

THE FACTORS AFFECTING FOOD SECURITY IN
MALAYSIA

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The Factors Affecting Food Security in Malaysia

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A square image showing a handwritten signature in black ink on a light-colored background. The signature is cursive and appears to be 'Lim Kiang Ping'.

Date : 9 August 2023

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LIST OF ABBREVIATIONS

CUOFS : Conceptual Understanding of Food Security

TFVCM : Total Food Value Chain Management

LFP : Local Food Production

FSIM : Food Security in Malaysia

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ABSTRACT

Food costs have risen in the present economy and the Ukraine war has created a worldwide food security issue that also affected Malaysia. Therefore, the objective of this study is to examine whether the conceptual understanding of the food security concept, total food value chain management and local food production have the significant effect on the food security in Malaysia. This study utilised a quantitative method by collecting the data from 302 respondents over the questionnaire questions. The result from this study show there was correlation and significant impact of local food production towards the food security in Malaysia but another two variables, conceptual understanding of the food security and total food value chain management have only correlation but not significant relationship with the food security in Malaysia. These findings were valuable to both theory and practise, as well as having significant implications for academics, policy makers and all the relevant parties that involved in the agriculture sector in Malaysia.

Chapter 1: Introduction

1.0 Introduction

Food security is a crucial issue in Malaysia, to identify factors affecting the food security in Malaysia is the main purpose for this study. This chapter will explain the study's framework and further describes the field of food security in Malaysia. Through the details research on the current scenario in this country, this research was constructed in order to achieve the research's objectives, and providing an insight of the food security issue in Malaysia.

1.1 Research background

Agriculture is an important industry for a country as the industry produces the food to feed the people. Only with the adequate food supply in the country, the government can pay attention to other aspects, otherwise it will be a disaster for a country. This was shown clearly during the pandemic period where all the countries were trying hard to make sure there was enough food supply and guarantee the food supply is in the correct order, otherwise it will cause the panic in the public and further worsen the condition. The government must comprehend the notion of food security, total food value chain management, and the food production process to solve the food security issue as well as to ensure there is enough food supply for the nation. The whole process from the seed for farmers planting to the fresh produce to the end users' table, then only can formulate the good strategies to overcome the food crisis.

According to the Agricultural Price Index, food prices were 19% higher in 15th July 2022 compared to January 2021, same happened to the maize price that was 15% higher and the wheat was 24% higher in the same period. These data shown the global scenario where the food security issue is happening in everywhere, especially for the country like Malaysia where we import 100% for the maize and wheat for both feed ad food. Due to these events, food security in Malaysia is of great importance to be discussed especially during the global food security crisis that has recently alarmed all countries to achieve self-sufficiency.

There are many definitions to food security. One of the definitions are measurement for food availability, stability, accessibility, and utilization (Chua et al., 2015). However, a useful food security working definition that is officially recognized is when everyone has access to food that they are contented and food inclination that could help them obtain an active and healthy lifestyle, irrespective of time (FAO, 2003).

Malaysian government has introduced several short- and long-term strategies to secure food availability for country under the National Food Security Policy (Tey, 2010). These strategies are of utmost important as our country is still importing about 60% of our food (Dermawan, 2022) and this have been in Table 1.1 which clearly showed the percentage of current production that meet domestic requirement in Malaysia.

Table 1.1: Percentage of current production that meets domestic requirement

Commodity	Production that meets domestic requirement (%)
Rice	70
Vegetables	44
Fruit	78
Liquid milk	63
Beef production	22
Poultry meat, eggs, fish and pork	90
Chili	31
Round cabbage	37
Sweet potato	75
Coconut	34

Source: Nair, 2022

According to Chin (2020), total food value chain management is among the main contributors to ensure the success of the food security program. According to FAO et al. (2022), food value chain includes those involved not only in production but also value adding activities to make an edible product. This means the total food value chain management will include the farm production, trade, and logistic until the product reaches the customer (Zainol et al. 2018). According to Chua et al. (2015), this includes having the seeds, planting, processing, and distribution. Therefore, a good total food value chain management system will determine the success of implementing the food security strategies.

Other than that, the local food production is another key component to determine the successful and continuous with the food supply in a country. Besides importing the food from other country, the local food production is the direct, easy and fast way of obtaining the food. Even though Singapore can import the food from most of the neighbouring countries but the disruption of the logistic by the pandemic caused the Singapore government to review their food security strategy and introduce a program called, 30 by 30, to produce 30% of their nutritional needs by 2030 through a lot of research and development and provide funding for the company that involved highlighted the important of the local food production. These initiatives from the Singapore government highlight the importance of local food production over the food security issue.

1.2 Problem statement

Food costs have risen in the present economy, and the Ukraine war has caused a worldwide food security problem that has affected Malaysia. This is not a new issue in Malaysia but there is no proper addressing the issue and effective solution to solve the issue for a long time. By understanding the food security concept and its correlation with the total food value chain management and local food production, it helps those involved in the industry able to identify of the root cause of the issue and hence able to come out a solution to the issue that we are facing in Malaysia.

Food security has been a very important issue to be debated especially during the food crisis which is happening globally. Despite Malaysia having over 700,000 hectares of land, the country is still unable to meet the domestic requirements. Due to this, several government agencies had introduced a number of short- and long-terms strategies to achieve the food

security but still lack behind from the target. The main reason of the failure for the past initiatives from the government was most of the relevant parties are still unclear about the food security and its definition and hence failed to achieve the food security objective. Without the fully understanding the food security concept, it is impossible for the policy makers to come out strategies and policies to solve the food security issue from the root cause

In ensuring that food is delivered to the consumers in an orderly way, it is important that the total food value chain is being managed. According to Yadav (2021), the total food value chain management refers to the fresh produce from the production site and delivery to the point of utilization through a series of stages. Being the main contributor for the food security, total food value chain management consists of farm production, logistic management, and marketing – from farm to table. However, there are many barriers that impede the total food value chain management such as training and preparedness, shortfall of supply chain visibility, insufficient knowledge, and many others (Mat Radzi, Saidon & Ab Ghani, 2015). Therefore, there is a need to fully understand the total food value chain management and its relationship with the food security.

Local food production process involves seeds, planting, and harvesting (Chua, 2016). In Malaysia, the imbalance between demand and supply has put a pressure in food prices that cause the hungry to be hungrier and poor to be poorer, especially for low-income family. Thus, strategies are needed to make sure that the production side can overcome the challenge of increasing demand and more sustainable. It is critical to emphasis these issues in the food production process and understand its relationship with the food security.

1.3 Research objective

- i. To examine the relationship between understanding of the food security concept on food security in Malaysia.
- ii. To examine the relationship between total food value chain management on food security in Malaysia.
- iii. To examine the relationship between local food production on food security in Malaysia.

1.4 Research questions

- i. Is there any correlation between conceptual understanding of food security concept on food security in Malaysia?
- ii. Is there any correlation between total food value chain management on food security in Malaysia?
- iii. Is there any correlation between local food production on food security in Malaysia?

1.5 Significant of study

Food security is a serious issue to be addressed, especially like Malaysia where we highly depend on the food import from other countries. The whole food supply chain is fragile and the issue was highlighted when the pandemic outbreak and the Ukraine war.

Through the understanding of the food security concept, it helps policy makers to identify the issue from the root cause and figure out an effective and long-term solutions to solve the issue. Most of the time we have the new policy from government is only address the current issue that we facing without consider the root cause of the issue. For instance, the government set the ceiling price for the chicken meat due to the shortage in the market but this is not the solution to solve the actual shortage issue in the market but only push the responsibility to the poultry farmers that are suffering from the high input cost. This kind of solution can only solve the issue temporarily and once we have another pandemic or war disruption, the same issue will happen again.

This study not only contribute to the literature of food security under Malaysian context but also to clearly define the food security concept and help to understand the whole scenario better. This can help policy makers to understand the food security concept and come up the policy that can benefits the whole industry and also the country to reduce the food bill.

1.6 Definition of term

- a) **Food Security:** Food security include four elements which are food availability, food accessibility, food stability, and food utility (FAO, 2006). Meanwhile, it is linked to the food supply sustainability to meet the food demand (Zainol et al. 2018)

- b) **Total Food Value Chain Management:** It refers to the agriculture product from the production site and distribution to the point of utilization through a series of stages (Yadav, 2021). It involves few parties including farmer, processors, distributors, and consumer (Deloitte, 2013).

- c) **Food Production:** According to Kaplinsky and Morris (2002), Food production is part in the TFVCM and it involve from seed until production. Seed is one of most important part in ensure food production consistently supply to consumer. (Chin, 2020).

