

EXPLORING THE COVID-19 PANDEMIC IMPACTS ON MALAYSIAN RURAL SMALLHOLDER FARMERS IN KUCHING, SARAWAK

Cheah WL¹, Myat SB¹, Wong AYW¹, Mohd Fauzi NFA¹, Hatity MS¹, Aseri AH¹, and Yeo ZS¹.

¹Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak.

Correspondence:

Cheah Whye Lian,
Department of Community Medicine and Public Health,
Faculty of Medicine and Health Sciences,
Universiti Malaysia Sarawak,
94300 Kota Samarahan, Sarawak.
E-mail: wlcheah@unimas.my

Abstract

The current study aims to explore the Coronavirus 2019 (COVID-19) pandemic impacts on Malaysian rural smallholder farmers in Kuching, Sarawak. Purposive sampling was employed and a qualitative descriptive approach was adopted. This study centred on a group of rural smallholder farmers actively participating in a food assistance programme for impoverished urban communities in Kuching. The farmers played a pivotal role in supplying vegetables and crops for the food assistance programme. The data were collected through semi-structured individual in-depth interviews. A thematic analysis was conducted, which revealed several major themes, namely the challenges encountered by smallholder farmers during the pandemic, the responses to the crisis, the recovery strategies, and subsequent plans. The current study not only enriched the understanding of the challenges encountered by rural smallholder farmers but also determined the underlying issues. The insights could serve as a foundation for developing specific solutions by relevant authorities to address rural smallholder farmers' respective needs.

Keywords: Smallholder Farmers, Challenges, Response, Recovery, Strategies

Introduction

The coronavirus disease 2019 (COVID-19) was first identified in Wuhan City (1). The first outbreak was declared on 31st December 2019, followed by the Public Health Emergency of the International Concern Declaration on 11th March (2). The first COVID-19 wave in Malaysia was imported cases from Chinese tourists. Various Movement Control Orders (MCOs) were announced throughout 2020 to control the spread. The strategies included wearing face masks, restricting movements, and halting non-essential economic sectors, which significantly impacted the economy when the MCO also prohibited travelling. Neither domestic nor international travel was allowed, which significantly restricted food supplies within Malaysia (3). Various economic sectors were also compelled to close, especially smallholder farmers who worked in the agricultural industry on small land and harvested a limited variety of food crops (4, 5). The farmers' income sources were negatively impacted, which elicited physical and psychological responses. Smallholder farmers responded by disposing of food stocks due to the inability to sell harvested crops as crops would wilt after being harvested (6). Moreover, certain farmers developed higher anxiety owing to losing significant crops, high uncertainty from multiple fake news, high loneliness levels, and insufficient

survival methods (7). Several farmers also resorted to suicide (8).

A total of 1,875,800 Malaysian agricultural farmers, including both commercial and smallholders (9), contributed 7.1% (RM 101.5 billion) to the gross domestic product (GDP) in 2019 (10). Previous studies revealed that the measures employed to control the pandemic, especially the MCO, negatively impacted farmers' lives directly and indirectly in terms of financial, physical, and mental health. The MCO engendered farmers different challenges, and farmers were required to develop corresponding strategies to ensure personal livelihood and survival. The Malaysian government allocated subsidies of a maximum of RM 4.4 billion in 2019 and increased to RM4.9 billion in 2020 to aid agricultural and agro-based farmers (11). Nonetheless, the subsidies could not be sustained and declined in 2021, wherein only RM 1.7 billion was allocated for farmers (12). Numerous smallholder farmers encountered various challenges, including issues related to control and exploitation, while endeavouring to maintain a steady income from product sales. The support to smallholder farmers is crucial due to the pivotal role in ensuring a consistent food supply for local communities. Consequently, a comprehensive understanding of smallholder farmers' needs and

encountered challenges is imperative while exploring the strategies employed to resolve the obstacles. This study seeks to explore the COVID-19 pandemic impact on Malaysian rural smallholder farmers in Kuching, Sarawak. A qualitative research design was implemented to provide deeper insights into the farmers' issues. The approach allowed for pinpointing the underlying factors, including local customs, cultural practices and beliefs, social norms, and environmental factors.

Materials and Methods

A qualitative research design, namely individual in-depth interviews, was employed. The seven participants were rural smallholders, who enrolled in a food assistance programme under the LIFESPANTREE (LST) initiative in Kuching. The initiative received support through the Yayasan Hasanah Special Grant HSG 2020-23. The primary objective was to provide canned nutritious and traditional dishes to urban B40 (bottom 40% of household incomes in Malaysia) families residing in Kuching. The families were identified and recruited by non-governmental organisations (NGOs) operating in economically disadvantaged urban areas of Kuching, such as the Society of Kuching Urban Poor (SKUP). The farmers were recruited based on specific criteria, namely land owners responsible for producing vegetables and crops, being actively involved in cultivating crops, and receiving consistent demands for produced vegetables and crops. The selected farmers would deliver vegetables and crops to the LST representatives for processing into canned goods. The sampling method employed was purposive sampling, which selected farmers fulfilling the criteria for participating in the food assistance programme.

