Malaysian Journal of Consumer and Family Economics (MAJCAFE) Vol 30 (2023)
https://www.majcafe.com : eISSN : 2948-4189

Food Supply Chain Assurance: Malaysian Consumer Household Perspective

Azreen Roslan[1], Farha Ghapar[2], Chew Li Lian[3], Siti Norida Wahab[1], Ariff Azly Muhamed[1*], Veera Pandiyan Kaliani Sundram[1*]

[1]Faculty of Business and Management, Universiti Teknologi MARA, UiTM Cawangan Selangor, Kampus Puncak Alam, Selangor, MALAYSIA
[2]Universiti Poly-Tech Malaysia, Cheras, Kuala Lumpur, MALAYSIA
[3]Binary Business School, Binary University, Selangor, MALAYSIA
**Email: veera692@uitm.edu.my/ariff@uitm.edu.my*

DOI : https://doi.org/10.60016/majcafe.v30.05

Abstract

Food supply chain assurance refers to the measures and processes that are put in place to ensure the safety, quality, and reliability of the food supply chain from farm to fork. Food supply chain assurance aims to minimize the risk of foodborne illnesses, ensure the integrity of the supply chain, and build trust between consumers and producers. Hence, this paper aims to provide empirical evidence on the effects of the dimensions of food security and their impacts on the food supply chain in the context of households in Malaysia. This research primarily focuses on individuals as the unit of analysis, and 498 households in the Klang Valley, Malaysia, were invited to take part in the survey. Subsequently, out of the invited households, 350 responses were received and considered valid for data analysis. The results of this study show that each of the hypotheses is true and that food security in the supply chain is affected by all four aspects of food security: how easy it is to get food, how much food is available, how it is used, and how stable it is. This study is one of the first to help partners in the food security supply chain better understand the effects of food security mechanisms. This will help consumers become more aware of the food security supply chain in the long run.

Keywords: food accessibility, food availability, food stability, food utilization, food supply chain security

1.0 Introduction

Global food consumption has the propensity to rise more quickly than supply. This scenario is due to the world population expanding by around 35% which makes up a total of 75 million people increasing between the years 1995 to 2022. With a total of 7.96 billion world

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

population in the current year 2022, it is predicted to reach 10 billion population in 2050 (Suhaimi, et al., 2022). Therefore, the issue of food security includes both the physical and economic needs to cater to the entire world population, in addition, producing a sufficient food supply to meet the growing demand is deemed essential (Godfray et al., 2010; Hetch et al., 2019). Importantly, the entire world population must have access to food that is both physically available and economically feasible to meet their nutritional needs for daily activities for a healthy lifestyle (Ala and Ridwan, 2020; Benton, 2016).

One of the numerous countries whose food self-sufficiency is declining annually in Malaysia. This is because according to findings, 30% to 40% of environmental degradation was because by the consumption activities of households (Barnett, 2020; Fróna et al., 2019; Jereme, 2017). Therefore, it is crucial to conduct this study at the household level to comprehend the actual demand for food and consequently understand the impact of food security in the household. Understanding the various household characteristics and feedback particular to food security and their implications for food-related concerns might help to further detail the needs for food security. It is because food security is a crucial element of both local and global society (Sam et al., 2019; Sulaiman, 2020).

The fact is that up until a decade ago, most of the producers primarily just gave attention to production and consumption per se and ignored the effects on the environment (Jusoh et al., 2021). Whereas, in a sense, supply chain management may be impacted by climate change, particularly in tropical regions like Malaysia where it will lead to increased food insecurity and shifting sea levels (Alam et al., 2017; de Amorim et al., 2019; Solaymani, 2018). As such, Malaysia needs to enhance its food security since is crucial in maintaining the nation's stability both economically and for its citizens (Arshad and Hameed, 2010; Norazman et al., 2018). Therefore, all actors in the entire supply chain have a responsibility to ensure a high level of food security, including households, farmers, business institutions, and particularly government institutions (Ashby et al., 2016; Brinkman et al., 2020; Peng and Berry, 2018).