Chapter 2: Literature review

2.0 Introduction

Previous researches were reviewed on all the topics related to this study, including the conceptual understanding of food security, total food value chain management, local food production and food security in Malaysia. This chapter will explore the definition used and how it is related to one and another. It introduces the case study's framework that comprises the main focus of the research in this thesis.

2.1 Conceptual understanding of food security

Food and Agriculture Organization (FAO) in 1983 (FAO, 2006) defined the food security concept as that everyone always has constant access to food that they require on a physical and financial level. However, in the World Food Summit 1996, the definition was revised to include accessibility to wholesome food that matches the nutritional requirements and personal food choice for a healthy and balanced lifestyle. In later definition by Dardak (2020), he measured food security as the constant supply of food to people, irrespective of natural disasters like earthquakes, floods, pandemics, and others. Besides, there are four main points that derived from these definitions, that are food availability, food accessibility, food utilization and food stability (FAO, 2006).

Food availability – Adequate amounts of food in acceptable quality, no matter it is imported or produced locally that is available (FAO, 2006). However, the food is available but does not mean the food is accessible. Food may be available globally but not share to everyone equitable. Even within the same country, the different households and individuals have different level of the food availability that might due to many reasons like the infrastructures, education level, geographical limitation and so on. Even though the food availability is crucial to food security, but it is not the only component (Inegbedion, 2021).

Food accessibility – There is adequate amount of funds available to purchase proper food for a healthy and balanced nutrient. Entitlements are the collection of all commodity bundles where the person have the authority according to the economic, legal, political, and social framework of the community (FAO, 2006). One of the major causes for the long-term failure in the food security is the development failures, but it does not mean the under developed regions do not have the channel for obtaining food from global markets. In fact, the main cause for the failure in food accessibility is the poverty, where the poor do not have resources to allow them to obtain to the required food even though the local or regional markets are selling the food. In short, the development failures that cause the poverty is the root cause of the population fails to access for the food (Inegbedion, 2021).

Food utilization – To achieve nutritional wellbeing through the food, where all the physiological needs are fulfilled by a sufficient diet, clean water, sanitation, and health care (FAO, 2006). There is a recommended intake of between 2,500 and 3,400 Kcal of energy and between 65-86gm of crude proteins per person in a day to ensure a healthy living. However, many underdeveloped countries have the energy intake are far below than the recommended

quantity and some even with the deficiency symptoms, especially on the vitamins and minerals (Inegbedion, 2021).

Food stability – Only all persons are able to access to enough food at all time, it is considered as food secure. They should not be exposed under the risk of being without adequate food, no matter any cyclical changes or unexpected shocks. Therefore, the food availability and food accessibility aspects of food security can both be referred as food stability (FAO, 2006).

From all the definitions explored above, Chin (2020) has the definition which is the most accurate to the current pandemic situation. A combined report by International Fund for Agricultural Development (IFAD), UNICEF, FAO, World Food Programme (WFP) and World Health Organization (WHO) (2022), showed there are approximately 828 million people in 2021 were in hunger condition, an increase of 46 million people compared to 2020. Additionally, the report also projected that there will be 670 million people still having the same issue, the hunger in year 2030, as consideration of global economic recovery. This scenario is made worse during the pandemic and Ukraine war, which involves two main global producers of staple cereals, oilseeds and fertilizer. Owing to the COVID-19 pandemic, the world economy was negatively impacted and billions of monies were used to contain it resulting in a rise in food prices. As a consequence, approximately 3.1 billion people could not manage to have a healthy and balanced diet in 2020.

Food security is the continuous supply of the food to fulfill the increasing food demand (Zainol et al. 2018), but the pandemic and ongoing war have disrupted the supply chain. For example, since Ukraine is the global producer for grain, fertilizer, energy and food for malnourish children, the war in the country has cause a disruption in the international supply chain, consequently pushing up the prices for those commodities. Additionally, owing to the pandemic outbreak, the delivery of the food and the supply chain system in the whole world were disturbed that cause the fresh produce was not able to deliver out and hence the prices of farm products to collapse. According to Rasul (2016), several grain-exporting countries restrain the export, consequently disrupting the global trade and reduced the international food market's confidence and hence, caused the food insecurity. South Asia is affected the most because most of their agricultural activities lacked mechanization usage and depended a lot on labor. The labor shortage issue during the Covid-19 pandemic is mainly caused by the restricted movement between and within the country, as well as the disruption of global supply chain system (Poo, 2022; Reuters, 2022). These disturbances have transformed agricultural activities like farming activity, production and also supply chains system that involves marketing, transportation, distribution, and consumption of agricultural goods in South Asia (Rasul, 2020).

2.2 Total food value chain management (TFVCM)

In ensuring that food is delivered to the consumers in an orderly way, it is important that the total food value chain is being managed. According to Yadav (2021), the TFVCM refers to the agricultural produce being produced from the production site and delivered to the point of utilization through a series of procedures. However, according to Deloitte (2013), TFVCM includes (1) the producers or farmers; (2) the processors (primary and value added); (3) the distributors (wholesalers and retailers); (4) the consumers; and (5) government, non-governmental organizations (NGOs), and regulators. Another definition from Marsden et al. (2000) and Blandon et al. (2009) is that TFVCM represents a series of activities from production, processing, distribution and consumption while keeping the food in safe condition while maintaining its quality. According to Kaplinsky and Morris (2002), it can also be defined as the required activities to drive a product from conception to farm production, delivery of the product to wholesales for distribution, reaching to customers through the local reseller, and final disposal after usage. In order to bring food commodities to consumers, processes like farm production, commerce, and supporting system are involved.

There are many different supply chains worldwide. The differences between TFVCM and other supply systems are the importance of maintaining the product quality and freshness within a short period of time given, hence the complexity and difficulty to control and handle (La Scalia et al., 2016). Perishable products have a relatively short shelf life that causes them to be difficult to handle, especially when transportation and storage are limited and problematic. Therefore, it is vital to have the resources and facilities like transport vehicles with chillers, proper storage facilities, well-planned transportation routes and experienced human capital in the food supply chain are critical to ensure food quality and safety (Wu et al., 2016).

2.3 Local food production

Within the TFVCM, the main component is in the food production to ensure consistent food supply to the nation. The unsustainable agriculture and flawed food safety policies in Malaysia should be reviewed by the government to prevent inconsistent food supply that will have the negative impact to the whole nation. Malaysia is a country that highly depends in importing of food like wheat, onion, cabbage, rice and potato. During the economic crisis in 1997 that affected Malaysia seriously, it caused the Malaysian currency dropped dramatically against the US dollar. It was a nightmare for Malaysia because of the weak performance of the currency, all the imported food, feed for livestock, fertilizers, seeds and pesticides became expensive (Razak, et al 2013). The same issue is happening again recently when we have the global climate changes, the outbreak of the COVID-19 pandemic as well as the ongoing Ukraine war, the food supply in Malaysia is facing disruptions and cause the food prices increase. One of the ways to ensure the continuous food supply with less price fluctuation is through the local food production.

Two types of agriculture can be found in Malaysia which are for plantation and food production. Malaysia has been doing fairly well in terms of plantation, with the palm oil exports value approximately RM90 billion annually (Dardak, 2020). However, for the food production side, Malaysia is still lagging behind from our neighbouring countries as shown in Table 1. There are several reasons that food production is low in Malaysia. One of the key reasons is that food crops have a shorter life cycle and more fragile compare to plantation crop, they are far more difficult to plant and ensure a good yield. Secondly, growing food takes many manpower as the turnover rate is high. Thirdly, planting food crops need a lot of inputs (e.g., fertilizers and

pesticides). As these inputs are mainly imported, our weak value of Ringgit Malaysia caused the expensive prices. Additionally, there are around 5.8 million hectares of land allocated for oil palm planting in Malaysia, whilst there are only one million hectares of land allocated for food crops. The imbalance policy set from the government cause the food crop production is not attractive to farmers. New generations also found that the plantation crop is easier to taking care and with relatively more stable income compared to food crops. Hence, many youngsters are either converting their land to plantation or selling them off to be transformed into housing and industrial development.

The local food producer industry is holding a vital position in sustain the country economy growth. The global retail sale in food products is around US\$3.5 trillion in 2015 with the annual increase rate of 4.8% to US\$ 6.4 trillion by 2020. There are a few major sub-sectors under the food producer, they are fish and fishery products, live stocks and livestock products, vegetables, fruits and palm oil products. These key products are majorly export to our neighbouring countries like Singapore, Indonesia, Thailand, and also Japan and USA (Hussain, 2015).