To recruit the participants, the researchers contacted the LST representative to obtain a list of farmers enrolled in the food assistance program. The list allowed the researchers to contact the farmers via phone to schedule face-to-face interviews. The researchers provided information to assist the potential participants in performing an informed decision about whether to be interviewed during the initial contact. The information included details about the expected interview duration, the study purpose, the selection reason, and the interviewer. A structured interview guide based on the study objectives was developed. The interview guide comprises five stem questions adhering to the study purpose, namely exploring the COVID-19 pandemic challenges, determining smallholder farmers' psychological state, comprehending smallholder farmers' response to the pandemic, pinpointing the recovery method from the pandemic as food assistance programme participants, and understanding respective plans in surviving the pandemic through the food assistance programme. All interviews were conducted in Bahasa Malaysia, which was the participants' preferred language. Each session was between 30 minutes and one hour.

Several examples of research questions (RQ) in the interview guide are listed as follows:

RQ1: What are the farmers' backgrounds?

1. What is your background as a farmer?
2. How long has your farm been operating?
3. Is farming your family's only source of income?

RQ2: What were the challenges encountered by the farmers during the COVID-19 pandemic?

1. What were the challenging situations during the pandemic?
2. How did you feel when the pandemic struck?
3. What was your take on the governmental interventions in handling the pandemic?

RQ3: How did the farmers resolve the COVID-19 challenges?

- How did you respond to the challenges?
- How long did you take to adapt to the new norms and regulations?

RQ4: How did the farmers recover from the pandemic?

- What was the form of support that you requested to cope with the consequences of the outbreak?
- How did the food assistance programme help you throughout the pandemic?
- Did you get any support?

RQ5: Have the farmers developed plans and strategies for future endurance towards pandemics?

- Have you thought of any future plans?
- What are the strategies that you have in mind?

Two researchers participated in each interview, with one as the interviewer and another recording interview notes in addition to audio recording. The approach was employed to ensure all interview questions were answered and served as a backup for any malfunctioning recorders. Voice recordings were also obtained during the interview to capture all spontaneous details. Data saturation was reached by employing the CERQual approach [GRADE – Grading of Recommendations Assessment, Development, and Evaluation] (13, 14). Audio recordings were subsequently transcribed verbatim for analysis by the two researchers. The data analysis plan adhered to the qualitative data analytic framework developed by Braun et al. (15, 16), which consisted of the following steps, namely a) data familiarisation, b) generating initial codes, c) identifying themes, d) reviewing the themes, e) defining and labelling the themes, and f) producing a report. Nowell et al. (17) guidelines were employed to ensure the reliability of the data analysis.

The audio recordings and notes were transcribed and rigorously verified. The transcripts were perused multiple times by all researchers to generate initial codes and

identify themes through a data-driven approach. The qualitative data analysis was discussed extensively in two debriefing sessions to further refine the themes, establish coding labels and notes, and develop a comprehensive coding framework. The process of refining, applying, and refining the analytical framework was repeated until no alternative codes emerged. Simultaneously, notable and pertinent quotes were selected for reporting purposes. A final consensus was achieved among all researchers to ensure the validity and reliability of the data analysis.

Results

A total of seven participants, namely six females and one male aged between 47 and 74 years old (mean age = 59.14) were interviewed. The socio-demographic and farming profile is presented in Table 1. Table 2 depicts the themes with relevant anecdotes.

Table 1: Socio-demographic and farming profile of the participants (n = 7)

Profile	n (%)
Gender	
Male	1 (14.3)
Female	6 (85.7)
Age (year)	
< 60	3 (42.8)
≥ 60	4 (57.2)
Farm size (acre)	
≤ 3	(85.7)
> 3	1 (14.3)
Source of income	
Only farming	5 (71.4)
Farming and other side income	1 (14.3)
Farming and retirement money	1 (14.3)
Work management	
Working alone	3 (43.0)
Assisted by spouse	2 (28.5)
Assisted by spouse and hired workers	2 (28.5)
Total hour spent on farming	
< 10 hours per day	4 (57.1)
10 hours and above	2 (28.6)
No fix time	1 (14.3)
Estimated cost for farming (monthly)	
RM100 to RM500	5 (71.4)
> RM500*	2 (28.6)
Selling methods#	
At market	4 (21.1)
Street stall	4 (21.1)
Taking order	4 (21.1)