Food Supply Chain Assurance is important in Malaysia as it ensures that the food supply chain is safe, efficient, and reliable, which helps to protect public health, support economic growth, and enhance consumer confidence. The COVID-19 pandemic has highlighted the critical importance of food supply chain assurance, as disruptions to

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

the food supply chain can have serious consequences for public health and well-being. One recent study on the importance of food supply chain assurance in Malaysia is by Lim et al. (2021), which emphasizes the need for a robust and resilient food supply chain to ensure food security and meet the increasing demand for safe and high-quality food products. The authors argue that food supply chain assurance is crucial for maintaining public health and safety, enhancing food quality and sustainability, and promoting economic growth and competitiveness. Another study by Hassan et al. (2020) focuses on the importance of food traceability and transparency in ensuring food supply chain assurance in Malaysia. The authors argue that traceability and transparency are essential for preventing food fraud, ensuring food safety and quality, and enhancing consumer trust and confidence in the food supply chain.

A review of previous literature reveals the absence of a credible study in understanding the influence of food security dimensions on the food supply chain from a household perspective. Thus, this empirical study attempts to fill the research gap. To understand the effects of food security dimensions on the food supply chain, the study will first understand the definition of dimensions to be analyzed with convergent indicators. It is considered an important aspect that deserves attention to improve the level of food security among Malaysian households. To analyze the effects of food security on the food supply chain and to provide broader perspectives on its effects on food security among Malaysian households, this study attempts to provide an empirical finding.

The next section of this paper will discuss the food supply chain assurance followed by the four aspects of food security namely (i) food availability (FAV), (ii) food accessibility (FAC), (iii) food utilization (FUT), and (iv) food stability (FST). Next, Section 3 will talk about the suggested methodology, followed by data analysis in Section 4. Section 5 will discuss the study findings and their implications. This paper concludes by providing information about future research.

2.0 Literature Review

2.1 Food Supply Chain Assurance

The term "supply chain management" could mean many different things depending on the setting. To facilitate and coordinate all activities concerning the flow of goods and services is one common

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

definition of supply chain management. This definition encompasses all of the processes involved in transforming raw materials into finished products to fulfill the requirements of consumers. Efficiency in handling and managing food safety is an important part of supply chain management, which is one of its important components. (Suhaimi et al., 2021; Suhaimi et al., 2022). Today's food supply chains have developed into extremely dispersed, diversified, and multinational structures with a wide range of requirements. As a result, the focus shifts to increasing food security through the identification of strategic commodities that need to be prioritized, and subsequent development initiatives should be in place (Ala and Ridwan, 2020; Mc Carthy et al., 2018). Food supply chain assurance refers to the processes and practices implemented to ensure the safety, quality, and integrity of the food supply chain. This includes monitoring and controlling the entire chain, from food production and processing to distribution and consumption, to ensure that food products are safe, authentic, and meet regulatory requirements (Jusoh et al., 2021). It is very important to ensure a continuous supply of food, especially for such high consumption level country. The absence of enough supply of food may not depend on its scarcity only, nonetheless, other reasons such as poor supply chain management may also affect the availability of food supply. According to Kamrath et al. (2019) and Trienekens et al. (2012), some of the actors in the supply chain may not be identified and recognized in most supply chains network, yet their roles are so much significant to an effective food supply chain management (FSCM). As illustrated in Fig. 1, the roles of supply chain actors may facilitate the availability of food from one location to another, particularly from farming communities to various consumer locations. Food producers, traders, processors, retailers, wholesalers, distributors, and consumers are among the actors. The actors involved in obtaining the required quantity of food are critical. Similarly, the supply chain networks that will connect distributors and retailers must be established. To ensure continuous supply, the actors, network, and anything else that can affect the flow movement of food must be identified. Furthermore, value chains play an important role in FSCM, benefiting both producers and consumers. As a result of the globalization of food production, distribution, and consumption, a connected system for FSCM has emerged, and its models are critical for ensuring the high and consistent quality and safety of food items. (Ling and Wahab, 2020;

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

Fung et al., 2018). As a result, a well-structured supply chain network is critical for food quality and safety.