Malaysian government realized the importance of the agriculture industry and recognized it as one of the key sectors to help for boosting the economic. One of the key contributions need to come from public sector's Agricultural R&D agencies in order to achieve the target (Stads Gert-Jan, 2005). As stated by Zaharah A Rahman (2012) more than 40 organizations including public universities and private firms are working in Malaysia's agriculture sector, and these big number of organizations should play their role in helping government in attaining the food security in the country.

Malaysia, a tropical nation with a rich biodiversity, can be a good habitat of various floras and faunas, including local food crops that are only grown in this area. By having a seed bank that collect for all kinds of food crop is important to safeguard the diversity of different genetic germplasms for crop diversification (Chin, 2020). Besides, the nation is largely dependent on important food due to the shrinking of land allocated for food crops. Therefore, having a seed bank would help to store rare species of food crops which will be valuable in the future (Kamarudin, 2012). In times of a pandemic or food shortages, the seed bank plays a role in distributing seeds/planting materials to encourage people to be self-sufficient and grow their own food crops. However, with a total import of USD3.8 million and an export of USD 0.7 million, Malaysia is considered as minor player in the seed industry. The majority of hybrid seeds are imported from nations like China, Thailand, Taiwan, Japan, and others. (Ugap et al., 2013). Hence, Malaysia should invest more in research and development of more varieties of food crops to cater to the farmers' demands.

2.4 Food security in Malaysia

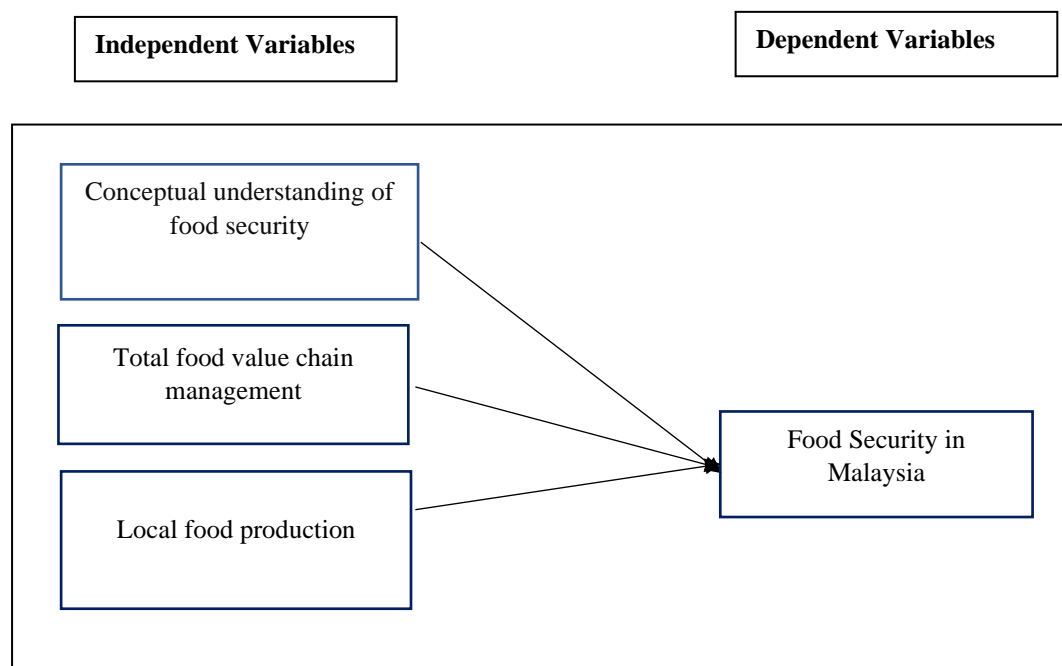
The unexpected outbreak of the Covid-19 pandemic and the ongoing conflict in Ukraine caused many food items are in short supply and rapidly rising in prices. Same issue is happening in Malaysia. One of the examples is the disruptions of chicken supply, where producers are having the difficulty to sell the meat at a controlled price, RM 8.90/kg amidst the imported chicken feed's price is skyrocketed (Morden, 2022). Since 60% of Malaysia's food needs are imported, food security is a major issue. According to BusinessToday (2022), RM55.5 billion of food products have been imported in the year 2020, considering that exports only totalled RM 33.8 billion, there was a sizeable trade deficit of RM 21.7 billion. From these numbers, it showed that Malaysia is highly depend on imported food to fulfil the needs, but in the event of natural

disasters or wars, the nation will not be able to fulfil its demand for food. According to a study by Alam et al. (2016) found that only 52.8% of the household were secured in food supply and the balance of 47.2% were categorized between mildly to severely food insecure. One of the reasons that causing this issue is the food price (Applanaidu et al., 2014).

In 2010, Arshad and Abdel Hameed explored on the reasons that caused food commodities price to increase and their association to food security in Malaysia. The authors found out the main factor include the decline in agricultural production and increasing food demand from developing economies. The second is the overall systemic factor like the low investment returns from agriculture that and unbalance policy towards export crops. The third factor is the biofuel demand increase and lastly is the technical factors. In addition, the unprecedented downpours on December 17th 2021, has caused several regions in Peninsular Malaysia to experience serious flooding. The unexpected climate change has serious impact on the agriculture sector, like livestock and farmers, resulted losses for nearly RM67.72 million (BusinessToday, 2022). The next issue is the poverty of the people within a country. According to Chua et al. (2015), most of the low-income household in developing countries having a similar issue is the food insecurity. Due to their lower income level and more likely to have food shortages, the allocation of food within the household to their family members will be affected. Consequently, the household members will not be able to get enough nutrition throughout their life. Shariff and Khor (2008) study on the association between food security level in the low-income rural communities with demographic as well as socioeconomic factors, the research found that those households lived below the poverty line, had a larger household size, more school-aged kids and mothers as housewives are more likely food insecure. By understanding these factors that contribute to food insecurity within a nation, measures could be developed to overcome these issues.

Although Malaysia is ranked 39th in the global food security score (Anon, 2022). Food is available all year round because Malaysia imports approximately 70% of the food. Therefore, in order to increase the ranking, Malaysian government has introduced the National Food Security Policy Action Plan 2021-2025. This precise planning is aiming to emphasising national food security issues and challenges in the food supply chain (MAFI, 2022). Other programs like the COVID-19 Mitigation Subgroup to make sure that the food security remains good, People's Concerned Economic Stimulus Package (PRIHATIN) and the Economic Regeneration Plan (GENERATOR) 2020 are to aid in boosting the ability of farmers, fishers, and food industry entrepreneurs. (Dardak, 2020). However, all these initiatives were only introduced after having the shortage of food in the market. The government should plan for long-term strategies that will solve the food security issue from the root cause.

2.5 Conceptual framework



2.6 Hypothesis Development

a. Based on the current food security scenario in Malaysia where the shortage of the certain food products in the market is frequently heard, example like the chicken and egg shortage in 2022 that cause the government Malaysia to import the egg from India for the first time and stop exporting the chicken to Singapore. This is a signal to us where the food security in Malaysia is very fragile and we might have more food shortage in future. This issue is reflected in the global food security score where Malaysia is only scored 69.9 and ranked 41st in 2022 compared to 2021, ranked 39th with 70.1 score. There is a big room for Malaysia to improve for the food security, especially our neighbour country, Singapore, without any natural resources and highly depends on the importing that is ranked 28th with 73.1 score. The challenge of food security needs to be addressed and solved promptly, as the complexity of sustainable development issue happened in developing countries often restricted them to solve the food supply issue (Zainol, 2021). In order to identify the root cause that cause the food security in Malaysia, all the parties need to conceptually understand the food security from different perspectives. However, the food security is complex and involves many factors and components, whether the local agriculturists, including the policy makers and industry players understand the food security holistically, otherwise the food security issue can never be solved from the root cause. That is why the conceptual understanding of the food security is important and one of the hypotheses for this research is to examine, if any significant relationship between conceptual understanding of food security among agriculturist and food security in Malaysia.

b. As the main supply chain system in food security, the total food value chain management is like the structure for organizing the agriculture produce from farm to end user and hence it has a critical role to achieve food security objective. Total food value chain management involves several components, including the agriculture input supply, the farming practises, the logistic, the trader, the marketer, end user and also processer. Each of these components have their own requirements in their operation, like the farming requires the agriculture input like seed with high yield and good disease resistance so they can have more income for planting the variety. However, the end user is only concern about the nutritional value, price and appearance of the food, meaning each of the components have different requirements. Hence the management of the total food supply chain and to harmonize each components requirements is important to achieve the food security. For example, the logistic disruption during the pandemic causes the food shortage in many areas, even though the farming activities were still carried on but the delivery of the agricultural produce from the production site to supermarket was seriously affected. The intervention from the government, especially the agency like Federal Agricultural Marketing Authority (FAMA), that help to solve the logistic and created the controlled Fresh Market helped to relief the food shortage issue (Abd Razzif Abd Razak, 2022). Every component within the food supply chain system is crucial in determining the delivery of food from the production site to the consumer in good and safe condition. The management of the food supply chain will determine whether every component can function accordingly to achieve the food security. Hence, one of the hypothesis of this study is to identify if any significant connection between total food value chain management and food security in Malaysia.