Table 1: Socio-demographic and farming profile of the participants (n = 7) (continued)

Profile	n (%)
Delivery	2 (10.5)
Request from neighbourhood	1 (5.2)
Wholesale selling to other farmers	1 (5.2)
Collected by factory	1 (5.2)
Online selling via WhatsApp	1 (5.2)
Types of crops	
Maise	6 (13.7)
Banana	4 (9.1)
Chilies, paddy	3 (6.8)
Cocoa, cucumber, pumkin, jackfruit, sour eggplant	2 (4.6)
Binjai ¹ , rambutan, palm, coconut, long bean, okra, bitter ground, papaya, pineapple, lemon, aubergine, Dayak cucumber, water spinach, sawi Dayak ² , spinach, sweat leaf, pepper, eggplant	

*RM = Ringgit Malaysia, 1 USD = RM4.3655; # multiple response

¹ Binjai or 'pokok keladi senduk' (*Limnocharis flava*) is a type of aquatic vegetable with hollow stem and triangular leaf.

² Sawi Dayak (*Brassica juncea*), commonly known as 'Ensabi' is a local mustard can be found in Sabah dan Sarawak.

Discussion

Theme 1: Challenges Encountered by Smallholder Farmers during the Pandemic

Sub-theme 1: Restrictions and lockdowns due to regulations

Smallholder farmers are a vulnerable group (18). The literature review discovered no differences between the challenges encountered by other smallholder farmers and the participants in this study (18-20). The reason could be due to all farmers encountering similar challenges during the pandemic and the MCO, which disrupted daily routines (18). The MCO was regarded as a significant challenge as the MCO disrupted farming and marketing activities. All participants expressed the inability to sell crops in the neighbourhood due to frequent police patrolling to enforce the MCO around the neighbourhood. Certain farmers also expressed dissatisfaction with restraining product selling on roadsides. Nonetheless, the farmers were required to adhere to the regulation as the farmers highly understood the pandemic risk. Changes in consumer behaviour also contributed to the decline in the food supply demand as consumers preferred to stay at home during the pandemic (21).

Sub-theme 2: Financial crisis due to the increased production cost, income, and wastage

Most participants delineated the increased stress when financial incomes drastically decreased and scarce financial

Table 2: Showing the themes, sub-themes and the anecdote

Theme	Sub-theme	Anecdote
Challenges faced by smallholder farmers during the COVID-19 pandemic	Restriction and lockdown due to regulations	<ul style="list-style-type: none"> • “I feel overwhelmed with regulations such as two persons per vehicles, and the need to apply for permit. Even the police sent drones to observe whether the people adhere to the regulation”- <i>Female, 52</i> • “Several regulations prevent me from working at my farm, it severely affects my daily income as I could not sell my crops. I feel like I am trapped in a jail because I couldn’t do anything, just sit at home” - <i>Female, 61</i> • “Opening market constraints makes it difficult for me to sell my crops. Even we are also prohibited from selling at the junction.” - <i>Female, 74</i> • “All of my friends including me were afraid to sell our crops from house to house as police continuously patrolling the villages. Certain regulations restrains us from selling our crops such as forced closure of market and unable to sell at the stall” - <i>Female, 47</i> • “I applied for permit from the police to send my harvested oil palm to factory. But I faced great loss on my harvested vegetables due to restriction in movement, so I could not go out and sell. We were also prohibited to sell at the stall junction” - <i>Female, 51</i> • “Police continuously patrolling the area, so I didn’t have the courage to go out and sell my crops to my other neighbor” - <i>Female, 60</i> • “Quarantine order restricts me from performing my normal task. As soon as I am recovered, the fruit season ended, so I am totally at loss” - <i>Female, 61</i>
	Financial crisis due to the rise in cost of production, loss of income and wastage	<ul style="list-style-type: none"> • “The price of the fertiliser has doubled from the previous year. I need to control the use of fertiliser, pesticides, and seeds because the price rose tremendously but luckily for paddy, the government provides incentives every year” - <i>Female, 52</i> • “If I have money, I will buy pesticides and fertiliser if not, I would not buy it. Even if the pesticides and fertiliser can be easily found, the rise in the price of these things really affects my financial.” - <i>Male, 69</i> • “As soon as pandemic struck, pesticides and fertiliser cost rose from RM 150 to RM 200. It has a while since I bought it” - <i>Female, 74</i> • “Some of the suppliers raise the cost without control” - <i>Female, 51</i> • “I am so stressed that the cost of fertiliser has increased from RM 100 to RM 200. I must limit my vegetable plantation because of it” - <i>Female, 60</i> • “I faced crisis in financial issues due to reduced daily income and unable to sell the crops” - <i>Female, 52</i> • “I need to ask for my children’s financial support when I do not have enough money” - <i>Male, 69</i> • “I faced many obstacles in terms of financial. My relatives and friends couldn’t help me financially, but I am very grateful that all of my children have already graduated from school” - <i>Female, 74</i> • “People thought oil palm plantation make me wealthy but in reality, I didn’t gain any profit from it due to sudden increase in cost of the pesticides and fertiliser” - <i>Female, 51</i> • “My daily income severely affected as I could not sell my crops” - <i>Female, 60</i> • “For banana and corn, I couldn’t arrange it time to ripe, but for ginger and pumpkin, I am able to manage and harvest it according to suitability to sell it. But for other crops abundances of it rotten and needed to throw away” - <i>Female, 52</i> • “Most of the crops have to be left rotten and thrown away as I could not get access to the market” - <i>Female, 74</i> • “My vegetables were all wilted, including my lemongrass. My corn was also aged, and not fresh anymore. I was very disappointed because I’ve used my fertilisers just for them to be wasted, I did not earn even a penny, I was helpless,” - <i>Female, 47</i>

