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Factors Influencing Farmers' Readiness to Face Covid-19 Post-Movement Control Order Challenges in Peninsular Malaysia

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Abstract

The COVID-19 pandemic is a global health catastrophe that has had severe effects on the worldwide economy, both directly and indirectly, because of the spread of the virus. The food and agriculture industries are also experiencing the effects. The COVID-19 epidemic disrupted the regular delivery system of agricultural extension services and the delivery of agricultural produce to markets. The study aimed to determine farmers' readiness to address post-MCO challenges in technology, implementation, decision-making, and leadership. Following the COVID-19 rules of reducing close contact to minimize virus transmission, a structured questionnaire was delivered to farmers online (Google form) and face-to-face with the support of extension agents. The results show that the relationship between independent and dependent variables was positive. Also, according to the findings, decision-making is the most crucial element influencing farmers' readiness to tackle post-movement control order issues. According to researchers, farmers' abilities should be developed to overcome challenges in pandemic conditions.

1. INTRODUCTION

The epidemic of COVID-19 (Severe Acute Respiratory Syndrome Coronavirus 2 (SARSCOV-2) harmed global healthcare systems, with a cascade effect on any aspect of human life (Nicola *et al.* 2020). COVID-19 was first released in China in December 2019 before being widely spread worldwide. It has been labelled a black swan event compared to the economic scene during World War Two (Nicola *et al.* 2020). Since early 2020, Malaysia has taken many steps to contain the COVID spread. The government declared a Movement Control Order (MCO) in March 2020 as a precautionary step, requiring schools and non-essential businesses to close, disallowing interstate travel, and imposing curfews.

The government identified the agriculture industry as significant during the execution of the Movement Control Order, allowing firms to continue operating normally. Food production and distribution have been hampered by a lack of raw materials and inputs, labour shortages and market access, global supply chain and export bottlenecks, and diminishing bulk demand from the hotel and tourism industries (Shaharudin, 2020; Vaghefi, 2020). At the same time, food costs have escalated due to the uncertain market and evolving consumer behaviours (Abdullah *et al.*, 2020).

Farmers' readiness to face post-MCO causes the new challenges faced by the agricultural community due to a slowdown in agricultural activities, logistics, and services. COVID-19 raised many issues relevant to the status, readiness, and capacity of the different communities and countries' self-sufficiency during lockdown conditions and social distancing requirements (Buheji *et al.*, 2020). Through the pandemic, this study concerns the farmers' self-developments, such as knowledge of agriculture technology, implementation of the technology on the farm, the action of self-leadership, and decision-making depending on the current situation. These aspects primarily concern the readiness of farmers to continue their farming activities after the post-MCO

1.1 Problem statements

Many aspects of daily life, involving social life and numerous economic sectors, have been affected by the Covid-19 pandemic. Since the pandemic, many people have been affected by uncertain economic situations, notably those in the agriculture and food industries. Covid-19 has an indirect impact on agriculture production and revenue. Agricultural services have been hindered, making

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it difficult for farmers to sell their products or buy inputs, resulting in a loss of output and income and an increase in post-harvest loss and food waste. In contrast, consumers have struggled to locate enough food to meet their daily nutritional demands (Aday & Aday, 2020). COVID-19's occurrence is a sad yet "natural experiment" that provides an opportunity to seek signs of resilience among smallholder farmers (Sabin *et al.*, 2022).

In Gua Musang, the news stated that 200 farmers could not sell their produce, resulting in a daily loss of RM400,000 (Manikam & Saad, 2021). Due to the MCO, proper harvesting procedures could not be carried out. Farmers need to decide whether to "throw" or "give" the vegetables that have been harvested. Crops that have been harvested are perishable. With the dearth of available companies, farmers have limited possibilities for marketing their farm products (Man, 2020). In some cases, disruptions downstream from the farm gate are causing surpluses to accumulate, putting a strain on storage facilities and, in the case of perishables, increasing food losses and putting pressure on the environment (OECD, 2020).

Several issues occurred under the MCO, including limited technical support from extension agents, limited information and knowledge gap across the agriculture supply chain, changes in marketing channels, disconnection of the agriculture supply chain, limited availability of fertilizers, pesticides, seeds, machinery spare parts, and farm equipment. Restrictions caused by COVID-19 had negative impacts on the agricultural sector, where there was limited movement and technical support from extension agents to farmers.

