JOVES (Journal of Vocational Education Studies)
VOL 5, No. 2, 2022, pp. 254-266
pISSN: 2614-7483 pISSN: 2614-7475 https://doi.org/10.12928/joves.v5i2.6471

Impact of Covid-19 on The Aquaculture Sector Freshwater Fish Farmers in Kelantan

[a, 1]Nurfarida Jusoh, [a,2] Zalina Ismail*, [a, 3]Asilah Abdul Mutalib, [a, 4]Zahidah Ab Latif, [b,3]Shaibatul ' Islamiah Che Man
[a] Universiti Pendidikan Sultan Idris, Malaysia
[b] Universiti Teknologi MARA, Malaysia.
Email : [2]zalina.ismail@ftv.upsi.edu.my *
* : coresponndensing author

ARTICLE INFO

Article history
Received Aug 16, 2022
Revised Oct 26, 2022
Accepted Des 15, 2022

Keywords:
Knowledge
Perception
Practices
Covid-19

ABSTRACT (10PT)

The spread of the Covid-19 virus has affected the freshwater aquaculture industry in Malaysia. Due to this pandemic, freshwater fish products and demand decreased, followed by labor problems. Therefore, this study aims to identify freshwater farmers' level of knowledge, perception and practices of freshwater farmers related to the Covid-19 pandemic. The study was conducted using a quantitative method to collect data. The study was conducted using an online questionnaire instrument and also survey forms were distributed to respondents in Machang, Tanah Merah and Kota Bharu. A total of 59 responses was returned. The survey was open for one month between November 15th and December 15th, 2021. The data was analysed using IBM SPPS software version 24.0 to obtain the frequency, percentage and descriptive analysis to analyse the level of knowledge, perception and practices of farmer and relationship between farmer knowledge, perception and practices about Covid-19. This study's outcome indicates that the farmer knowledge is related to farmer practices in dealing with this problem as the spread of this virus occurs rapidly. In conclusion, this research showed that the level of farmers' knowledge, perception and practices toward Covid-19 effect is high. Directly, it will help farmers prevent the spread of this virus, helps farmers understand and be aware of Covid-19 issues and helps farmers implement good practice to reduce the risk in aquaculture activities, especially in this COVID-19 situation. This research would contribute positive impacts by finding new novel theories that can become the reference and guideline.

Introduction

The outbreak of the Covid-19 virus started from Wuhan, China, in December 2019 and then it has spread globally. Malaysia is also one of the countries that this pandemic has affected. The government imposed the Movement Control Order (MCO) due to increase in illnesses and fatality rates. This MCO's target is to stop the spread of the Covid-19 epidemic. A sudden increase in the number of positive cases was reported and the number of cases continued to increase day

by day. Due to that, the situation became worse and the government continued to extend the MCO.

The pandemic Covid-19 and the restrictions imposed under PCID affected the primary production sectors, including the aquaculture sector. First, consider the implications on aquaculture productivity. They were followed by the closure of food-related industries such as hotels, restaurants, and catering facilities. Some farmers are also affected due to the closure of international markets because farmed species cannot be exported (FAO, 2020). Second, there has been a decrease in the demand for fish. In Malaysia, fish and fish products are highly dependent on international and local trade (Waiho et al., 2020). The closure of the local and global markets decreased the fish demand. This may result in drops in fish price and increase the cost, expenditures and risk to the farmers like farmers will suffer huge losses if it continues. Third, affect the field of labour and employment. The Covid-19 crisis deeply affects employment and work in almost all sectors, including the aquaculture sector. The lockdown caused considerable disruptions in employment across the supply chain. Therefore, this study's main objective is to determine the freshwater fish aquaculture farmer's knowledge, perception and practices on the impacts of pandemic Covid-19 on freshwater fish activities.