Table 2: Showing the themes, sub-themes and the anecdote (continued)

Theme	Sub-theme	Anecdote
		<ul style="list-style-type: none"> • “Prior to lockdown announcement, lots of my vegetables were ready to be harvested, however, as soon as covid-19 struck this country, we could not sell it. So, we must leave it rotten and wilted” - <i>Female, 51</i> • “Harvested vegetables could not reach the market so we have to leave it rotten and thrown away” - <i>Female, 60</i> • “As we cannot sell the crops, it becomes more and more as time flows. My family couldn’t eat it all, we just gave it to others” - <i>Female, 74</i> • “Too many harvested vegetables that we just could not do anything” - <i>Female, 60</i>
Response to pandemic	Emotionally affected Due to movement restriction	<ul style="list-style-type: none"> • “I am really stressed out, I can just stare out the window and entertain myself with music. I also feel very confined,”-<i>female, 61</i> • “Being stressful is a given, I cannot even go anywhere when the pandemic struck,” -<i>female, 52</i> • “The government’s implementations are troubling, we need permit to go outside—which contributed to my sorrow and stressfulness during that time,” -<i>female, 52</i> • “I felt so much stress during the pandemic, it was difficult to reach customers due to the restrictions,” -<i>female, 74</i> • “Though I understood and accepted the situation, it was still shocking and it was sad, I was emotionally unstable,” -<i>female, 51</i> • “I am frustrated because when the pandemic first came, it was during Chinese New Year which was supposed to be the time to generate more income than usual,” -<i>female, 52</i> • “I could not sell my crops because the markets were closed down, it upset me,” -<i>female, 60</i>
	Adapting to the new norm	<ul style="list-style-type: none"> • “I took a long time to adapt with the situation,” -<i>male, 69</i> • “I took five months to adapt with the situation, one of the ways to adapt is that I changed my selling method,” -<i>female, 52</i> • “I took approximately one month to familiarise the new norm caused by the pandemic,” -<i>female, 61</i> • “It took me about five to six months to adapt to the new usual, I developed a new hobby—work on my plants at my house,” -<i>female, 74</i> • “It took me more than one month to adjust to the new situations,” -<i>female, 60</i> • “I took around nearly one month to adapt to the SOP and other restrictions,” -<i>female, 51</i> • “I did not take much time adapting to ‘being confined at home’ because I do not go outside too often,” -<i>female, 47</i> • “I would pay them (freelance farmers) RM80 per day if I cannot bear the workload sometimes,” -<i>female, 61</i> • “When it is time to harvest the paddy, I would call one or two people to help,” -<i>female, 74</i> • “It is to prevent ripen fruits/ vegetables from not getting harvested unnoticedly or from the yields to pile up, not sold,” -<i>female, 47</i> • “I sell them via WhatsApp,” -<i>female, 52.</i> • “I use WhatsApp to sell the unsold yields, to my friends and neighbors only,” -<i>female, 51.</i> • “I sell them to my friends and neighbors, and my husband would dispatch them,” -<i>female, 61.</i>
Recovery plans and strategies	Selling method	<ul style="list-style-type: none"> • “I change my method of selling from going to market to online. My niece and nephew help me by creating WhatsApp and join the groups for our area. So, I advertise my crops on WhatsApp and people can order them via WhatsApp or phone calls. We will send the order to customer using Waze.”- <i>female, 52</i> • “I used to sell online during pandemic but now once it is becoming better, I sell physically at the market too.”- <i>female, 47</i> • “I did not change any method of selling. I have stable income due to there are orders from customers.”- <i>female, 74</i> • “I achieve stable income right now as the market already open.”- <i>female, 51</i> • “As I can sell the crops as usual, I achieve stable income.”- <i>female, 60</i> • “I did not change my method of selling. I just wait for people’ request for my vegetables per usual.”- <i>male, 69</i>

