforementioned countries. With the lessons learned, the capacity of fishers should be enhanced, for example in fish culture and fish processing as alternative livelihoods and more importantly, alternative marketing systems should also be introduced.

Strengthening the role of fisheries actors

As of 16 August 2020, a number of Southeast Asia countries had made successful moves towards controlling COVID-19 and re-opened some businesses after being locked down temporarily, with the hope that the countries could resume certain levels of economic activities. However, news of second wave of COVID-19 infections has been reported in several countries, *e.g.* in Australia, Japan, Singapore, South Korea, and Viet Nam, that could worsen the economic impacts. It is important for the fisheries and aquaculture sector to consider developing strategies on how the stakeholders could survive in the midst of any pandemics until the successful discovery of appropriate vaccine for protection against COVID-19.

Nonetheless, all concerned stakeholders should actively play their respective roles in controlling the transmission of COVID-19 at national level, and to ensure that the impacts of the virus on the economies are addressed in the most sustainable way (**Box 3**). So that, when the market will hopefully be restored in the next few months and food services systems resume their operations, fish trade could speed up and prices could stabilize as the demand for fish heightens. Then, the seafood business would attain speedy recovery and the fisheries industry would survive.

Box 3. Roles of stakeholders in addressing the impacts of COVID-19	
Stakeholders	**Roles in addressing the impacts of COVID-19**
Governments, development organizations and donors	Develop relief packages that support local organizations in their efforts to enhance social and economic resilience; protect local and migrant workers from COVID-19 contamination in workplaces; encourage purchase of seafood for institutional use such as hospitals and schools; promote domestic and online sales of seafood products
NGOs and civil societies	Facilitate and coordinate activities to support coastal communities and monitor the impacts of COVID-19 at the local level
Private sector	Ensure the health and safety of workers including fishers and fish farmers by endorsing the healthy and safety COVID-19-free procedures along the supply chain
Researchers and the academe	Identify short-term solutions on the impacts of COVID-19 pandemic and long-term strategies for effective and appropriate policy development
Fishing and fish farming communities	Enhance their networks for acquiring relevant information, *e.g.* supply and demand, to improve their access to markets especially domestic, online and direct sales, and also explore the possibility of seeking assistance from governments and relevant agencies for the establishment of insurance scheme or other means to secure their livelihoods should disasters like this current pandemic occur in the future

Way Forward

Governments, development organizations, and donors could support local organizations through relief packages in order to enhance social and economic resilience; protect local and migrant workers from COVID-19 contamination in workplaces; encourage purchasing of seafood for institutional use such as in hospitals and schools; and promote increased domestic and online sales of seafood products. Moreover, NGOs and civil societies could facilitate and coordinate activities that support coastal communities and monitor the impacts of COVID-19 at the local level, while the private sector could ensure the health and safety of workers including fishers and fish farmers by endorsing healthy and sanitary COVID-19-free procedures along the supply chain. Meanwhile, research institutions and the academe could identify short-term solutions on the impacts of the pandemic on the fisheries sector and establish long-term strategies to contribute to effective and appropriate policy development. On the part of the fishing and fish farming communities, stakeholders could enhance their networks to acquire relevant information, *e.g.* supply and demand to improve their market access, especially domestic, online, and direct sales. They could also seek assistance from their governments, and relevant agencies to develop an insurance scheme or other means to secure their livelihoods when similar disasters occur.

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