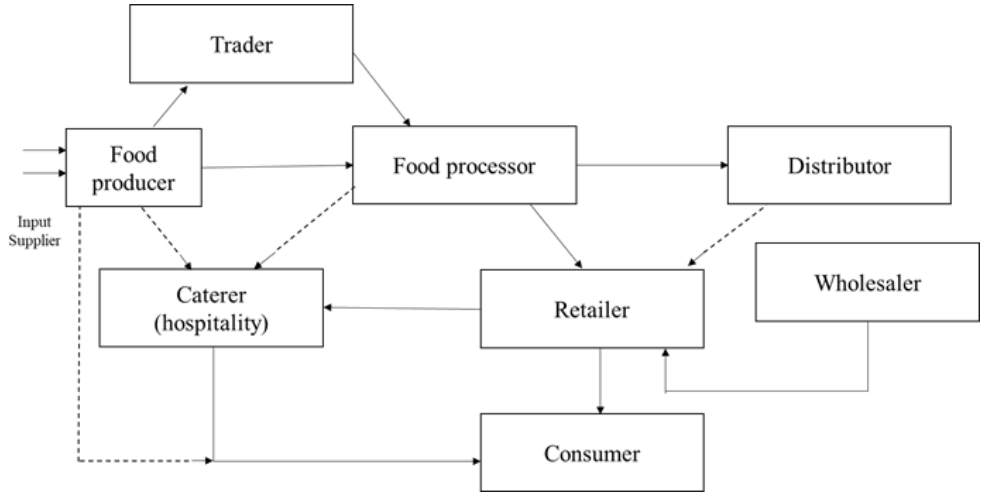

Figure 1 : Actors of Supply Chain Management (Dani, 2015)

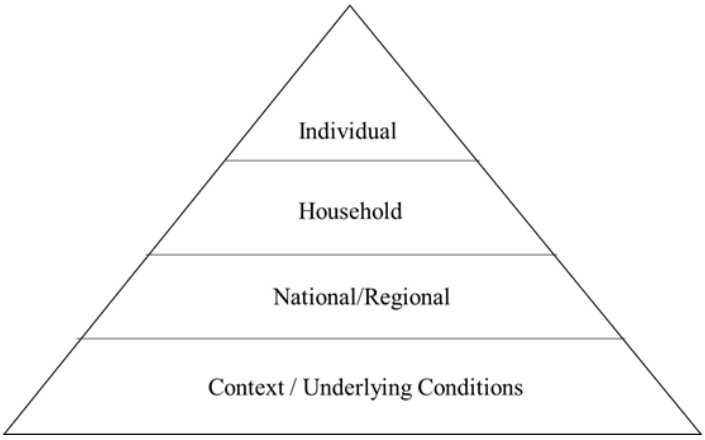

Figure 2 : Different Levels of Food Security (Gibson, 2012)

At the very least, as seen in Fig. 2, natural disasters have had a significant impact on the nation's food production and consumption levels, placing a sizable section of the population in a situation of temporary but perhaps permanent food insecurity.