LITERATURE REVIEW

Coronavirus

A coronavirus is a group of viruses from Coronaviridae family (Shereen et al., 2020). In December 2019, authorities in Wuhan, China, announced the first human cases of Covid-19 sickness caused by the new coronavirus that causes Covid-19; subsequently, it is called SARS-CoV-2. Since that, the virus has spread worldwide, infecting 4,806,299 people and causing 318,599 deaths by May 20, 2020. In Malaysia, Covid-19 cases were increasing. The increased number of threats when Singapore, Malaysia neighbour, reported its first foreign Covid-19 case from Wuhan, China, on January 23, 2020. Malaysia reported its first case less than 48 hours after the first case in Singapore. According to Abdullah (2020), the first case is imported from Wuhan, and eight positive cases are recorded within six days after the first case. On February 3, 2020, the first Malaysian who tested positive for COVID-19 was reported after this individual had a history of travelling to a neighbouring nation for the meeting, which was also attended by a Chinese delegation (Ahmad, 2020). Furthermore, Shah et al. (2020); reported that Malaysia cases could be divided into three waves where the first waves were successfully handled by February 27, 2020.

Impact of Covid-19 to Aquaculture

Production

The pandemic of Covid-19 has impacted aquaculture production (Azra et al., 2021). According to Manlosa, Hornidge & Schluter (2021), aquaculture production was negatively littered with the pandemic through discontinuous convenience of fry and fingerlings as travelling fingerlings, the restricted native offer of various inputs to mobility restrictions, temporal arrangement of lockdown, and restricted individual quality. Due to this pandemic, the cultivation production sector is extraordinarily diverse. During pandemic Covid-19 the aquaculture industry is struggling to keep the fish production cycle going. According to Rafiquzzaman (2020), farmers are not interested in harvesting the fish because of the low price and this is also another reason to delay replenishment this season. Thus, the production of freshwater fish drops during pandemic Covid-19.

Demands of product

Aquaculture production demands increase every year. The increase of aquaculture production demands in every year led significant changes in how the product are marketed. The safety control really contributes to increase the demands of the products in markets. Pandemic Covid-19 has an impact the demands of aquaculture product due to the closure of the foodservice industry, the closure of the tourism industry, and changes in purchasing methods, the use of MCO may have a severe impact on domestic demand for fish and shellfish. According to Giridharadas (2020), when China implemented a nationwide lockdown, international fish commerce between China and other seafood supplier nations, notably Malaysia, plummeted. The cancellation of seafood export contracts occurred due to the implementation of lockdown. As a result, Malaysia's agriculture industry has begun to experience the first waves of declining international food demand, with seafood exports from an Asian country to Singapore already down by 50% by 2020 (Aruno et al., 2020).

Labor

During the pandemic COVID-19, Malaysia was impacted by a labour crisis due to a lockdown. The lockdown was forced Malaysians to stay indoors and work from home. In Malaysia, expect for the lockdown to state, health, food production, drugs production and oil industry workers and security forces, they still need to follow the standard operation procedure (SOP). The movement requires confirmation of the responsible party. In the short term, owing to confinement measures, and in the medium to long term, due to financial or cash flow challenges faced by farmers, or travel restrictions for seasonal or migratory employees, labour layoffs have also

increased (Virginia Tech, 2019). Having the labour problem direct effect on the food supply chain. During pandemic Covid-19 the human interaction are very limited. Social distancing needs to be practiced. That is why farmers are limiting the number of workers to ensure that human interaction is limited. Thus, this impact has a significant impact on the whole aquaculture value chain.

Method

Research Design

This study used a survey to identify the knowledge, perception, practices and impact of pandemic Covid-19 towards farmers in the aquaculture sector, especially for freshwater fish farmers. Survey is research that analyses a group of people or a sample by collecting and analyzing information from only a few people or items that are thought to represent the entire collection.