Aside from that, agricultural services lagged due to a lack of information and knowledge across the agriculture supply chain, causing the supply chain to be disrupted. Farmers had to adjust their marketing tactics and channels because of the COVID-19 pandemic, as they could not operate their farms and sell their products as usual. Farmers cannot manage their businesses, resulting in significant product and revenue losses because of vegetable dumping, as buyers no longer purchase their products during the MCO time.

1.2 Objectives

As a consequence, this research is needed to identify farmers' readiness to be exposed to the problems of the COVID-19 epidemic, one of the agricultural community's new challenges due to the slowdown of farm activities, logistics, and services. Furthermore, extension agents, who play an essential part in the development process and problem-solving, could not meet with farmers as often as they would have liked to provide advice due to movement restrictions.

The specific objectives of this study are i) to determine the level of technology skill, implementation skill, leadership skill, decision-making skill, and farmers' readiness to face challenges during the post-MCO, and ii) to determine the relationship between technology skill, implementation skill, leadership skill, decision-making skill, and farmers' readiness to face challenges during the post-MCO; and iii) to determine the most important skills that influence farmers' readiness to face challenges during the post-MCO.

2. LITERATURE REVIEW

Farmers' readiness is linked to their knowledge level, with higher knowledge levels resulting in higher farmers' readiness (Fairuz et al., 2018). In this study, technological, implementation, leadership, and decision-making skills influenced farmers' readiness to meet post-MCO difficulties. These four abilities are independent variables in this study, and each is critical for farmers to become successful, productive, and educated.

2.1 Technology skills

Technology is one of the essential skills in today's farming world. Intensive technological use is connected to increased vegetable yield (Minten, Mohammed & Tamru, 2020). Using technology in agricultural activities has several advantages, including optimizing agricultural management and processes. According to Kahan (2008), the technological application can result in higher farm yields and more cost-effective agricultural input utilization. Farmers' use of technology could assist them in increasing production and farm productivity (Kahan, 2008). As a result, all agricultural communities, particularly farmers, require advanced technological skills to simplify farm management and increase production.

2.2 Implementation skills

Farmers also demand a high level of implementation expertise. The capacity to carry out tasks in preparation for problem-solving and achieving strategic objectives and goals is known as implementation skill (Tiraieyani *et al.*, 2010). According to Sulong (2016), implementation significantly impacts task performance. Therefore, farmers with solid implementation skills will better run a successful farm. Due to financial difficulties brought on by the COVID-19 pandemic, smallholder farmers struggle to keep up with agricultural productivity. Many countries are launching aid programs for smallholder farmers who lack incentives because of this financial challenge (Fatah & Cramon-Taubadel, 2017). Smallholders require financial assistance and safety net services that might boost productivity. Most communities, especially those that rely on informal economies, could not do their daily commercial operations during that time. Examples include small companies selling vegetables, fruits, household items, or commerce. (Rashidi *et al.*, 2021)

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2.3 Leadership skills

Next, leadership capacity refers to a farmer's ability to direct vision and attention and identify goals and difficulties to improve farm productivity (d'Arros, 2007). Farmers must be able to lead themselves without the assistance of others. Farmers should not wait to carry out agricultural activities until they are given instructions. They should be the driving force behind their farm and organize all of the activities without the assistance of others.

2.4 Decision-making skills

Finally, a farmer's decision-making ability is critical factor in handling farm (Ali *et al.*, 2018). To prevent farmers from making poor decisions that negatively influence their agricultural management, decision-making ability is required (Demiryurek *et al.*, 2008). Farmers must have excellent knowledge and expertise in managing a farm and dealing with agricultural obstacles to make informed decisions about how to solve problems. As a result, one of the independent variables in this study is decision-making skill, which is used to determine farmers' decision-making ability level during post-Covid-19 cases.

Respondents also brought up a problem with decision-making that negatively influences agriculture operations and income since MCO has limited their capacity for clear communication and quick decision-making (Rashidi *et al.*, 2021). As a result, based on the arguments above, Figure 1 illustrates the conceptual framework that shows the links between the constructs as hypothesized.