Table 2: Showing the themes, sub-themes and the anecdote (continued)

Theme	Sub-theme	Anecdote
	Getting assistantship	<ul style="list-style-type: none"> • “I supply them vegetables like bamboo shoots,” -male, 69 • “I am one of the members of the food assistance program under Mr X. I supplied 3 times since November and this give me an opportunity to help besides stabilise my income.”- female, 52 • “I was under Puan Y for food assistance program. I supplied for Puan Y hence indirectly join the food assistance program. I was committed to join directly later which can cover my expenses as well.”- female, 74 • “I indirectly contacts and supply for Puan Y and Mr X. The food assistance program help me with my crops.”- female, 51 • “I am indirectly involve with the food assistance program with Puan Y and Mr X.”- female, 60 • “I have received Bantuan Khas Sarawakku Sayang (BKSS). I also received Bantuan Penjaja for RM2500. I received coffee plants from the government. Since I am Ahli Jemaah Pengarah Peladang, I received pesticides and fertilisers from the government.”-female, 52 • “I received BKSS (Bantuan Khas Sarawakku Sayang). I have applied for other schemes but gotten no response from the organisations even with all the complicated procedure. The government supply me pesticides and fertilisers for paddy once a year.” -female, 61 • “I received BKSS for RM 250 3x per year. I applied for Bantuan Penjaja but was rejected. I also received bantuan bakul makanan during lockdown.” -female, 74 • “I received incentives (Sarawak Pay)—RM1500 for once. I have submitted the ‘Borang Kaum Peladang’ form for pesticides, machines, and fertilisers.” -female, 47 • “The market seller receives a support including Puan Leba. I also received BKSS to support the financial.” -female, 60
Future plan	Upgrading farming method	<ul style="list-style-type: none"> • I have the intention to widen the farm and ask people to work for me but I doubt for it as I already old – Female, 74 • I wish to expand the guava crops as it is one of the primary sources of income – Female, 61 • It would be great if there is a factory that need my guava supply, hence I would not need to wait for buyers- Female, 61 • If possible, I want to have my own lorry so that it’s easy to send the palm to the factory without renting from other company. – Female, 51 • Perhaps to have excavator to make the crop border. – Female, 52 • I have another land that even wider so want to expand my crops there. – Female, 52 • I learned to use the old tyre to make the crops barrier to avoid from high tide – Female, 74 • I learned to sell the crops online during the pandemic – Female, 47 • I want to find co-workers to help me with the farm – Female, 52 • I would like to hire new workers to help with the jobs at the farm – Female, 47 • I wish to have more co-workers to help me with palm – Female, 51 • I learned the online business method to help me with my crops and this help me to sell my crops. – Female, 52 • I don’t learned anything from the pandemic and just accept what had happened – female, 60 • Since I live in village hence, I don’t feel anything – Male, 69 • What am I am doing right now is the best that I can do with my current abilities hence I don’t have any specific strategies – male, 69 • I don’t have future strategies and future plan hence I will proceed with what I have right now – female, 60 • I don’t have any intention to join any other food assistance program as I don’t think I can make it – Female, 74 • I am not really sure to join any other food assistance program as my schedule is pack– Female, 47
	Joining other food assistance programme	<ul style="list-style-type: none"> • I would like to have other food assistance program as well if there is chance – Female, 51 • I want to have other food assistance program if there is any – Female, 52 • I wish to join more food assistance program if there is any – Female, 61 • I have to be independent and adapt with every change that will occur – Female, 51

savings to support the family. The participants described that the significantly increased input price contributed to financial challenges. Certain farmers were compelled to either reduce plantations or usage of the inputs. The situation was aggravated when the farmers could not sell crops, which resulted in squandering the input usage. Resultantly, the farmers felt high levels of grief, depression, and anxiety about the future. The issues were also prevalent across the globe (18). Nevertheless, certain farmers in other countries described low difficulties in selling crops owing to more relaxed containment measures implemented by the governments (19). Meanwhile, several participants expressed high restlessness when the farmers entirely depended on farming activities for household income. An abundance of crops was left to rot, wilt, and disposed of due to the prohibited access to the market, which was a dilemma among smallholder farmers.