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

2.2 Food Availability

Food availability is one of the fundamentals of food supply where the ability to provide a sufficient amount of food and deemed available at any time when needed. This pillar considers food availability that is either locally produced by local food producers or food that is imported. Additionally, it might consider any food reserves that already exist in a certain area and any food aid that has been allocated from other nations. Several authors have studied the association between food availability and food security assurance (Battersby and Hysom, 2020; Lawlis et al., 2018). According to Ala and Ridwan (2020) and Sam et al. (2019), food should be available in ways that respect human dignity and are socially acceptable. When individuals have access to enough food that is nutritiously enough, readily available, and stable in terms of cost and utility, the food supply chain is considered assured. Meanwhile, the provisions do not necessarily predict access but uniform supply capacity to the consumers. Considering its importance, the majority of the nation has mostly focused on this at a macro level. However, simply increasing output is insufficient to guarantee availability at the household level. Thus, food availability is imperative. Food availability refers to the accessibility of enough and the right kinds of food supply for each individual from home production, commercial imports, or benefactors. Additionally, the term food availability also refers to a continuous and dependable source of adequate nutritious food to maintain an active and healthy lifestyle. Therefore, appropriate household food production and transportation systems are vital to ensure food is available at the source points where it is grown, and food exchange systems along the supply chain (Fróna et al., 2019; Solaymani, 2018). Thus, the following hypothesis is developed to be tested in this study:

H1: Food availability has a direct and positive influence on the food supply chain assurance among consumer households.

2.3 Food Accessibility

According to Ashby et al. (2016), having sufficient financial means and easy access to food falls under the category of food accessibility. They added that food accessibility is crucial in achieving food security since it depends on establishing food availability which can be accomplished when people have enough financial resources

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

and physical access to the food that they intended to have (Fróna et al., 2019; Khan et al., 2012). Further investigation reveals that the main problem with food security in developing nations is accessibility rather than availability. Accessibility is mostly determined at the level of household-level income as well as other socioeconomic factors including employment, social support, education and safety. Therefore, from the standpoint of the consumer household, food accessibility is a crucial factor in ensuring a greater level of food supply chain assurance. The basic concept of food accessibility states that people need to have enough money or other resources to buy or trade for the quantities of appropriate foods required to maintain consumption of an adequate nutrient level across the supply chain (Lawlis et al., 2018; Trienekens et al., 2012). This proves that the food supply chain was considerably impacted by the availability of food (Alam et al., 2017; Cafiero et al., 2018). As such, the following hypothesis is developed to be tested in this study:

H2: Food accessibility has a direct and positive influence on the food supply chain assurance among consumer households.

2.4 Food Utilization

Food utilization addresses the handling of food from a safety standpoint throughout the whole supply chain network. Food utilization, according to Battersby and Haysom (2020), refers to the consumption of food that is safe and fits one's physiological, sensory, and cultural needs. In order to turn food into meals, it also refers to personal, social, and physical resources. To address the barriers to food utilization, such as the physical and nutritional losses associated with food preparation, the lack of knowledge and application of health practices relating to nutrition, child care, sanitation, and cultural customs that restrict the consumption of a nutritionally adequate diet by particular groups or family members, it is necessary to improve the method of measuring this dimension (Bala et al., 2014; Prosekov and Ivanova, 2018). It includes both sanitary and hygienic conditions as well as food safety. Food utilization is centered on people's capacity to select nutrient-dense foods and their resources to cook and store them securely, both of which have an impact on the assurance of the food supply chain (Unnevehr, 2015; van Meijl et al., 2020). The food supply chain cleanliness, which largely consists of production, processing, distribution, retail, and household, is the center of this study's attention.

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

Additionally, it is required for the development of an effective and secure food supply chain as well as the promotion of nutritional awareness among all stakeholders so that they are better informed about the nutritional value of various foods (Battersby and Haysom, 2020; Briones Alonso et al., 2018). As such, the following hypothesis is developed to be tested in this study:

H3: Food utilization has a direct and positive influence on the food supply chain assurance among consumer households.

2.5 Food Stability

This pillar primarily focuses on stability from the perspectives of food supply and access. Food stability comprehends that hunger may be momentary, cyclical, or persistent. The three aforementioned characteristics are impacted by stability over time through seasonal and transient change. Price, political stability, and the local economy are common variables that could have an impact on food stability. Weather patterns that harm crop production are another aspect that is always overlooked. It is widely acknowledged that a country, household, or consumer is more vulnerable to external variables (Ashby et al., 2016; Brinkman et al., 2020; Sam et al., 2019). A population, household, or individual must always have access to enough food they should not be at risk of losing that access due to sudden shocks (such as a natural disaster or an economic crisis) or cyclical events (such as seasonal food insecurity), nor should they have to compromise on the quality of their diet (e.g. due to high and volatile prices) (Benton, 2016; Peng and Berry, 2018). Food supply chain assurance among consumer households will be significantly impacted by food stability, which will result in substantial food security issues (Burns et al., 2000; Lawlis et al., 2018). Based on the aforementioned arguments, the following hypothesis is proposed:

H4: Food stability has a direct and positive influence on the food supply chain assurance among consumer households.