3. METHODOLOGY

This study focused on vegetable farmers in peninsular Malaysia. The target population for this study was defined to include selective vegetable farmers according to the type of vegetables they plant. Mustard, spinach, okra, long beans, and eggplant are the selected agricultural commodities with high value per capita consumption in Malaysia, according to the Department of Statistics Malaysia (2020). Because these six vegetable crops are perishable and have a short shelf life, they are the focus of this research.

This research used a simple random sampling method. Using this method, all farmers in the selected population have the same probability of being selected as the sample units. According to the Department of Agriculture (DOA)/MAFI statistics, 35,780 farmers in the targeted demographic meet the above requirements. According to Raosoft.com's sample size computation, the sample size required 381 farmers based on the population indicated.

In this research, farmers' readiness is the dependent variable. Four main independent variables contribute to the dependent variable: technology skills, implementation skills, leadership skills, and decision-making skills. Hence, the framework of this study reveals the relationships between farmers' readiness to face post-MCO challenges and the determinants of skills that influenced them.

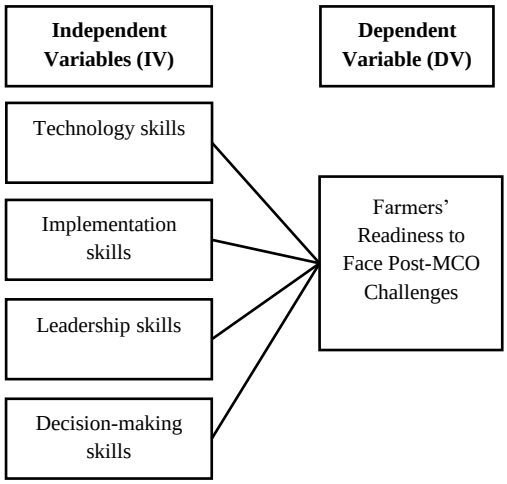

Figure 1. Conceptual framework

Based on works of literature, farmers' readiness highly depends on knowledge and skills in terms of technology (Maciejczak and Faltmann, 2018), implementation **(**Leitão, Colombo and Karnouskos, 2016), decision-making (Ketteler, 2018) and leadership (Ulvenblad and Bjorklund, 2018).

Data for this study were collected using two methods: online and manually. The first method, the questionnaire, was formed online using Google Forms. This online questionnaire was distributed to the respondents via a link through the WhatsApp application by the researchers and with the help of extension agents of the Department of Agriculture (DOA). In the second method, the questionnaires were distributed manually and collected from respondents on the same day. Data from the questionnaires in this study is analyzed by IBM SPSS Version 26.

4. RESULTS AND DISCUSSION

It is a synonym to know that demographic factors influence the work performance of farmers. The results' distribution was described by gender, age, race, educational level, and project location.

The gender composition of the respondents was 88.1% male and 11.9% female. Males dominate most vegetable farmers. Commonly, farmers in Malaysia are more male because of their energy and responsibility to work. Besides, farmers' age distribution shows that the highest percentage refers to the age between 41 to 50 years old (25.4%). This age range commonly has more experience than the young age that tends to do other jobs.

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Table 1. Distribution of Vegetables Farmers Profile

Variables	Frequency	Percentage (%)
Gender		
Male	443	88.1
Female	60	11.9
Age		
≤30	80	15.9
31-40	122	24.3
41-50	128	25.4
51-60	102	20.3
≥ 61	71	14.1
Race		
Malay	350	69.6
Chinese	116	23.1
Indian	16	3.2
Others	21	4.2
Educational Level		
Primary school	78	15.5
Secondary school	237	47.1
Institute certificate	42	8.3
Diploma	67	13.3
Degree	79	15.7

(Source: Survey, 2020)

Table 1 indicates that 69.6% of the respondents were Malay, 23.1% were Chinese, 3.2% were Indian, and 4.2% belonged to other races. Most of the farmers were Malay compared to other groups. Regarding the educational background of the respondents, Table 1 also indicates that 47.1% had completed secondary school. About 37% of farmers have an academic background, at least at the Institute level. It showed that farmers could literately understand technology as their educational background is satisfying.

The eggplant showed the highest percentage of 26.1% of the plants, followed by okra with 21.5%. Because these six vegetable crops are perishable and have a short shelf life, they focus on this research. Vegetable intake per capita is higher; as a result, these veggies are in high demand on the market because customers favour them. Mustard, spinach, okra, long beans, and eggplant are the selected agricultural commodities with high value per capita consumption in Malaysia, according to the Department of Statistics Malaysia (2020).