Research Population

According to Fraenkel & Wallen (2009), the target population is the population that the researcher wishes to investigate, and it is rarely available as a basis for generalization. The population could be defined as finite and infinite. In this study, the freshwater fish farmers in Kelantan were a sample. According to the Department of Fisheries, Malaysia (2018), the total number of farmers that run freshwater fish activities in Kelantan is about 618. According to Mugo (2002), when dealing with individuals, the sample could be a collection of respondents drawn from a larger population for a survey. Thus, sample refers to a smaller, more manageable version of a larger group (population) that shares the characteristics of the larger population. Therefore, a sample of 234 farmers was selected as the respondents but due to the pandemic Covid-19 a few areas ware selected to conduct this survey which are Machang, Tanah Merah and Kota Bharu. The determination of sample size is based on Krejcie & Morgan (1970).

Research Instrument

The researcher's primary instrument in this research is an online questionnaire. The online survey questionnaire was divided into section A, section B, section C and section D (Table 1). A set of questions will be distributed to the randomly selected respondents. The survey questionnaire was used the 5-point Likert scale range, which is from 1 (strongly disagree) to 5 (strongly agree).

Table 1. Section in Questionnaire.

Section	Item
A	Demographic information
B	Level of knowledge of freshwater fish aquaculture farmer about pandemic Covid-19
C	Level of perception of freshwater fish aquaculture farmer on the impact of the Covid-19 pandemic on freshwater fish activities.
D	Level of freshwater fish aquaculture farmer practices during the impact of the Covid-19 pandemic on aquaculture activities.

Data Analysis

In this study, IBM SPSS Statistic was used to analyse the data. The descriptive statistic is used to analyse the study purposes. The demographic question in section A was analysed using percentage and frequency. Next, for the second to the fourth objectives of studies, it was analysed using the value of mean, value of standard deviations and the value of frequency and percentage.

ANALYSIS AND DISCUSSION

This study was analyzed using the Statistical Package for Social Science (SPSS) system, version 24.0. The study results presented in this chapter describe the answer to the research question that is a study on the level of knowledge, perception and practices on the impact of Covid-19. To answer the research questions, the researcher has used frequency and descriptive statistics to clarify the respondents' background, along with questionnaires to ascertain respondents' knowledge about pandemic Covid-19, perception of a freshwater fish farmer on the impact of Covid-19 and practices during the impact of the Covid-19.

Demographic Profile of Respondent

Table 1 presents frequencies and percentages for demographic variables. The majority of respondents were 19-30 years (49.2%) old in comparison to the 31 to 42 (20.3%), 43 to 54 (18.6%) and above 55 years (11.9%) age group. A total of 29 respondents (49.2%) were single in comparison to the married (40.7%) and other status (10.2%). Most respondent were male (79.7%, male; 20.3%, female. The majority respondents, (47.5%) have a PMR/SPM and (40.7%)

are diploma graduates and followed by degree (11.9%). Besides that, majority of respondents have income less than RM2500 (73.6%) followed by income between RM2501-RM500 (22.0%) and RM5001-10000 (1.7%). Then, (50.8%) respondents are raising the silver catfish, 11 respondents (18.6%) raising catfish, one respondent (1.7%) raising green catfish, tilapia and lastly, followed by others which is a total of (27.1%). Lastly, most of respondent (61.0%) use earth pond fish farming system, (6.8%) cage system and 32.2% uses others system.

Table 2. Demographic profiles respondent

Variable	Category	Frequency	%
Age	19-30	29	49.2
	31-42	12	20.3
	43-54	11	18.6
	>55	7	11.9
Gender	Male	47	79.7
	Female	12	20.3
Marital status	Single	29	49.2
	Married	24	40.7
	Others	6	10.2
Level education	PMR/SPM	28	47.5
	Diploma	24	40.7
	Degree	7	11.9
Income	<RM2500	45	76.2
	RM2501-RM5000	13	22.0
	RM5001-RM10000	1	1.7
Type of fish	Silver catfish	30	50.8
	Catfish	11	18.6
	Green catfish	1	1.7
	Tilapia	1	1.7
	Others	16	27.1
Fish farming system	Earth pond	30	50.8
	Cage	11	18.6
	Others	16	27.1

Knowledge of Freshwater Fish Aquaculture Farmer about Pandemic Covid-19

Based on the results (Table 3), the level of knowledge of freshwater fish aquaculture farmers about pandemic Covid-19 showed the overall mean for this section at a total high level.