The study's framework, based on the arguments and hypotheses put forth, is shown in Fig. 3.

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

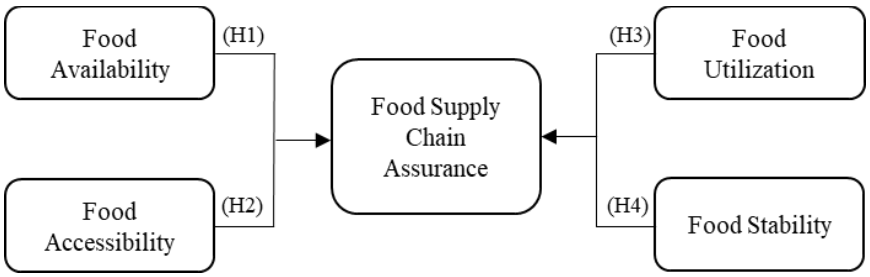

Figure 3 : Conceptual Framework

3.0 Methodology

3.1 Research Design

The framework's dimension classification and measurement tool, which was derived from earlier research, focuses on the relationship between the dimensions of food security and the safety of the food supply chain. 350 households were participating in the study as a final population sample. An email invitation to participate in the survey was sent to 498 households in Malaysia's Klang Valley at the early stage because this study predominantly uses individuals as the unit of analysis. The email included a link that led respondents to the survey and explained the study's goal. In order to create a useful snowball sample, respondents were asked to forward the invitation to further respondents. The precise response rate cannot be calculated because it is unknown how many potential responses there are. To get a more comprehensive picture of the population, it is important to just concentrate on the specific residents of this location.

3.2 Survey Instrument

The study adopted a quantitative approach that included self-administered survey questionnaires and convenience snowball sampling. A questionnaire-based survey was conducted for three months. A digital questionnaire was created and made accessible online. Based on the literature, a measurement item was created with six primary sections; (i) the respondents' profile, (ii) food availability, (iii) food accessibility, (iv) food consumption, (v) food stability, and (vi) the assurance of the food supply chain. Every item was measured using a five-point Likert scale from strongly disagree (1) to strongly agree (5). Multiple regression analysis and correlation were used to analyze the data (Sundram, et al., 2016).

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

3.3 Analytical Methods

Multivariate analysis was used to analyze the data that had been gathered. A measurement model was estimated before the structural model, as suggested by Farid and Wadood (1988). To evaluate the measurement model and examine the accuracy of the data, including reliability and construct validity checks, a confirmatory factor analysis (CFA) was employed. To evaluate the suggested model's overall fit and test the hypotheses, structural equation modeling (SEM) was conducted. The use of SEM is justified by its capacity to simultaneously estimate multiple associations among latent constructs in a model while also addressing measurement errors in the model (Hou et al., 2015). Additionally, SEM is a powerful analytical technique for handling CFA for measurement models, analyzing the causal links between latent components in a structural model, estimating their variance and covariance, and testing several model hypotheses at once (Sharif and Ang, 2001; Hou et al., 2015).