Theme 2: Responses to the Pandemic

Sub-theme 1: Emotionally impacted due to movement restriction

Participants elucidated personal responses to the pandemic as smallholder farmers. The responses encompassed both mental and physical aspects. According to Haleem et al. (22), the pandemic outbreak negatively and extensively impacted daily life, in which the impact could be categorised into healthcare, economic, and social. A significant decrease in revenue growth and prolonged stress were also observed. As such, smallholder farmers' economic and social aspects were significantly impacted. Three main themes were identified, namely emotional impacts, adapting to different norms, and resolving arising issues. Most participants encountered emotional changes when experiencing stress and frustration due to the pandemic. The participants portrayed high discontentment with the strict movement restrictions imposed by the government. The participants were confined and forbidden from working on farms. Limited social life was also detrimental to mental health as individuals yearned for interactions with fellow workers (23). The participants also expressed that prohibited commercial activities for crops led to decreased household income.

Sub-theme 2: Adapting to different norms

The participants required time to adapt to the different norms during the pandemic. Corpuz (24) explicated that the phrase 'new norm' was employed during the COVID-19 pandemic due to significant impacts on several daily routines. No movements in public areas were allowed and the participants could not visit respective farms. The farmers could also not sell harvested crops at the market as premises were compelled to be closed down. Hence, the participants required more time and space to adjust to the different situations. The fear and worry of psychological trauma caused by the pandemic persisted despite the situation improved after the pandemic (25). Moreover, the farmers were required to resolve various pandemic issues. The unattended farm resulted in accumulated

workloads, wherein usual methods were altered to resolve the issue. Certain farmers hired additional workers to assist with the increased workload while other farmers altered the crop-selling methods. According to Fei et al. (26), consumers developed habits of ordering fresh food online and utilising immediate deliveries to homes. Smallholder farmers commenced employing online platforms, such as WhatsApp, to receive orders and directly deliver fresh produce to customers' houses to suit consumers' preferences. Both parties benefited from online platforms when the previous purchase method of fresh produce was changed.

Theme 3: Recovery Plans and Strategies

Sub-theme 1: Selling methods

This study determined participants' recovery methods from the COVID-19 pandemic to minimise the negative pandemic impacts. The COVID-19 pandemic engendered agricultural product markets to stagnate as movement restrictions prevented farmers from travelling to the marketplace to sell harvested products. Accordingly, the participants shifted to e-commerce platforms as e-commerce platforms elevated market efficiency in the agricultural value chains and improved farmers' livelihood. One participant utilised WhatsApp to advertise agricultural products and the customers could order through WhatsApp and phone calls. The participant delivered orders to customers through Waze, which was a navigational application (app). In addition, most participants did not change the current selling method after achieving stable income as certain regular customers were accustomed to online ordering. The farmers also preferred long-term sustainability over higher income.

Sub-theme 2: Requesting assistance

Smallholder farmers play a key role in the food supply chain, which calls for an urgent need for assistance and synergistic support through various collaborations among institutions and organisations (27). Moreover, most participants participated in the food assistance programme and received assistance from the government and NGOs to maintain livelihood. The participants received assistance from Bantuan Khas Sarawakku Sayang (BKSS), which was established for individuals aged 21 years old and above with a monthly income below RM2000. Subsidies and incentives were essential as COVID-19 lockdowns associated with movement restrictions significantly reduced crop yields and personal livelihood. Subsequently, the poverty level in rural farming systems was exacerbated. The assistance from the government and NGOs assisted in resolving the farmers' economic crisis. The participants also received fertilisers and pesticides from the government as the MCO disrupted access to various agricultural inputs, including seeds, fertilisers, and herbicides essential during pre- and post-planting periods. Limited access to agricultural inputs caused low crop yields during the COVID-19 pandemic. Furthermore, the food assistance programme assisted the smallholder farmers in stabilising monthly household

income and maintaining personal livelihood by supplying crops through the programme.

Theme 4: Future Plans

Sub-theme 1: Upgrading farming methods

The participants intended to upgrade the farming quality by increasing the farm size, expanding marketing strategies, employing machinery, recruiting additional workers, and modifying farming approaches. Expanding the crops was the main intention as the farmers possessed additional land, which could increase crop production as a primary income source. The workload could increase as most participants worked independently, in which recruiting additional workers could resolve the challenge. Hurst (28) discussed that the workforce would be increased significantly, especially during harvesting and the end of the season. Recruiting additional workers could reduce smallholder farmers' workloads and farming hours. Meanwhile, machinery, such as lorries and excavators, became a primary choice to establish the crop border and deliver harvested crops to the factory. Machinery was observed to improve farming efficiency by reducing existing workloads (29). Certain participants reused the recycled tyres for farming modification. The recycled tyres were employed as crop borders to prevent high tide. In addition, the farmers planned to expand current marketing strategies by leveraging online platforms for efficient advertisement of harvested crops and swift ordering. Summarily, upgrading the farming quality could lead to increased crop production, systematic management, and improved product quality (30).