Besides, in the respondent's status of Malaysian Good Agricultural Practices (MyGAP) certificates, the majority do not have the MyGAP certificate with 74.4%. While for others with the certificate, the low percentage is only 24.1%. According to a study by Fam et al. (2019), to be certified with MyGAP, a farm must operate in an ecologically friendly and sustainable manner and provide high-quality, safe goods, according to the three critical characteristics of the MyGAP Farm Accreditation Scheme. MyGAP certification from DOA needed a necessary process and standard of the procedure because the farm needs to be clean from pesticide and chemical residues.

Table 2. Farm Profiles

Variables	Frequency	Percentage (%)
Type of Plant		
Mustard	122	11.2
Water Spinach	138	12.6
Spinach	115	10.5
Okra	235	21.5
Long Beans	198	18.1
Eggplant	285	26.1
MyGAP Certificates		
Have	121	24.1
Do Not Have	374	74.4
Year Owned MyGAP Certification		
2005-2008	10	8.6
2012-2015	19	16.4
2016-2019	67	57.8
2020	20	17.2

(Source: Survey, 2020)

MyGAP was initiated in Malaysia in 2003. Table 2 also shows the year of respondents who owned their MyGAP certificate. The highest rate was from 2016 to 2019, with 57.8%, and the lowest frequency was from 2005 to 2008, with only 8.6%. Thus, in the early phase, there are limited numbers of farmers who try to get the certificate. However, as food safety becomes a tool to increase product quality and compliance with legislation (Karaman et al., 2012), farmers must practice MyGAP as a food safety control. Therefore, there were increasing numbers of farmers who applied for the certificate.

4.1 Type of Guidance from DOA

Table 3 shows the type of guidance from DOA received by farmers. The guidance from DOA is mostly in fertilizer application compared to other advice. The highest type of guidance was fertilizer application, with a frequency of 303, representing 18.3% of the total advice. The second highest type of guidance was disease control, with a frequency of 281 and a percentage of 17.0%. Some farmers claimed that they do not receive any advice from extension agents.

Hence, the responsibility of extension officers in transferring technology and technical ability to developing farmers to raise their production is critical to the success of extension services (Rahim, 2008). Thus, they need to guide various guidance to enhance farmers' readiness to handle the farm job.

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Table 3. Type of Guidance from DOA

Type of Guidance from DOA	Frequency	Percentage (%)
Planting Schedule	154	9.3
Fertilizer	303	18.3
Pest Control	235	14.2
Disease Control	281	17.0
Weed Control	221	13.4
Harvesting	180	10.9
Marketing	155	9.4
No Guidance	125	7.6

(Source: Survey, 2020)

4.2 Type of Extension Services from DOA

Table 4 shows the type of extension services from DOA received by farmers.

Table 4. Type of Extension Services from DOA

Type of Extension Services from DOA	Frequency	Percentage (%)
Land Preparation	114	13.5
Drainage	105	12.4
Fences	62	7.3
Irrigation System	145	17.1
Fertilizer	306	36.2
No Assistance	114	13.5

(Source: Survey, 2020)

The highest percentage of extension services was fertilizer, with a frequency of 306, representing 36.2% of the total respondents. Based on the data summary, the percentage of fertilizer services is quite far from the other services. It is in line with the guidance from the previous data set. Department of Agriculture needs technical support and agriculture incentive aids (Baqutayan *et al.*, 2017). For instance, the following studies conducted by Mwambi *et al.* (2020) and Hoffmann *et al.* (2019) agree that a lack of information and poor incentives is a significant barrier to improving food safety in developing nations. Therefore, the other services must also be highlighted by extension agents to farmers.

4.3 Estimated Profit Loss During MCO

During MCO, the connection between farm production and the final consumer has stopped due to the disruption of logistics services and restriction movement (Poudel *et al.*, 2020). Table 5 shows the estimated profit loss during MCO by farmers.

Most of the respondents lost RM5001 or more, with 173 respondents accounting for 34.4 percent of the total. Table 5 shows that vegetable producers in Peninsular Malaysia lost more than RM5000 of their earnings. Farmers depend on most of their income based on their profit. Because of MCO, their income has been disrupted and affecting their daily life spending. Covid-19 jeopardizes people's and institutions' economic well-being (Sneader & Singhal, 2020). The epidemic affects global health and threatens the global financial system. As a result, many economies are experiencing a slowdown (OECD, 2020).