These findings; clearly showed that freshwater fish farmers in Malaysia were already known and exposed to the pandemic Covid-19. This is because Malaysian citizens were exposed to mass media. According to Ismawati et al. (2021), mass media was the fastest medium for mobilising public health awareness. During the Covid-19 Malaysian government was used mass as a medium for disseminating information. Every day, the Ministry of Health Malaysia will update the number of cases, Covid-19 symptoms, preventive measures and more information on their Facebook page. Therefore, the researcher has concluded that the level of knowledge of freshwater fish aquaculture farmers about Covid-19 was high.

Table 3. Means and standard deviations of knowledge of freshwater fish aquaculture farmer about pandemic Covid-19

Item	Mean	SD
I clearly understand what Covid-19 is	4.51	.504
I have extensive knowledge in the issue of Covid-19	4.17	.791
I found out about the pandemic Covid-19 issues from advertisements in the mass media	4.41	.529
I am aware of the effects of the Covid-19 pandemic on the aquaculture sector	4.17	.699
I know that Covid-19 pandemic could affect the productivity of freshwater livestock	4.37	.613
I know that Covid-19 infection can be dangerous to farmers	4.37	.717
I know preventive measures such as tightening the movement of workers to prevent the transmission of Covid-19	4.49	.569
I was impressed with the Covid-19 pandemic (Loss, Productivity, Demand and Manpower)	4.47	.537

Perception of freshwater fish aquaculture farmer on the impact of the Covid-19 pandemic on freshwater fish activities

Descriptive analysis has found that freshwater fish farmers' perception of the impact of the Covid-19 pandemic on freshwater fish activities is high (Table 4). This is because the farmers' perception has accumulated an overall mean value of 4.20. Based on this research most farmers were so impressed with the impact of Covid-19. According to Azra et al. (2021), small and micro-based businesses were directly or indirectly affected during the MCO period. Based on this study, it was found that the production, demand and labor issues were affected during pandemic Covid-19 (Azra et al., 2021). The MCO and SOP that the government has set pressured the farmers. Therefore, the level of perception of freshwater fish aquaculture farmers on the impact of the Covid-19 pandemic on freshwater fish activities is high.

Table 4. Means and standard deviations of perception of freshwater fish aquaculture farmer on the impact of the Covid-19 pandemic on freshwater fish activities

Item	Mean	SD
I was so impressed with the Covid-19 pandemic	4.20	.406
Freshwater fish production in Kelantan is affected by the Covid-19 pandemic	3.95	.391
The demand for freshwater fish in Kelantan is declining due to the Covid-19 pandemic	4.41	.601
Labor issues such as workforce reductions increased during the Covid-19 pandemic	4.15	.582
My income was affected by the Covid-19 pandemic	4.14	.434
I was disappointed with the productivity of freshwater fish during the Covid-19 pandemic	4.10	.548
I feel pressured by the SOP that set by the government	4.49	.571
I feel that movement control affects the activities of freshwater fish aquaculture	4.05	.539

Fish aquaculture farmer practices during the impact of the Covid-19 pandemic on aquaculture activities

Established on the findings and analysis of the results (Table 5), the level of fish aquaculture farmer practices during the impact of the Covid-19 pandemic on aquaculture activities shows that the overall mean for this section is high. In this; study, the researcher found the farmers were practicing reducing the numbers of workers and tightening workers' movement. According to Kiruba-Sankar et al. (2022), harvesting and marketing problems were faced during the pandemic due to restriction in movement, lack of labor, lack of marketing facility and fear of the consumers' intake of fish intake. Due to that, the lack of labor leads to a reduction in production. According to FOA (2020), they are increasing expenditures due to the continuous feeding requirements and the risk of aquaculture products dying in ponds due to late harvesting. Therefore, the high level of farmer's practices during the impact of pandemic Covid-19 on freshwater fish activities help farmers in facing the impact of Covid-19 and able to carry out their farm activities well during pandemic.