4.0 Data Analysis

An overview of the respondent's gender, age, education, and income characteristics shows an appropriate distribution. In terms of gender, 46% of the respondents were female and 54% of the respondents were male. The majority (73.2%) of the respondents were between the ages of 18 to 44. In terms of education, two main groups 32.3% were holding a bachelor's degree and 30.6% with postgraduate level. Approximately 73.2% of respondents with an income level between RM 2,000 to RM 5,000. Table 1 displays the household profiles. Wave analysis was used to measure non-response data (Rylander et al., 1995). Early responses were those that were gathered in November 2020 whereas late responses were those that were gathered in October 2021. Additionally, an independent t-test was performed, and the results showed no difference between the early and late response groups. This led to the conclusion that non-response bias was not present in the sample (Heerwegh et al., 2005).

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

Table 1 : Household Profiles

Attributes	Distribution	Frequency (n=350)	Percentage (%)
Gender	Male	189	54.0
	Female	161	46.0
Age	18 - 24 years old	115	32.9
	25 - 44 years old	141	40.3
	45 - 54 years old	62	17.7
	55 - 64 years old	32	9.1
Educational Levels	Primary/Secondary	61	17.4
	Diploma	87	24.9
	Bachelor Degree	113	32.3
	Postgraduate	87	24.9
	Others	2	0.6
Household Income	Less than RM 2,000	100	28.6
	RM 2,001 – RM 5,000	156	44.6
	RM 5,001 – RM 8,000	40	11.4
	More than RM 8,000	54	15.4

4.1 Common Method Bias Test

Common method bias suggests that some or all of the responses were gathered using the same type of scale, which causes the covariance between the measured items (Chan and Idris, 2017). The method described by Podsakoff et al. (2003) was used to conduct a one-factor test to assess whether common method variance bias existed among the study variables. To determine whether a single factor emerged from the factor analysis or if one general factor explained more than 50% of the co-variation, all the study's items were put into a principal component analysis with varimax rotation. The results showed that five dimensions could be derived from the 38 questions, and the overall variation explained was 31%, showing that there was no significant issue with common method variance in this study.

4.2 Measurement Model

The measurement model's analysis aims to explain how well the observed indicators function as a tool for measuring the latent variables. A CFA model for food security dimensions and their impacts on the food supply chain was built utilizing the gathered data to evaluate the measurement model. Six items were eliminated based on

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

the CFA results due to low factor loadings and poor squared multiple correlations. Chan and Idris (2017) claim that 20% of the items can be removed due to low factor loadings. The CFA findings for the remaining items met the requirements for model fit (χ^2 = 902.726; df = 298, p< 0.001; χ^2 /df = 3.02 GFI = 0.91, RMSEA = 0.060, and CFI = 0.93).

Consequently, the measurement model was further analyzed. Table 2 lists the CFA findings for the other 33 items about the four aspects of food security and their impacts on the food supply chain. According to Hair et al. (2006), all standardized factor loadings that emerged were significant and high, ranging from 0.71 to 0.88, suggesting that the indicators and the relevant underlying factors are suitable (Anderson and Gerbing, 1988). The table also includes the composite reliability (CR) and Cronbach's values, both of which were significantly higher than Nunnally's (1978) proposed threshold of 0.70. Each construct's average variance extracted (AVE) values were all higher than 0.50. Overall, these findings provided compelling support for the measures' uni-dimensionality, reliability, and validity.

Table 2 : Validity and Reliability for Constructs

Variables	**Statements**	**Factor Loading**	**AVE**	**CR**	**Cronbach's α**
Food Accessibility (FAC)	I cannot obtain the products I would like as often as I would like because of my financial situation.	0.772	0.57	0.888	0.486
	My family members and I have been afraid of running out of food before more money comes in.	0.761			
	The effectiveness of the current food distribution process in Malaysia is very low.	0.720			
	I need to visit a food bank to get some food for our family.	0.726			
	My family members and I have anxiety and uncertainty about the food supply.	0.813			
	Food quality or nutrition levels in the local market are very low.	0.733			
	Households having any transport for buying food.	0.738			