c. Local food production is one of the main components in the total food value chain and it has an important role to achieve the food security. Local food production can only be increased by increasing the farming area or improvement of the existing farmland. However, the actual situation is adverse due to the urbanization and ever-growing population that cause the reduction of agricultural land all over the world. This is an inevitable challenge and there is a need to produce more food from less arable land. One of the methods to achieve this objective is through the better-quality input like higher yield variety, better management of natural resources like efficiently use the chemical fertilizer and greater access to technical assistance through the public R&D agencies, capacity building and markets (Chua, 2015). Besides, the shortage of foreign workers in Malaysia further restricts the local food production. Most of the commercial farm in Malaysia is in small scale and is highly depends on the labour worker to operate the farm activities. With the reduction in the foreign workers due to the pandemic, it is inevitable to reduce the farming activities and hence reduce the food supply in the market. Since the local food production is directly affect the food supply to the market, one of the hypotheses is to examine if any significant relationship between local food production and food security in this country.

Chapter 3: Methodology

3.1 Research Design

There are several processes for a research, research design is important in setting all the processes and to gather the data needed to address any research challenge, serving as an overarching plan for doing the study. The most common definition of research design is a structure plan of circumstances that links all pertinent facts and data with a method by organizing as well as analyzing data in a systemic way. It may also be stated in terms of procedures. A good research design is able to control variance, conduct inquiries and create a research structure to make sure that research questions are identified and handled. The relationship between variables such as conceptual understanding of food security, TFVCM and local food production toward the food security in Malaysia were conducted using a quantitative method. This type of research is a method established to collect numerical data and using statistical tool to analyse and ultimately interpret the data that is being investigating

3.2 Sampling Procedure

This research aims those who work in agriculture sector in Malaysia as the target population. Due to huge number of agriculturists in Malaysia, to collect data from the entire population is not possible; instead, a sample of agriculturalists from varied backgrounds was selected to serve as a indicative sample that represent for the entire population. The most important is that the data delivers a substantial amount of information derived from the respondents' response, no matter how big or small the sample size was. Respondents from these backgrounds were chosen to get the whole picture on how much the respondents understand about food security

and total food value chain management. In addition, these various backgrounds will also help in identifying the objectives of this research.

The data in this research was obtained through an adopted questionnaire distributed through Microsoft Forms administered to more than 300 agriculturists in Malaysia. The research questionnaire is included demographic information and the also questions linked to both dependent and independent variables and their corelation ships. The informed consent will be firstly given in the first section of questionnaire to ensure that respondents are fully voluntary, and all of the data collected will be protected solely for research purpose.

The data was collected via a non-probability sampling method, specifically convenience sampling. Convenience sampling is selected as the target population as it is available at any time and the assumption of that target population is homogenous where the data obtained is the same across a random or nearby sample (Etikan, Musa, & Alkassim, 2016). The online questionnaire will be circulated through WhatsApp messaging application, in order to reach out to more respondents.

3.3 Measurement of variables

The purpose for conducting this study is to find out factors affecting food security in Malaysia. The measurement in this study is referring to earlier research and adopt it into this study. The explanation of these measurements as follow.

3.3.1 Variable Scales and Measurement

Three variables are selected in this study which are conceptual understanding of food security, total food value chain management and local food production. The measurement of food security is focusing on conceptual understanding on food security by experts. As mentioned by Zainol et al, 2021, the conceptual understanding on food security is fundamental for further discussion on food security. Meanwhile, the next measurement of variable is total food value chain management which emphasizing on the component of TFVCM as well as the relationship between TFVCM toward food security. Lastly, the measurement is focussing on local food production. The parameter of measurement is determining the relationship between food production toward food security. Likert scale were used as measurement scale for each question created for this study. Five points is created from one (1) that represents strongly disagree and ending at five (5) that represents strongly agree.

Table 3. 1: List of questionnaires

Conceptual understanding

Questions	Source
1. Food security encompasses food availability, food accessibility, food utility and food stability.	Zainol, F. A. and Chua, K. A. 2021. Food value chain, sustainable intensification and food security in Malaysia. <i>The Journal of Management Theory and Practice</i> , 2(2), 27-30.
2. Sustainability is important in ensuring food security	Luckstead, J., Nayga Jr, R. M., & Snell, H. A. 2021. Labor issues in the food supply chain amid the COVID-19 pandemic. <i>Applied Economic Perspective and Policy</i> , 43, 382-400.
3. Malaysia will face a dangerous situation where the supply of the country is insufficient to meet the needs all residents.	Zainol, F. A. and Chua, K. A. 2021. Food value chain, sustainable intensification and food security in Malaysia. <i>The Journal of Management Theory and Practice</i> , 2(2), 27-30
4. Feeling insecure regarding the food supply in the time of pandemic.	Rabbi, M. F., Oláh, J., Popp, J., Máté, D., & Kovács, S. 2021. Food security and the COVID-19 crisis from a consumer buying behaviour perspective – The case of Bangladesh. <i>Foods</i> , 10(12), 3073.

Local food production

Question	Source
1. Food production is a national food security issue	Luckstead, J., Nayga Jr, R. M., & Snell, H. A. (2021). Labor issues in the food supply chain amid the COVID-19 pandemic. <i>Applied Economic Perspectives and Policy</i> , 43(1), 382-400.
2. Agriculture food production is important amid the coronavirus crisis	
3. Farm production is severely affected by the pandemic.	
4. The only way to achieve food security is by increasing production and sustainability.	

Total food value chain management

Questions	Source
1. The elements of the food value chain, such as food availability, food usage, and food stability, that have an impact on food security	Zainol, F. A. and Chua, K. A. 2021. Food value chain, sustainable intensification and food security in Malaysia. <i>The Journal of Management Theory and Practice</i> , 2(2), 27-30.
2. Inconsistency of supply chain system due to poor interaction between supplier will affect the food security	Ada, N., Kazancoglu, Y., Sezer, M. D., Ede-Senturk, C., Ozer, I., & Ram, M. 2021. Analyzing barriers of circular food supply chains and proposing industry 4.0 solutions. <i>Sustainability</i> , 13(12), 6812.
3. Food conditions are acceptable under the total food value chain management	Rabbi, M. F., Oláh, J., Popp, J., Máté, D., & Kovács, S. 2021. Food security and the COVID-19 crisis from a consumer buying behaviour perspective – The case of Bangladesh. <i>Foods</i> , 10(12), 3073.
4. Availability of farm labour might disrupt the farming in the wake of Covid-19	Inegbedion, H. E. (2021). COVID-19 lockdown: implication for food security. <i>Journal of Agribusiness in Developing and Emerging Economies</i> , 11(5), 437-451.

Food security in Malaysia

Questions	Source
1. Worry about food in past month	Jaacks, L. M., Veluguri, D., Serupally, R., Roy, A., Prabhakaran, P., & Ramanjaneyulu, G. V. (2021). Impact of the COVID-19 pandemic on agricultural production, livelihoods, and food security in India: baseline results of a phone survey. <i>Food security</i> , 13(5), 1323-1339.
2. Food prices have tripled since the pandemic	Rabbi, M. F., Oláh, J., Popp, J., Máté, D., & Kovács, S. 2021. Food security and the COVID-19 crisis from a consumer buying behaviour perspective – The case of Bangladesh. <i>Foods</i> , 10(12), 3073
3. Food amount does not allow me to meet daily demand and is not available in local shops	
4. Food production will increase with lower quality after the pandemic	Inegbedion, H. E. 2020. COVID-19 lockdown: Implication for food security. <i>Journal of Agribusiness in Developing and Emerging Economies</i>

3.4 Instrumentation

To analyse the relationship between total conceptual understanding of the food security, total food value chain management and local food production toward food security, framework is created and questionnaire acts as a tool to collect the data. Section 1 is the survey on the respondent's information including gender, age, income range, ethics, and working field. Meanwhile, section 2 contain survey related to conceptual understanding on food security. Section 3 covered the survey on total food value chain management which including to determine the important factor that affect the operation of TFVCM by ranking. Lastly is section 4 which survey about the important component for food production by ranking.

3.5 Data Collection Methods

Based on the G-Power, the total sample size should be minimum 111. The data was collected through google form and broadcasted through multiple social media platforms including WhatsApp, Facebook, Wechat, Microsoft Team.