Table 5. Means and standard deviations of fish aquaculture farmer practices during the impact of the Covid-19 pandemic on aquaculture activities

Item	Mean	SD
I carried out livestock activities as usual during the Covid-19 pandemic	4.17	.769
I reduced the number of workers during the Covid-19 pandemic	4.17	.746
I tightened the movement of workers	4.27	.582
I ask employees to follow the SOP	4.59	.495
I ensure that workers with symptoms are not involved in activities on the farm	4.69	.464
I was able to carry out farming activities well during the Covid-19 pandemic	4.36	.643
I increase the market by using online platforms like Facebook, Instagram and Tiktok	4.36	.637
I do other work to cover income	4.12	.832

Inference Analysis

Differences between level of education of farmer with freshwater fish farmer knowledge about the pandemic Covid-19

One-way ANOVA test is used to see if there are differences between the level of education of farmer with the knowledge about the pandemic Covid-19. The test result proves a statistically significant difference between the level of education with freshwater fish farmer knowledge about the pandemic Covid-19 ($F(2,56) = 6.288$, $p = 0.003$; Figure 1).

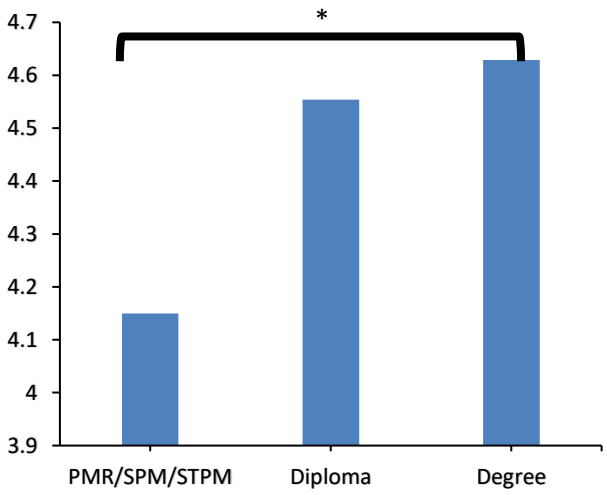

Fig 1: The differences between the level of education of farmer with the knowledge about the pandemic Covid-19

This means the respondent's level of knowledge has a difference between the levels of education by farmers. According to Diaz-Quijano et al.; (2018), high school graduates recognized the

knowledge more often than non-high school graduated. In this study, farmers with degree level have the highest mean. Thus, education plays a very important role as it widens the vision of farmers and exposes them to various aspects and opportunities (Shetty et al., 2010).

Relationship between farmer knowledge with farmer practices during the impact of the Covid-19 pandemic on aquaculture activities

A correlation test was used to see relationship between farmers' knowledge with the farmer practices during the impact of the Covid-19 pandemic on aquaculture activities. There was a positive correlation between the two variables, r = 0.295, n = 59, p=0.023 (Figure 2).