Table 5. Estimated Profit Loss During MCO

Estimated Profit Loss During MCO	Frequency	Percentage (%)
RM0 – RM1000	82	16.3
RM1001 – RM2000	76	15.1
RM2001 – RM3000	54	10.7
RM3001 – RM4000	70	13.9
RM4001 – RM5000	48	9.5
RM5001 and more	173	34.4

(Source: Survey, 2020)

4.4 Level of Technology Skills, Implementation Skills, Leadership Skills, and Decision-Making Skills Towards Farmers' Readiness to Face Challenges Post-MCO

In this study, the first objective was to determine the level of technology, implementation, leadership, decision-making, and farmers' readiness to face challenges post-MCO. The overall mean of the farmers was categorized into three levels (low, moderate, and high).

Table 6. Level of skills by farmers

Variables	Mean	Levels	SD
Farmers Readiness	4.26	Medium	1.067
Technology skill	4.13	Medium	0.936
Implication skill	4.14	Medium	0.905
Leadership skill	4.47	High	0.903
Decision-making skill	4.34	High	0.945

*Level range: Low (1.00 – 2.669); Medium (2.68 – 4.339); High (4.34 – 6.00)

According to the rating in Table 6, (1-2.699) is low; (2.67-4.339) is moderate, and (4.34-6) is high as an indication of readiness. This indicates an acceptable level of respondents' perceptions about the contribution of the determinants of farmers' readiness. From the table, the farmers' scores on leadership and decision-making skill showed a high skill level. Otherwise, the readiness, technology, and implication levels were medium.

4.5 Relationship between Technology Skills, Implementation Skills, Leadership Skills, and Decision-Making Skills Towards Farmers' Readiness

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The correlation coefficient was used to associate technical skills, implementation skills, leadership skills, decision-making abilities, and farmer readiness.

Table 7. Relationship between Technology Skills, Implementation Skills, Leadership Skills, and Decision-Making Skills Towards Farmers' Readiness

		X1	X2	X3	X4	Y
X1	Technology Skills	1	.866**	.738**	.772**	.633**
X2	Implementation Skills		1	.774**	.819**	.668**
X3	Leadership Skills			1	.820**	.646**
X4	Decision-making Skills				1	.751**
Y	Farmers' Readiness					1

**. Correlation is significant at the 0.01 level (2-tailed).
(Source: Survey, 2020)

According to this study, technology, implementation, leadership, and decision-making abilities influence farmers' readiness to tackle post-MCO issues. In this study, all four talents are independent variables, and all four skills are necessary for farmers to become successful, productive, and educated. Table 7 shows that technological skills (r = 0.633), implementation skills (r = 0.668), leadership skills (r = 0.646), and decision-making abilities (r = 0.751) all have a positive correlation.

According to the findings, extension agents should be equipped with the necessary abilities to develop farmers' capability and potential efficiently and effectively. For example, research has provided evidence as Langemeier (2018) emphasized the necessity of implementing a technology suite that maximizes input efficiency, hiring consultants to help with challenging or complicated production issues, and establishing, monitoring, and benchmarking critical production efficiency measurements.

4.6 Regression Analysis for Farmers' Readiness to Face Challenges Post-MCO in Malaysia

The regression analysis has been conducted to determine the most vital variable influencing the dependent variable: farmers' readiness to face challenges post-MCO.

The estimated coefficient for the farmers' readiness model is shown in Table 8. The p-value obtained was 0.000, which was less than 0.05, as shown in Table 8. Decision-making is important with farmers' readiness to confront problems post-MCO, as shown in Table 8. Compared to other skills, decision-making has the highest Beta value of 0.586. As a result of the research, farmers' decision-making influences their readiness to handle issues post-MCO. Aside from that, farmers' readiness to tackle post-MCO difficulties was unaffected by technological abilities, implementation skills, or leadership skills. Because the p-value for these three skills is more than 0.05, this is the case. As a result, it does not contribute to farmers' readiness to address post-MCO difficulties.