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

Variables	Statements	Factor Loading	AVE	CR	Cronbach's α
Food Availability (FAV)	The availability of expected food in the local market is low.	0.758	0.628	0.922	0.864
	My family members and I have not had the means to eat a balanced diet.	0.771			
	My family members and I have insufficient quality and variety of food to consume which affect our health.	0.770			
	The sufficiency of expected food in the local market is very low.	0.790			
	Changes in the unavailability of food in the market lead to food shortages causal.	0.760			
Food Utilization (FUT)	Households having knowledge about maintaining the nutritious and hygienic way of cooking and washing food is important	0.776	0.619	0.919	0.822
	Households having a neat and clean kitchen and dining place is important.	0.732			
	Households having a hygienic sanitation facility is compulsory.	0.756			
	Access to a health center is easy to get proper consultation on food intake.	0.754			
Food Stability (FST)	The availability of expected food in the local market was very low.	0.742	0.668	0.923	0.832
	The current prices of general food items were very low.	0.802			
	The current difference between rural and city food prices was very low.	0.769			
	High prices of food cause household food shortages.	0.721			
	The current level of household income was very low and cause a food shortage.	0.716			
	Ready budget arrangements to buy food anytime were very low.	0.711			
	The availability of discounts or offers on food prices in the local market was very low.	0.731			

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

Variables	Statements	Factor Loading	AVE	CR	Cronbach's α
	The stability of food prices and food supply was very low.	0.756			
Food Supply Chain Assurance (FSCA)	Our supplier/retailer can manage production resources to meet customer requests.	0.756	0.568	0.839	0.843
	Our supplier/retailer can respond to changes in the delivery requests regarding location and /or delivery date.	0.723			
	Our supplier/retailer can customize (standard) products to meet customer specifications.	0.766			
	The supplier/retailer can respond to changing household/customer requirements regarding the number of goods.	0.759			
	The supplier/retailer can respond to target household/customer needs. The supplier/retailer can respond to changing household/customer requirements regarding the quality of goods	0.771			
	The supplier/retailer can produce a range of different (types of) products or fulfill different activities in a certain fixed situation.	0.744			
	The supplier/retailer can provide the household/consumer with safe, accurate information, and a healthy and nutritious product supply.	0.795			
	The supplier/retailer practices good safety and hygiene on food supplies to household/customer	0.755			

Notes: $\chi 2 = 902.726$, GFI = 0.91, CFI = 0.93, RMSEA = 0.060, $p < 0.000$

Table 3 displays the constructs' discriminant validity. The square root of the AVE between each factor was higher than the correlation estimated between factors, confirming its discriminant validity (Chan and Idris, 2017).

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

Table 3 : Discriminant Validity

	FAC	*FAV*	*FUT*	*FST*	*FSSa*
Food Accessibility	**0.754**				
Food Availability	0.723	**0.792**			
Food Utilization	0.667	0.736	**0.742**		
Food Stability	0.578	0.766	0.198	**0.817**	
Food Security Supply Chain	0.499	0.191	0.641	0.412	**0.753**

4.3 Structural Model

A food supply chain and structural model of food security dimensions were built to estimate the parameters. Building a structural model had the purpose of determining whether the supply chain for food security was significantly impacted by the four aspects of food security. The findings indicate that χ2 is significant (χ2 /df = 2.64, ρ < 0.000; GFI = 0.90, CFI = 0.941; RMSEA = 0.06). The model's RMSEA value was 0.06, which is satisfactory and also falls within the required range. The findings show that food accessibility (β = 0.610; t-value = 3.775; p < 0.03) and food availability (β = 0.415; t-value = 2.567; p < 0.000) exert a substantial influence on the supply chain for food security, supporting H1 and H2.

Additionally, findings show that food utilization has a significant impact on the food supply chain (β = 0.513; t-value = 4.212; p < 0.000), supporting hypothesis H3. The results of this study also support H4, which asserts that food stability has a significant impact on the food supply chain (β = 0.381; t-value = 2.137; p < 0.02). An overview of the hypothesis testing is shown in Table 4.