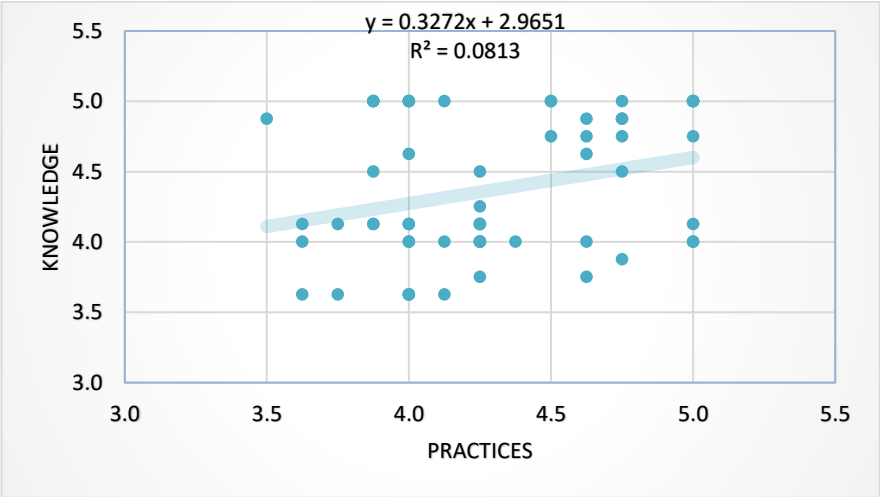

Fig 2: Correlation test between knowledge and farmer practices during the impact of the Covid-19 pandemic on aquaculture activities

The study results show a positive relationship between farmers' knowledge and practices. During pandemic Covid-19, the farmer's practices affected production, demand and labor activities in the field. According to Jones et al.; (2014), prioritised the knowledge will serve as a guidance for structuring continuing efforts to make science more accessible to practitioners, as well as assisting in the prioritisation of future scientific policy and financing needs. Therefore, farmers' knowledge about pandemic Covid-19 was important to help farmers applying a good practices during this pandemic. Besides that, the process of information exchange, as well as the means via which it might be accomplished, has successfully emerged as the top priority for long-term aquaculture sustainability (Jones et al.; 2014). Due to that, farmer's knowledge affecting their practices

Implication of the Study

This research discovered the knowledge of freshwater fish aquaculture farmers positively impacted to the farmer's practices during the impacts of the Covid-19 pandemic on the aquaculture activities.

Recommendation

For recommendations in this study, few things on the study need to improve. This study should involve all the farmers in Kelantan to get better result for this study. Second, the instrument for conducting the investigations need to be improved and made more reliable to study. This is because the instrument's question is important for respondents to understand and analyse to make a decision and easily answer based on their knowledge.

Conclusion

This study shows that the level of freshwater fish farmers' knowledge about pandemic Covid-19, perception and practices during the impact of the Covid-19 is high. Therefore, this study is provided information to the freshwater fish aquaculture farmers in facing this pandemic Covid-19 in the future.

References

Ahm Abdullah, N.H. (2019). Pengesanan kes baharu yang disahkan dijangkiti 2019 novel Coronavirus (2019-nCoV) di Malaysia [Press release]. 2020 Retrieved from http://www.moh.gov.my/index.php/database_stores/store_view_page/21/ 1301 [Accessed 28 April 2021].

Abdullah, N.H. (2019). Situasi terkini jangkitan 2019 novel Coronavirus (2019-nCoV) di Malaysia [Press release]. 2020 Retrieved from https://kpkesihatan.com/2020/ 01/30/kenyataan-akhbar-kpk-30-januari-2020-situasi-terkini-jangkitan-2019- novel-coronavirus-2019-ncov-di-malaysia/ [Accessed 28 April 2021].

Ahmad D. Situasi terkini jangkitan 2019-nCoV dan pengesahan kes baharu di Malaysia [Press release]. 2020 Retrieved from https://www.penerangan.gov. my/japenv2/wp-content/uploads/2020/02/Kenyataan-Akhbar-KPK-Situasi- 2019-nCoV-4-FEBRUARI-2020_edited-2.pdf [Accessed 30 April 2021].