Sub-theme 2: Participating in other food assistance programme

The farmers intended to participate in other food assistance programmes, which provided opportunities to increase food accessibility and improve health quality when the community could access nutritional food (31). While most participants were eager for future planning, certain respondents remained conservative and comfortable with the current condition due to ageing and limited capabilities. Brown et al. (32) concluded that older farmers were less inclined to be productive by highly exploring land usage. The farmers also preferred to be self-reliant. Summarily, the participants were required to adapt to the three pandemic impacts, namely economic, social, and association (33). Nevertheless, the current study contained several limitations. Specifically, the responses acquired from the participants could be influenced by emotions. Response bias might arise as the participants could anticipate the researchers' desired answers for social desirability. Moreover, the farmers in the current study expressed different perspectives, which might not apply to other farmers.

Conclusion

This study demonstrated that most participants were similarly impacted by the COVID-19 pandemic and developed negative psychological responses during the quarantine period. The circumstance was highly challenging to the participants in terms of the daily farming routine, although restrictions and lockdowns could contain the virus. The restriction measures prohibited farmers' market access, which compelled the farmers to discard harvested crops and rotten products and created a dilemma. The significantly increased input price also led the farmers to encounter financial crises when farming was the primary household income source. Most participants experienced high levels of stress and frustration apart from dissatisfaction and a lack of freedom for social life. The participants also required more time to adapt to the different norms that significantly impacted the daily routines before the pandemic. The farmers resolved various pandemic challenges by employing additional workers and utilising online platforms to sell crops and improve marketing strategies. The government and NGOs also assisted the farmers in recovering by providing subsidies and incentives. Furthermore, most participants intended to upgrade the farming quality and participate in other food assistance programmes. Certain farmers preferred to maintain the current circumstances and adapt to every change. The findings were consistent among the participants despite this study being conducted in terms of face-to-face in-depth interviews, which indicated high data reliability.

Acknowledgement

The researchers would like to extend a deep gratitude to all study participants, especially to the individuals assisting in arranging with the farmers for the interview.

Competing interest

None

Ethical Clearance

Ethical approval was acquired from the UNIMAS Medical Ethics Committee for this study, reference number: FME/22/05.

Financial support

No funding was received for the current study.

References

1. Cennimo DJ. Coronavirus Disease 2019 (COVID-19). 2021. Available at: <https://emedicine.medscape.com/article/2500114-overview#a1>. Accessed 30 June 2022.