3.6 Data Analysis Techniques

3.6.1 Data Analysis

No matter of qualitative or quantitative research, data analysis helps researchers to accomplish the goals of the research by minimizing and managing the data collected. IBM SPSS Statistics Software was used to analysed the data collected from respondents.

3.6.2 Descriptive Analysis

Descriptive analysis comprises of computation of averages, differences, and asymmetry that help researchers in sum up the data and recognize the possibility of the trend. There were a few methods used for identifying the data, like mean, median, mode, percentage, and frequency. As the first data analysis process, descriptive statistics acts as the research structure by carrying out the inferential statistical tests to access variables. Hence, a methodical approach to documenting all descriptive data is crucial since it helps to establish solid research practices and reduces the possibility of publishing false findings. (Huebner, Vach & le Cessie, 2016). Researcher simplified the data acquired from 302 respondents in this study by adopting the descriptive analysis, an effective and efficient scientific method.

3.6.3 Inferential Analysis

Non-parametric and parametric are two types of inferential statistics. The non-parametric that used to analyse for the data without the normal distribution. Whereas the other inferential statistics called parametric is more commonly used to analyse the data that quantified at the interval level, the data distribution are in normal distribution, and also the estimation of sample statistics, testing of statistical hypothesis and significant testing. The main reason for the broad spectrum used of inferential analysis is that it allows to make for a estimation for the whole research population based from the inspection of a small sample. Under the inferential analysis, there are two types of analysis called estimation and point estimate method. Estimation is using the parameter value, whereas point estimate is suing a sample of observation. In this research, the estimation technique was applied.

3.6.3.1 Pearson Correlation Coefficient

The easiest way to examine the connection between variables is through the correlation testing. If there is a linked between variables, the changes in the magnitude of one variable will directly affect the changes of another variable in the same magnitude. The Pearson Correlation is frequently used to refer to the linear connection between two variables and compute the level of association between variables. In this study, independent variables of relationship between the conceptual understanding of food security, TFVCM, local food production as well as the dependent variable of food security in Malaysia will be examine using the Pearson Correlation.

3.6.1.2 Multiple Linear Regression

In order to assess the relationship between variables that consist of significant relationship and to estimate subjects based on their relationship, multiple linear regression can be used for these purposes (Uyanik and Güler 2013). In this study, a comprehensive prediction was estimated using multiple regression analysis to determine independent factors' impact on the dependent variable. This is a statistical method utilizes independent variables to examine the result or conclusion of the dependent variable. This can help the researcher to interpret the linear relationship between food security in Malaysia, the dependent variable, and conceptual understanding of food security, TFVCM, local food production, the independent variables.

3.7 Conclusion

This chapter mainly focused on the approaches taken to carry out this study. Aside from that, this chapter covers the methodologies for data collecting, data analysis, and research design. The following chapter will go into great detail regarding the detailed outcomes of the analysis.

Chapter 4: Finding and Analysis

4.0 Introduction

In this chapter, it outlines the result from the research questionnaire, which 302 participants completed. This chapter is separated into two sections, the first of which includes a descriptive study of the respondents' demographic information. Whereas the second section shows the reliability tests and inferential analysis that were computed using IBM SPSS Statistics Subscription Software.

4.1 Descriptive Analysis

This section examines the demographic info summary of the respondents. The information gathered from 302 respondents was analyzed and presented in the next sections that contain tables and results of the SPSS Statistics program's interpretation.

4.1.1 Demographic Data

4.1.1.1 Gender

In this study, both male and female respondents were targeted to acquire precise and representative data from respondents. In the table 4.1, it shows the gender info in this study.

Table 4. 1: Respondent’s Gender

	Frequency	Percent
Female	90	29.8
Male	212	70.2
Total	302	100

The data of genders in this study had counted and presented in the table 4.1 above. There were 90 respondents was female and 212 respondents were male which occupied 29.8% and 70.2% respectively. In conclusion, this study attracted more male respondents than female respondents, but this did not have any significantly affect the results of the overall analysis.

4.1.1.2 Age group

The questionnaire was distributed randomly, regardless of their age. Table 4.2 shows the age group of respondents in this study. There are 5 age group, that are under 35 years old, between 36 and 45, between 46 and 55, between 56 and 65, and over 65 years old.

Table 4. 2: Respondent’s age group

	Frequency	Percent
Less than 35 years old	91	30.1
36-45 years old	122	40.4
46-55 years old	49	16.2
56-65 years old	33	10.9
More than 65 years old	7	2.4
Total	302	100

The distribution of respondents' age groups as determined by the questionnaire sent for analysis purposes is shown in table 4.2. In this study, 30.1% of the sample populations' total respondents, or 91 respondents, were under the age of 35. Among the five age groups, 36-45 years old group has the majority respondents by having of 122, or equal to 40.4% of respondents. Besides, there

are 49 respondents between 46-55 years old which occupied 16.2%, respondents with the age group of 56-65 years old are 33 or 10.9% of respondents. The minority of the respondents in this study was came from the age group over 65 years old, that is seven respondents, or 2.4%. The researcher must be aware of the respondents' age range in order to assess how effectively the topic is being viewed and understood. For example, respondents who are of a younger age (less than 35 years) might not take the subject matter as seriously as those who are older (more than 46 years).

4.1.1.3 Working organization

The questionnaire was design to collect the respondent's working organization, as the researcher try to collect all the data from different working organization on their respond on the research topic. There were three options under the respondent's working organization, that are private sector, public sector and self-employed. Table 4.3 shows the respondents' working organization.

Table 4. 3: Respondent's working organization

	Frequency	Percent
Public sector	34	11.2
Private sector	141	46.7
Self-employed	127	42.1
Total	302	100

For the respondents working in the public sector were the minority in this research, that were only 34 respondents or 11.2% from the total of 302 respondents. Whereas the respondents from private sector and self-employed were in similar population, that were 141 respondents or 46.7% and 127 respondents or 42.1%.

4.1.1.4 Income level

Another demographic profile data collected was the respondent's income level by given a few incomes range. The income level group are less than RM 3,000, RM 3,001 to RM 5,000, RM 5,001 to RM 7,000, RM 7,001 to RM 9,000 and the last option is more than RM 9,000. As the issue of this research is food security, knowing the respondents' income range will determine how much the issue pose a threat to the respondents. For example, a lower income respondent will feel the pinch of increasing food costs compared to those who are high earners.

Table 4. 4: Respondent's income level

	Frequency	Percent
Less than RM 3,000	72	23.8
RM 3,001 to RM 5,000	96	31.8
RM 5,001 to RM 7,000	66	21.8
RM 7,001 to RM 9,000	34	11.3
More than RM 9,001	34	11.3
Total	302	100

Table 4.4 shows the result of respondent' income level. Based on the results obtained from 302 respondents, 72 respondents or 23.8% were less than RM 3,000. Whereas 96 respondents or 31.8% were the majority with the income level from RM 3,001 to RM 5,000 and 66 respondents or 21.8% were RM 5,001 to RM 7,000. For the income level group of RM 7,001 to RM 9,000 and more than RM 9,001, both of these group has the same number of respondents, that were 34 or 11.3%.

4.1.1.5 Educational level

The educational background level of the respondents is another data points that was gathered for this study because it is crucial for the researcher to have this information. There were six alternatives for respondents to select from when it came to education level in this study: secondary school, diploma, bachelor's degree, master's degree, doctorate, and others. The 302 respondents' results are shown in Table 4.5.

Table 4. 5: Respondent's educational level

	Frequency	Percent
Secondary	100	33.1
Diploma	40	13.2
Bachelor's degree	100	33.1
Master's degree	34	11.3
Doctorate's degree	10	3.3
Others	18	6
Total	302	100

Table 4.5 presents respondent's educational background level obtained from 302 respondents. There were both 100 respondents with secondary and bachelor's degree, which were the majority of respondents in this research that occupied for 33.1% respectively. Followed by respondents with diploma (40 respondents, 13.2%), master's degree (34 respondents, 11.3%), others (18 respondents, 6%) and the minority were the doctorate's degree (10 respondents, 3.3%). Basically, the responses of higher level of education respondent will vary from a lower level of education respondent such as secondary level of education.

4.1.1.6 Ethnicity

Ethnicity is another demographic data collected in this research. Table 4.6 shows the ethnicity data obtained from 302 respondents.

Table 4. 6: Respondent's ethnicity

	Frequency	Percent
Malay	126	41.7
Chinese	129	42.7
Indian	35	11.6
Bumiputera Sabah/Sarawak	10	3.3
Others	2	0.7
Total	302	100

The table 4.6 shows the majority of the respondents were Chinese (129 respondents, 42.7%), followed by Malay (126 respondents, 41.7%), Indian (35 respondents, 11.6%), Bumiputera Sabah/Sarawak (10 respondents, 3.3%) and others (2 respondents, 0.7%). By knowing the ethnicity will help to get a better understanding on the food security issue as the eating habit is different with the ethnicity.