Aruno, C., Lai, A., Timbuong, J., Aravinthan, R., 2020. Seafood export to Singapore down by half. The Star Online [Online Resource] Assessed on 29 April 2021. Retrieved from: https://www.thestar.com.my/news/nation/2020/02/17/seafood-export-to-s ingapore-

down-by-half

Azra, M. N., Kasan, N. A., Othman, R., Noor, G. A. G. R., Mazelan, S., Jamari, Z. Bin, Sarà, G., & Ikhwanuddin, M. (2021). Impact of COVID-19 on aquaculture sector in Malaysia: Findings from the first national survey. In Aquaculture Reports (Vol. 19). https://doi.org/10.1016/j.aqrep.2020.100568

Diaz-Quijano, F. A., Martínez-Vega, R. A., Rodriguez-Morales, A. J., Rojas-Calero, R. A., Luna-González, M. L., & Díaz-Quijano, R. G. (2018). Association between the level of education and knowledge, attitudes and practices regarding dengue in the Caribbean region of Colombia. BMC Public Health, 18(1), 1–10. https://doi.org/10.1186/s12889-018-5055-z

FAO. (2020). Malaysia National Aquaculture Sector Overview. FAO Fisheries Division [Online], 1–16. http://www.fao.org/fishery/countrysector/naso_malaysia/en

Ismawati, I., Ma, A., Ar, N. A., Am, Y. S., & I, H. B. (2021). Pengaruh Infografik Kesihatan Melalui Facebook Jabatan Kesihatan Negeri Pahang Terhadap Literasi Kesihatan Masyarakat Berkaitan COVID-19 (The Influence of Health Infografic Through Pahang State Health Department ' s Facebook on Community Health Literacy . 3(3), 28–40.

Kiruba-Sankar, R., Saravanan, K., Haridas, H., Praveenraj, J., Biswas, U., & Sarkar, R. (2022). Policy framework and development strategy for freshwater aquaculture sector in the light of COVID-19 impact in Andaman and Nicobar archipelago, India. Aquaculture, 548(P1), 737596. https://doi.org/10.1016/j.aquaculture.2021.737596

Krejcie, R. V, & Morgan, D. W. (1970). Determinants of sample size for research activities. Educational and Psychological Measurement, 30(3), 607–610.

Manlosa, A. O., Hornidge, A. K., & Schlüter, A. (2021). Aquaculture-capture fisheries nexus under Covid-19: impacts, diversity, and social-ecological resilience. Maritime Studies, 20(1), 75–85. https://doi.org/10.1007/s40152-021-00213-6

Rafiquzzaman, S. . (2020). Case Study on the Impact of Pandemic COVID-19 in Aquaculture with its Recommendations. American Journal of Pure and Applied Biosciences, April, 36–38. https://doi.org/10.34104/ajpab.020.36038

Shah, A. U. M., Safri, S. N. A., Thevadas, R., Noordin, N. K., Rahman, A. A., Sekawi, Z., Ideris, A., & Sultan, M. T. H. (2020). COVID-19 outbreak in Malaysia: Actions taken by the Malaysian government. International Journal of Infectious Diseases, 97, 108–116. https://doi.org/10.1016/j.ijid.2020.05.093

Shereen, M. A., Khan, S., Kazmi, A., Bashir, N., & Siddique, R. (2020). COVID-19 infection: Origin, transmission, and characteristics of human coronaviruses. Journal of Advanced Research,

24(March), 91–98. https://doi.org/10.1016/j.jare.2020.03.005

Shetty, P. K., Murugan, M., Hiremath, M. B., & Sreeja, K. G. (2010). Farmers' education and perception on pesticide use and crop economies in Indian agriculture. Journal of Experimental Sciences, 1(1), 3–08.

Virginia Tech. (2019). Overview of Good Aquaculture Practices. Virginia Cooperative Extension, 054.

Waiho, K., Fazhan, H., Ishak, S. D., Kasan, N. A., Liew, H. J., Norainy, M. H., & Ikhwanuddin, M. (2020). Potential impacts of COVID-19 on the aquaculture sector of Malaysia and its coping strategies. Aquaculture Reports, 18, 100450. https://doi.org/10.1016/j.aqrep.2020.100450