2. World Health Organization. Archived: WHO Timeline – COVID-19. 2020. Available at: <https://www.who.int/news/item/27-04-2020-who-timeline---covid-19>. Accessed 30 June 2022.
3. Fan V, Cheong R. MCO, CMCO, RMCO, CMCO Again: Regulations and SOPs. MahWengKwai & Associates. 2020. Available at: <https://mahwengkwai.com/mco-cmco-rmco-regulations-sops/>. Accessed 30 June 2022.
4. Nyambo DG, Luhanga ET, Yonah ZQ. A review of characterization approaches for smallholder farmers: Towards predictive farm typologies. *Sci World J*. 2019 May 22; 2019:6121467.
5. Tang KHD. Movement control as an effective measure against COVID-19 spread in Malaysia: an overview. *Z Gesundh Wiss*. 2022; 30(3):583-6.
6. Hassan H, Leong T. Coronavirus: Farmers dump their stock after police impose restrictions at wholesale market. 2020. *The Straits Times*. Available at: <https://www.straitstimes.com/asia/se-asia/coronavirus-farmers-dump-their-stock-after-police-impose-restrictions-at-wholesale>. Accessed 27 July 2022.
7. Kusumawati RN, Wardani KK, Sunturo S. The psychological states of farmers in the agricultural cultivation of food crops during the COVID-19 pandemic in Java, Indonesia. *Caraka Tani: J Sustain Agri*. 2020; 36(1):61-5.
8. Timisilna B, Adhikari N, Kafle S, Paudel S, Poudel S, Gautam D. Addressing impact of COVID-19 post-pandemic on farming and agricultural deeds. *Asian J Adv Res*. 2020; 11(4):28-36.
9. Ministry of Human Resources. Statistics of employment and labour. *Jabatan Percetakan Negara*. 2021. Accessed 22 June 2022.
10. Department of Statistics Malaysia Official Portal. Selected Agricultural Indicators, Malaysia, 2020. Accessed 22 June 2022
11. New Strait Times. 2020 Budget: More funds for rice farmers, cash crops to supplement income. *New Strait Times*, October 11. 2019. Available at: <https://www.nst.com.my/news/government-public-policy/2019/10/529000/2020-budget-more-funds-rice-farmers-cash-crops>. Accessed 22 August 2022.
12. Bernama. Budget 2021: RM 1.7 billion subsidies to assist farmers, fishermen – Tengku Zafrul. 2020. *BERNAMA.com*, November 6 2020. Available at: https://bernama.com/en/business/news_penjana.php?id=1897981. Accessed 24 August 2022.
13. Faulkner SL, Trotter SP. Data Saturation. *The International Encyclopedia of Communication Research Methods*. 2017.
14. Glenton C, Carlsen B, Lewin S, Munthe-Kaas H, Colvin CJ, Tunçalp O, Bohren MA, Noyes J, Booth A, Garside R. Applying GRADE-CERQual to qualitative evidence synthesis findings – paper 5: How to assess adequacy of data. *Implementation Science*. 2018; 13(1):14.
15. Braun V, Clarke V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*. 2006; 3:77–101.
16. Braun V, Clarke V, Weate P. Using thematic analysis in sport and exercise research. In: Smith B, Sparkes AC, eds. *Routledge handbook of qualitative research in sport and exercise*. London: Taylor & Francis (Routledge). 2016: 191-205.
17. Nowell LS, Norris JM, White DE, Moules NJ. Thematic analysis: Striving to meet the trustworthiness criteria. *Inter J Qual Methods*. 2017; 16(1):1-13.
18. Sapbamrer R, Chittrakul ., Sirikul W, Kitro A, Chaiut W, Panya P, Hongsihsong S. Impact of COVID-19 Pandemic on Daily Lives, Agricultural Working Lives, and Mental Health of Farmers in Northern Thailand. *Sustainability*. 2022; 14(3):1189.
19. Hammond J, Siegal K, Milner D, Elimu E, Vail T, Cathala P, Gatera A, *et al*. Perceived effects of COVID-19 restrictions on smallholder farmers: Evidence from seven lower- and middle-income countries. *Agric Syst*. 2022 Apr; 198:103367.
20. Thang TC, Trang TTT, Linh NTH, Thuy NT. Impacts of COVID-19 Pandemic on Smallholder Farmers and Vulnerable Rural People in Vietnam. *FFTC journal of agricultural policy*. 2021; 2:24-31.
21. Lioutas ED, Charatsari C. Enhancing the ability of agriculture to cope with the major crisis or disaster: What the experience of COVID-19 teaches us. *Elsevier*. 2021; 187(103023):1-5.
22. Haleem A, Javaid M, Vaishya R. Effects of COVID-19 pandemic in daily life. *Curr Med Res Pract*. 2020; 10(2):78–9.
23. Hraszkova D, Rolkova M. Teleworking—a flexible conception of managing the enterprise. In *Proceedings of the 2nd International Scientific Conference Whither Our Economie*, Mykolas Romeris University, Vilnius, Lithuania. 2012; 39:1-322.
24. Corpuz JCG. Adapting to the culture of ‘new normal’: an emerging response to COVID-19. *J Public Health*. 2021; 43(2):e344–5.
25. Xie Y, Sarkar A, Hossain MS, Hasan AK, Xia X. Determinants of farmers’ confidence in agricultural production recovery during the early phases of the COVID-19 pandemic in China. *Agriculture*. 2021; 11(11):1075.
26. Fei S, Ni J, Santini G. Local food systems and COVID-19: an insight from China. *Resour Conserv Recycl*. 2020; 162:105022
27. Mthembu BE, Mkhize X, Arthur GD. Effects of COVID-19 Pandemic on Agricultural Food Production among Smallholder Farmers in Northern Drakensberg Areas of Bergville, South Africa. *Agronomy* 2022; 12(2):531.
28. Hurst P. Agricultural workers and their contribution to sustainable agriculture and rural development. 2007. *International Labour Office*. Available at: https://www.ilo.org/wcmsp5/groups/public/@ed_dialogue/@actrav/documents/publication/wcms_113732.pdf. Accessed 19 June 2022.
29. Bhattarai M, Singh G, Takeshima H, Shekhawat RS. Farm machinery use and agricultural industries in India: Status, evolution, Implications and lessons

- learned. International Food Policy Research Institute Discussion Paper. 2018. Available at: <https://ssrn.com/abstract=3239587>. Accessed 27 July 2022.
30. Shock CC, Shock CB. Research, extension, and good farming practices improve water quality and productivity. *J Integ Agric*. 2012; 11(1):14-30.
 31. Jones P, Bhatia R. Supporting equitable food system through food assistance at farmers' markets. *Am J Public Health*. 2011; 101(5):781-3.
 32. Brown P, Daigneault A, Dawson J. Age, values, farming objectives, past management decisions, and future intentions in New Zealand agriculture. *J Environ*. 2019; 231:110-20.
 33. Menon A, Schidmt-Vogt D. Effects of the COVID-19 pandemic on farmers and their responses: A study of three farming systems in Kerala, South India. *Land*. 2022; 11(1):144.