4.1.1.7 Years of employment in agriculture sector

A questionnaire targeting respondents working in the agriculture sector was issued in order to gather representative data from the target respondents. Table 4.7 shows the respondents' years of employment in agriculture sector with years range from less than 1 year, 1 to 3 years, 3-5 years, 5-7 years, 5 to 9 years and more than 9 years.

Table 4. 7: Respondent’s years of employment in agriculture sector

	Frequency	Percent
Less than 1 year	50	16.6
1-3 years	59	19.5
3-5 years	69	22.8
5-7 years	46	15.2
7-9 years	26	8.6
More than 9 years	52	17.3
Total	302	100

The table 4.7 shows the group of years of employment from target respondents in this study. The majority of the respondents were 3-5 years (69 respondents, 22.8%), followed by 1-3 years (59 respondents, 19.5%), more than 9 years (52 respondents, 17.3%), less than 1 year (50 respondents, 16.6%), 5-7 years (46 respondents, 15.2%) and 7-9 years (26 respondents, 17.3%).

4.1.2 Results of the study

The second part identify respondent’s conceptual understanding of the food security towards the food security in Malaysia. Using a five-point Likert scale, with 5 denoting "strongly agree" and 1 denoting "strongly disagree," the questionnaire asked respondents to rate their level of agreement or disagreement. The results for score and standard deviations are computed and shown in the table 4.8, based on the data obtained from 302 respondents

Table 4. 8: Results of the study

Conceptual Understanding of Food Security								
No	Item	SD	D	N	A	SA	Mean score	Standard deviations
8	CUOFS1	7	4	18	91	182	4.45	0.852
9	CUOFS2	4	6	10	75	207	4.57	0.769
10	CUOFS3	5	7	20	79	191	4.47	0.850
11	CUOFS4	7	17	36	84	158	4.22	1.015
Total Food Value Chain Management								
No	Item	SD	D	N	A	SA	Mean score	Standard deviations
12	TFVCM1	3	5	19	87	188	4.50	0.772
13	TFVCM2	3	4	27	98	170	4.42	0.789
14	TFVCM3	5	12	57	90	138	4.14	0.968
15	TFVCM4	4	5	26	91	176	4.42	0.823
Local Food Production								
No	Item	SD	D	N	A	SA	Mean score	Standard deviations
16	LFP1	3	8	17	91	183	4.47	0.801
17	LFP2	4	3	27	89	179	4.44	0.804
18	LFP3	6	7	36	93	160	4.30	0.911
19	LFP4	6	10	29	84	173	4.35	0.927
Food Security in Malaysia								
No	Item	SD	D	N	A	SA	Mean score	Standard deviations
20	FSIM1	42	66	81	77	36	3	1.229
21	FSIM2	4	7	43	118	130	4.20	0.864
22	FSIM3	53	81	79	58	31	2.78	1.236
23	FSIM4	12	48	95	79	68	3.47	1.123

The highest mean for the first variable, that is the conceptual understanding of food security was came from the item CUOF2. Most of the respondents (207 respondents) strongly agree on the statement, that stated that the sustainability is important in ensuring food security. This show the respondent is concern about the sustainability of the food supply towards the food security issue. Whereas for the total food value chain management variable, the TFVCM1 is the highest mean with 4.49 score, 188 respondents strongly agree elements of the food value chain, such as food availability, food usage, and food stability, that have an impact on food security.

Whereas for the local food production, item LFP1 score 4.46, is the highest mean score within the variable. Most of the respondents (183 respondents) strongly agree the food production is a national food security issue and has direct impact on the food security. Lastly, FSIM2 has the highest mean score of 4.20 within the dependent variable, that is the food security in Malaysia. There were 130 respondents strongly agree the food prices have tripled since the pandemic. It indicates that the food is less available due to the high price.

4.2 Reliability Test

As stated by Franzen (2011), reliability test refers to a test of the consistency in research over the time. Same result is being obtained no matter the number of testings, if the research is being designed and constructed properly. Basically, the Cronbach's Alpha value was used as the reliability test for this the research to find out the consistency of the research variables. When the Cronbach's Alpha value is less than 0.6, it is considered poor, those in the range of 0.7 are acceptable, and those with the value of 0.8 or higher are considered good (Sekaran and Bougie, 2016).

Table 4. 9: Reliability Statistic for Actual Research

Variable	Cronbach's Alpha	N of items
Conceptual Understanding of Food Security	0.887	4
Total Food Value Chain Management	0.886	4
Local Food Production	0.871	4
Food Security in Malaysia	0.689	4

The reliability statistic result of this study is analysed using IPSS, with the result being constructed and present in table 4.9. All the independent variables show good consistency as their value are more than 0.8. Whereas for dependent variable, the food security in Malaysia is relatively low due to its value, 0.689. All variables were measured with 4 items.

4.3 Inferential Analysis

4.3.1 Pearson Correlation Analysis

Correlation is used to investigate the direction, magnitude of the connection as well as the significant linear relationship between two variables.

Table 4. 10: Correlations

		Mean-CUOFS	Mean-TFVCM	Mean-LFP	Mean-FSIM
Mean -CUOFS	Pearson Correlation	1	0.778**	0.815**	0.433**
	Sig. (2 tailed)	.	<0.001	<0.001	<0.001
	N	302	302	302	302
Mean-TFVCM	Pearson Correlation	0.778**	1	0.882**	0.490**
	Sig. (2 tailed)	<0.001	.	<0.001	<0.001
	N	302	302	302	302
Mean-LFP	Pearson Correlation	0.815**	0.882**	1	0.515**
	Sig. (2 tailed)	<0.001	<0.001	.	<0.001
	N	302	302	302	302
Mean-FSIM	Pearson Correlation	0.433**	0.490**	0.515**	1
	Sig. (2 tailed)	<0.001	<0.001	<0.001	.
	N	302	302	302	302
** Correlation is significant at the 0.001 level (2 tailed).					

In this study, researcher analysed the association between independent variables with the dependent variable using SPSS shown in table 4.10. The food security in Malaysia has been computed using the Pearson correlations, which includes the relationship between the conceptual understanding of food security, total food value chain management, local food production in relation to food security in Malaysia. Based on the Pearson correlation coefficient's rule of thumb, the coefficient level of all the independent variables had the modest association with the dependent variable, where the conceptual understanding of food security was 0.454, total food value chain management was 0.508 and local food production was 0.532 respectively.

4.3.2 Multiple Linear Regression Analysis

Table 4. 11: Model Summary

Model	R	R Square	Adjusted R Square	Std Error of the Estimate	R Square Change
1	0.52 ^a	0.271	0.263	0.69334	0.271
a. Predictors: (Constant), Mean_CUOFS, Mean_TFVCM, Mean_LFP					
b. Dependent variable: Mean_FSIM					

The model summary used to examine whether the regression model can fits well with the data. The R value is total of several coefficients of correlation for the whole data. R can be considered as a metre to measure the precision of the dependent variable's estimation. The R-value in this research is 0.52, considered as a modest correlation. Whereas for the R square number, it is commonly known as the coefficient of determination, that is the percentage of variance in the dependent variable that can be explained, is 0.271.

Table 4. 12: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	53.167	3	17.722	36.866	<0.001 ^b
	Residual	143.255	298	0.481		
	Total	196.422	301			
a. Dependent variable: Mean_FSIM						
b. Predictors: (Constant), Mean_CUOFS, Mean_TFVCM, Mean_LFP						

Table 4.12 shows there are 3 df in this study that refer to conceptual understanding of food security, total food value chain management and local food production. The F-ratio in the ANOVA table is 36.866 that determines of the overall regression model fits the data well with significant level less than 0.001. As a conclusion, independent variables have significant impact towards the dependent variable in this research.

Table 4. 13: Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std Error	Beta		
1	(Constant)	0.768	0.256		2.996	0.003
	Mean_CUOFS	0.014	0.093	0.13	0.145	0.885
	Mean_TFVCM	0.176	0.119	0.159	1.478	1.41
	Mean-LFP	0.402	0.129	0.364	3.124	0.002

a. Dependent Variable:
Mean_FSIM

According to table 4.13, the first variable which is conceptual understanding of food security shows the significant value of 0.885, that is higher than the significant value of 0.05, meaning a negative correlation towards the dependent variable that is the food security in Malaysia. Whereas for the total food value chain management also shows the negative correlation with the dependent variable with the significant value of 1.41, higher than the significant value of 0.05. The local food production shows positive correlation with the food security in Malaysia,

with the significant value of 0.002, which is lower than the 0.005. It is the only independent variable in this research with the positive impact.