Table 8. Regression Analysis for Farmers' Readiness to Face Challenges Post-MCO in Malaysia

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
(Constant)	.404	.162		2.489	.013
Technology	.068	.069	.059	.986	.325
Implementation	.126	.079	.107	1.584	.114
Leadership	.045	.064	.038	.708	.479
Decision-making	.662	.068	.586	9.797	**.000**

R= 0.758, R^2 = 0.574, Adjusted R^2 = 0.571, Std. Error of Estimate= 0.699
(Source: Survey, 2020)

4.7 Discussion

Based on the findings, vegetable farmers in Peninsular Malaysia said that decision-making was the sole skill related to their readiness to meet post-MCO difficulties. According to Ali *et al.* (2018), one of the most important skills for farmers is decision-making. Decision-making is a fundamental component of management, and hence decision-making skills demand farmers to think objectively and confidently to obtain better results (Kahan, 2008). Decision-making skill is the ability of farmers to think objectively and make the right decision with the confidence to achieve better performance.

Farmers need to acquire more knowledge and experience in managing a farm and challenges in agriculture to create excellent decisions to overcome problems. Demiryurek *et al.* (2008) stated that knowledge in agriculture is an essential factor in better agricultural management and allows farmers to make a good-decisions regarding the knowledge and information provided by extension agents, researchers, and others. While findings by Motolani *et al.* (2017) proved that decision-making skills are needed skills that are significant in human resource development skills. Thus, farmers need decision-making skills to improve farm performance and boost productivity.

To make the right decision, farmers must first know the technology skills they learn from extension agents before MCO. The capability and expertise of key decision-makers, typically farmers, have a substantial impact on farm economic success concerning technology adoption (Bock, 2004, Fernandez-Cornejo *et al.*, 2007). These skills apply to managing resources effectively and absorbing new technologies (Morris *et al.*, 2017). The analysis shows that the vegetable farmers are ready to decide on some farm activities. However, the farmers have realized that some actions need extra training and knowledge. The findings also indicated that vegetable farmers are trying their best to make decisions in difficult

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times to ensure their products can be marketed offline and online to survive post-MCO.

5. CONCLUSION AND RECOMMENDATIONS

This study showed that decision-making is the only significant factor contributing to farmers' readiness. They faced challenges in making the suitable and the best decision based on what they confronted. Thus, the study concluded that farmers had equipped themselves with the knowledge and skills to adapt to the challenges and make better decisions. To increase farmers' readiness, they must be prepared to make a decision that suits them most within the situation faced. Thus, short-term and long-term preparation must be planned in the decision-making process to empower farmers to be ready to face post-MCO challenges. In addition, they must be prepared to face any challenges and decide to solve problems independently, without assistance from others, particularly extension agents. As a result, even if communication or travel is restricted, farmers can continue to operate their farms normally and with minor problems. Consequently, agricultural practices will be more in line when farmers face obstacles from the post-MCO.

Long-term adaptations to a pandemic's influence on agriculture, such as advancements in technology and production facilities and marketing of agricultural food, must be prepared to limit the effects of COVID-19. Additionally, specific allocations during times of crisis, and a rise in the sensitivity of the initial risk preparation, will help farmers be better prepared to manage the risk and improve the networks of collaboration between farmers and wholesalers as well as between wholesalers and food manufacturers.

Regarding technology adaption, farmers, particularly those in horticulture and dairy products, need agricultural insurance for perishables losses (Bright, Kudzai & Ngavaite, 2021). Due to this, farmers will be able to stay afloat in the case of a pandemic. The government should invest in value-added equipment and infrastructure to maintain the value of perishables and extend their shelf life. According to Ali and Khan (2020), the government should continue to assist farmers in obtaining appropriate supplies of critical inputs; otherwise, the country will face COVID-19 and severe hunger. These supplies will help farmers continue the farm implementation during this time.

Limitations of the Study

The limitation of this study was that only vegetable farmers in Peninsular Malaysia were studied. In addition, the selection of vegetable farmers is also limited to the highest consumption per capita. Their technological abilities, implementation skills, leadership skills, decision-making skills, and readiness to meet post-MCO issues were assessed. An online survey was used as the study's first data collection tool. Most people who participated in the survey were elderly and technologically illiterate. Thus, family assistance is required for some of the respondents. However, the limitation has not been an excuse for this study to successfully generalize the population with high consumption of vegetables in Malaysia.

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