4.4 Summary of hypothesis results

Table 4.14 below shows the hypothesis result based on the table 4.13. In this research, only the local food production shows there is positive correlation with the dependent variable, meaning the local food production has correlation on the food security in Malaysia. Whereas another 2 independent variables, conceptual understanding of food security and total food value chain management has no correlation with food security in Malaysia.

Table 4. 14: Summary of hypothesis result

Variables	Hypothesis constructed	Result
Conceptual understanding of food security	H0a: There is no significant relationship between conceptual understanding of food security concept on food security in Malaysia	Accepted
	H1a: There is a significant relationship between conceptual understanding of food security concept on food security in Malaysia	Rejected
Total food value chain management	H0b: There is no significant relationship between TVFCM on food security in Malaysia	Accepted
	H1b: There is a significant relationship between TFVCM on food security in Malaysia	Rejected
Local food production	H0c: There is no significant relationship between local food production on food security in Malaysia	Rejected
	H1c: There is a significant relationship between local food production on food security in Malaysia	Accepted

4.4.1 Conceptual understanding of food security

Even though the data collected from this research analysed through multiple regression analysis shows that the conceptual understanding of food security has no significant relationship with the food security in Malaysia but the Pearson correlation shows the conceptual understanding of food security has a medium correlation with the dependent variable. The fully understanding of the food security concept is critical, especially for the policy makers, in solving the food security issue from the root cause as stated by FAO (2008), but respondents in this research were mainly came from the private sector and self-employed, with only a small percentage of respondents were came from the public sector. With the different working environment and background, those respondents came from the private sector might not be interested with the understanding of the food security concept and hence cause this research outcome different from other literatures. However, this can be a good topic to further study to find out the actual understanding of the food security concept among the agriculturist from different background.

4.4.2 Total food value chain management

The total food value chain management has the same result as the conceptual understanding of food security where the regression analysis show it has no significant relationship with the food security in Malaysia but the Pearson correlation shows the total food value chain management has the modest correlation with the dependent variable. Even though the other literature like Mulyo Aji (2020) show the total food value chain management has the positive impact toward the food security but the respondent from this research has different prospective on this factor. The well-established food supply chain system in Malaysia plays important roles in the food delivery from farm to table. Besides the involvement from the private sector, the government

agency like Federal Agricultural Marketing Authority (FAMA) also assist in the food supply chain.

4.4.3 Local food production

Both correlation analysis and regression analysis show the local food production is correlated and has significant relationship with the food security in Malaysia. The positive correlation shows a positive association between local food production and food security in Malaysia, meaning if there is an increase in food production, the food security level will be increased as well. The outcome from this research regarding the local food production is similar with the findings by Savary et al. (2022), which local food production have positive relationship with food security, that indicates the local food production has the impact on the food security.

Chapter 5: Conclusion

5.0 Introduction

Based on previous chapters' findings, all result is further discussed in this chapter. The research conclusion, research implication and limitations of this research study, as well as recommendations are also included in this part.

5.1 Conclusion

Food security is accomplished when everyone has constant access to enough, safe, and nourishing food to meet their dietary needs and food preferences for an active and healthy lifestyle. Sustainable agriculture is a method of meeting society's food security demands without jeopardising future generations' well-being and capabilities. Literature has demonstrated that the conceptual understanding of food security, local food production and total food value chain management are important elements to food security. However, this research's result did not show the similar result under the Malaysian context. The respondents' background, sample size, the current scenario on the food security, social economic situation in Malaysia and other external factors might affect the result of the research. This is good to have the research based on our actual situation in Malaysia where we can understand our position in food security based on the same research structure.

Even though the result from this research did not prove the conceptual understanding of food security and total food value chain management have the impact on the food security in Malaysia but variations of relationship between conceptual understanding of food security,

local food production, total food value chain management toward the food security in Malaysia were identified. Furthermore, the local food production was proven as one of the factors that influencing food security in Malaysia under the local situation context.

5.2 Implication of study

This research concentrates on food security issue in Malaysia and determine factors that have the impact in food security. As a result, this research can help organisations and governments mitigate future food security concerns. Furthermore, because the results may change between settings, it is critical for organisations or governments to undertake benchmark evaluations within their own surroundings, as well as create or implement relevant incentives/alternatives that are acceptable for the Malaysia context.

Besides, this research become one of the latest literatures in examining the aforementioned issues and developing a theoretical framework that will have an influence on organisations and governments involved in the agriculture sector. Furthermore, this paper further validates of previous research where the local food production is significant element influencing the food security.

Last but not least, Bahasa Melayu is the native language for most of the people in the country and is the official language in Malaysia but questionnaire was administered in English. If the responder does not understand or is uncertain about the questionnaire's questions, their proficiency in English could have an impact on the data's accuracy. The study's capacity to

generalize its findings is limited by the fact that it was restricted to Malaysia and hence might not be indicative of the entire nation.

5.3 Limitation of study

There was only several months to complete for this study, the limited time frame to conduct for this study was one of the constraints. This kind of research need more time and fund in order to unveil more supporting literature and evidence to this research. Limited time also make the researcher unable to get more respondents to involve for this research. Such obstacles may constraint the amount of time to identify the research problem and observe changes over a period of time.

The researcher found it difficult to find latest literature review on food security, local food production, and total food value chain management, especially from the Malaysian researchers. Most of the past literature was from more than 6 years back and overseas. Basically, the supporting evidence for the researcher's study's literature evaluation is came from earlier research, and the prior research provides theoretical foundations for any new research with the similar topics. The researcher may need to create a new research typology because there hasn't been much prior research on the subject. In this situation, recognizing a constraint may be seen as a great opportunity to identify knowledge gaps and highlight the want for additional field study.

5.4 Recommendation for future research

Since the researcher faced with limited time to find more respondent for this research and limited time to explore a research problem and monitor changes over time. If the time factor is not an issue for the next time, a longitudinal design of research can be considered. Basically, a longitudinal design research can trace changes pattern over the time, causal direction and reciprocal relationship by conducting. This can provide a better and holistic result to reflect the actual food security issue in Malaysia, more meaningful research to contribute to policy makers, organizations and also those involve in the agriculture in Malaysia.

Lastly, to translate the questionnaire into a few different languages, including the official and key languages in Malaysia: Bahasa Melayu, English, and Chinese. Given that the country is multi-cultural, multi-racial, multi-religious, and multilingual, it is crucial to create the questionnaire in a variety of languages to maximize the likelihood that more respondents will participate. When the questionnaire is presented in the respondent's native language, they are more inclined to complete it.

Reference

- Abd Razzif Abd Razak, M. I., Sani, M., Adnan, M. H. M., & Salleh, I. K. M. (2022). Controlled Fresh Market (CFM): A case of rebranding Farmers' market with Government Intervention during Covid-19 in Malaysia. *Journal of Agribusiness Marketing*, 9(1).
- Alam, M. M., Siwar, C., Wahid, A. N. M., & Talib, B. (2016). Food security and low-income households in the Malaysian East Coast Economic region: An empirical analysis. *Review of Urban & Regional Development Studies*, 28(1), 2–15.
- Allua, S., & Thompson, C. B. (2009). Inferential statistics. *Air Medical Journal*, 28(4), 168-171.
- Anon. (2022). Global Food Security Index. *Ranking and trends*. <https://impact.economist.com/sustainability/project/food-security-index/Index>
- Applanaidu, S. D., Bakar, N. A., & Baharudin, A. H. (2014). An econometric analysis of food security and related macroeconomic variables in Malaysia: A vector autoregressive approach (VAR). *UMK Procedia*, 1, 93–102.
- Blandon, J., Henson, S., & Cranfield, J. (2009). Small-scale farmer participation in new agri-food supply chains: case of the supermarket supply chain for fruit and vegetables in Honduras. *Journal of International Development*, 21(7), 971–984.
- BusinessToday. (2022, July 2). *Malaysia needs to desperately find new trajectory for the food system*. BusinessToday. <https://www.businesstoday.com.my/2022/07/02/malaysia-needs-to-desperately-find-new-trajectory-for-the-food-system/>
- BusinessToday. (2022, May 23). *Economists raise red flag on Malaysia's food security and urge prompt action*. BusinessToday. <https://www.businesstoday.com.my/2022/05/23/economists-raise-red-flag-on-malysias-food-security-and-urges-prompt-action/>
- Chin, C. F. (2020). The impact of food supply chain disruption amidst COVID-19 in Malaysia. *Journal of Agriculture, Food Systems, and Community Development*, 9(4), 161–163.

- Chiong, Y. K. (2022, July 4). *Food security and unsustainable agriculture in Malaysia*. TheSun. <https://www.thesundaily.my/home/food-security-and-unsustainable-agriculture-in-malaysia-LK9048692>.
- Chua, K. A., Zainol, F. A., & Arumugam, N. (2015). Food security: Where are we heading? *Journal of Life Sciences*, 9, 357–364.
- Dardak, R. A. (2020). Addressing food security in challenging times. *Food and Fertilizer Technology Center for the Asian and Pacific Region*.
- Deloitte. (2013). *The food value chain: A challenge for the next century*. Deloitte Touche Tohmatsu Limited.
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American journal of theoretical and applied statistics*, 5(1), 1-4.
- FAO, IFAD, UNICEF, WFP, & WHO. (2022). *The state of food security and nutrition in the world 2022. Repurposing food and agricultural policies to make healthy diets more affordable*. FAO. <https://www.fao.org/3/cc0639en/online/cc0639en.html>
- Food and Agriculture Organization of the United Nations [FAO]. (2006). *Food security*. https://www.fao.org/fileadmin/templates/faoitally/documents/pdf/pdf_Food_Security_Coept_Note.pdf
- Food and Agriculture Organization of the United Nations [FAO]. (2003). *Trade reforms and food security: Conceptualizing the linkages*. FAO.
- Franzen, M. D. (2011). Test Reliability. *Encyclopedia of Clinical Neuropsychology*, 2496–2497. https://doi.org/10.1007/978-0-387-79948-3_2241
- George, D., & Mallery, P. (2016). *SPSS for Windows Step by Step: A Simple Guide and Reference*. 11.0 update, 2003.

- Huebner, M., Vach, W., & le Cessie, S. (2016). A systematic approach to initial data analysis is good research practice. *The Journal of thoracic and cardiovascular surgery*, 151(1), 25-27.
- Hussain, S. S., & Miras, H. (2015). The determinants of capital structure for Malaysian food producing companies. *International journal of accounting and business management*, 4(2), 138-161.
- Inegbedion, H. E. (2021). COVID-19 lockdown: implication for food security. *Journal of Agribusiness in Developing and Emerging Economies*, 11(5), 437-451.
- Kamaruddin, S. B. (2012, May 22). *Call for establishment of a national seed bank*. Universiti Kebangsaan Malaysia. <https://www.ukm.my/news/archive/year-2012/may-2012/call-for-establishment-of-a-national-seed-bank/>
- Kaplinsky, R. & Morris, M. (2002). *A Handbook for value chain research*. Brighton: Institute of development studies. University of Sussex.
- Marsden, T., Banks, J., & Bristow, G. (2000). Food supply chain approaches: exploring their role in rural development. *Sociologia Ruralis*, 40(4), 424–438.
- Mat Radzi, R., Saidon, I. M., & Ab Ghani, N. (2015). Overcoming barriers of food supply chain in Malaysia by Japanese food companies. *Research Journal of Business and Management*, 2(3), 380–400.
- Ministry of Agriculture and Food Industries. (2022, July 29). *National Food Security Policy Action Plan 2021-2025*. <https://www.mafi.gov.my/en/pelan-tindakan-dasar-sekuriti-makanan-2021-2025>.
- Morden, Z. (2022, June 2). *As rising prices bite in Malaysia, S&P Global warns food crisis could last years, not months*. Malaymail. <https://www.malaymail.com/news/malaysia/2022/06/02/as-rising-prices-bite-in-malaysia-sp-global-warns-food-crisis-could-last-years-not-months/10220>.

- Mulyo Aji, J. M. (2020). Linking supply chain management and food security: A concept of building sustainable competitive advantage of agribusiness in developing economies. *E3S Web of Conferences*, 142, 06005. <https://doi.org/10.1051/e3sconf/202014206005>
- Peace, K. E., Parrillo, A. V., & Hardy, C. J. (2008). Assessing the Validity of Statistical Inferences in Public Health Research: An Evidence-Based, 'Best-Practices' Approach. *Journal of the Georgia Public Health Association*, 3(1), 10-23.
- Razak, M. I. M., Hamzah, A. S. M. A., Abas, N., Idris, R., & Ibrahim, Z. (2013). Sustaining food production for food security in Malaysia. *Journal of Economics and Development Studies*, 1(2), 19-25.
- Savary, S., Waddington, S., Akter, S., Almekinders, C. J. M., Harris, J., Korsten, L., Rötter, R. P., & Van den Broeck, G. (2022). Revisiting food security in 2021: An overview of the past year. *Food Security*, 14(1), 1–7. <https://doi.org/10.1007/s12571-022-01266-z>
- Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill-building approach* (7th ed.). Chichester, West Sussex, United Kingdom John Wiley & Sons.
- Schober, P., Boer, C., & Schwarte, L. A. (2018). Correlation coefficients: appropriate use and interpretation. *Anesthesia & Analgesia*, 126(5), 1763-1768.
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International journal of medical education*, 2, 53.
- Uyanık, G. K., & Güler, N. (2013). A study on multiple linear regression analysis. *Procedia-Social and Behavioral Sciences*, 106, 234-240.
- Yadav, V. S., Singh, A. R., Gunasekaran, A., Raut, R. D., & Narkhede, B. E. (2022). A systematic literature review of the agro-food supply chain: Challenges, network design, and performance measurement perspective. *Sustainable Production and Consumption*, 29, 685–704.

Zainol, F.A., Chua, K.A., Hadi, N.M.H., Wan Daud, W.N., Rashid, N., & Afthanorhan, A. (2018). Food security and food value chain: Identifying the influencing components in Malaysian seed industry. *International Journal of Academic Research in Business & Social Sciences*, 8(12), 834–849.

Appendix

Factors affecting food security in Malaysia

Dear respondent,

I am a Master Degree candidate at UTAR, currently working on my Master Dissertation with a proposed title of “The Factors Affecting Food Security in Malaysia”. For that purpose, I would appreciate your kind cooperation to fill in this questionnaire. This questionnaire will only take approximately 10 minutes to be filled in.

Please be assured that your responses will only be used for academic purpose and your identity will never be known throughout any part of the research process.

* Indicates required question

Section 1: Demographic profile

1. Gender *

Mark only one oval.

- Male
 Female

2. Age *

Mark only one oval.

- Less than 35 years old
 36-45 years old
 46-55 years old
 56-65 years old
 More than 65 years old

3. Which organization are you working for? *

Mark only one oval.

- Public sector
- Private sector
- Self-employed

4. Please indicate your range of monthly income *

Mark only one oval.

- Less than RM 3,000
- RM 3,001 - RM 5,000
- RM 5,001 - RM 7,000
- RM 7,001 - RM 9,000
- More than RM 9,000

5. Level of education *

Mark only one oval.

- Secondary
- Diploma
- Bachelor

- Master
- PhD
- Others

6. Ethnicity *

Mark only one oval.

- Malay
- Chinese
- Indian
- Bumiputera Sabah/Sarawak
- Others

7. How many years you have been involved in agriculture sector? *

Mark only one oval.

- less than 1 year
- 1-3 years
- 3-5 years 5-7 years 5-9 years
- More than 9 years

Section 2: Conceptual understanding of food security

8. Food security encompasses food availability, food accessibility, food utility and food stability. *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly agree

9. Sustainability is important in ensuring food security *

Mark only one oval

	1	2	3	4	5	
Strongly disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly agree

10. Malaysia will face a dangerous situation if the supply of the country is insufficient to meet the needs of all residents. *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly agree

11. Feeling insecure regarding the food supply in the time of pandemic. *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly agree

Section 3: Total Food Value Chain Management

12. The elements of the food value chain, such as food availability, food usage, and food stability, that have an impact on food security. *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly agree

13. Inconsistency of supply chain system due to poor interaction between supplier will affect the food security *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly agree

14. Food conditions in Malaysia are acceptable under the total food value chain management *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly agree

15. Availability of farm labour might disrupt the farming activity in the wake of Covid-19 *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly agree

Section 4: Local Food Production

16. Food production is a national food security issue *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly agree

17. Agriculture food production is important amid the coronavirus crisis. *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly agree

18. Farm production is severely affected by the pandemic. *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly agree

19. The only way to achieve food security is by increasing production and sustainability.
*

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly agree

Section 5: Food Security in Malaysia

20. Worry about food in past month *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly agree

21. Food prices have tripled since the pandemic *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly agree

23. Food amount does not allow me to meet my daily demand and is not available in local shops *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly agree

24. Food production will increase with lower quality after the pandemic *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly agree