Table 4 : Results of the Structural Model

Hypothesized path	**Standardized coefficients**	**t-value**	**p**	**Decision**
H1 Food Accessibility → Food Supply Chain Assurance	0.610	3.775	0.000	Supported
H2 Food Availability → Food Supply Chain Assurance	0.415	2.567	0.020	Supported
H3 Food Utilization → Food Supply Chain Assurance	0.513	4.212	0.000	Supported
H4 Food Stability → Food Supply Chain Assurance	0.382	2.137	0.015	Supported

Notes: χ^2 /df = 2.64, ρ < 0.000, GFI = 0.90, CFI = 0.94l, RMSEA = 0.06

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

5.0 Discussion

The food business is currently one of the most significant industries, particularly in light of Malaysia's declining domestic food supply and rising global food demand. The current study sought to evaluate the various aspects of food security and how they affected the assurance of the food supply chain. The researchers were inspired to conduct this study after collecting various feedback from fieldwork and recent government reports that the public was complaining about a wide range of issues of food security and safety. The study's findings showed that all of the hypotheses were supported and that all four aspects of food security which are accessibility, availability, stability, and utilization have an impact on food supply chain assurance. It covers many aspects and elements of food security, such as temporality and shocks (availability), physical, social, and economic access to food (accessibility), sufficient quantity and quality of food to meet nutritional needs, including the safety of food (utilization), and people's capacity to make decisions and consume preferred foods at a reasonable price and within their purchasing power (stability).

This study adds to the body of knowledge on food security since it shows that strengthening the pillars of food security will increase the assurance of the food supply chain. The results are consistent with earlier research conducted by Ala and Ridwan (2020) and Sam et al. (2019). It is noted that food accessibility and availability are the factors that account for a sizable portion of the influence on the degrees of food security assurance along the food supply chain. In a similar vein, Solaymani (2018) claimed that the accessibility and availability of food give the general public confidence in the safety of the food supply chain. This study also demonstrated that the assurance of the food supply chain will occur when there is an adequate supply of food of appropriate quality to meet nutritional needs. These findings were in line with other previous studies that found that food utilization contributed significantly to the security of the food supply chain (Prosekov and Ivanova, 2018). This research has also provided evidence for the impact of food stability on food supply chain assurance, which is consistent with earlier studies (Burns et al., 2000).

6.0 Theoretical and Practical Implications

In terms of theoretical contributions, this study has expanded earlier research carried out in the majority of Western nations and the

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

Middle East. It also offers great potential by improving knowledge of the relationship between FSCM in Malaysia and the impact of the food security dimension among Malaysian households. Additionally, this study contributes by suggesting Malaysian food supply chain participants and households that will help raise the bar for managing food security and ensuring a safe and sustainable food supply. Thus, the stakeholders in the food supply chain need to understand how each actor in the supply chain interprets the shared information given the direct influence of dimensions of the food supply chain on FSCM. There are many ways that data sharing in the supply chain can go wrong, which may lead to less cooperation and less effectiveness of the food supply, which may lead to problems with the FSCM on a national level generally. Therefore, the focus should be less on the quantity of shared information and more on the content of shared information and how this content is interpreted by other supply chain members. Additionally, in the context of the household, a better understanding of how to manage food supplies through participation in awareness programs in various ways, such as through emails or any virtual events with a high level of ubiquity conducted by the involved organizations, can improve food security at the household level.

In terms of policy implication, the Malaysian government can strengthen regulations related to food safety and quality, and increase enforcement to ensure that food products meet the required standards. This could involve increasing the frequency and rigor of inspections, as well as imposing stricter penalties for non-compliance. Malaysia can implement policies and initiatives to improve transparency and traceability in the food supply chain. This could involve the use of technology such as blockchain or barcoding systems to track products from farm to fork, and improving labeling and information disclosure requirements to ensure that consumers have access to accurate and reliable information about the products they purchase. Furthermore, the Malaysian government can collaborate with the private sector to develop and implement initiatives to improve food supply chain assurance. This could involve partnering with food industry associations and companies to develop and implement best practices, as well as providing financial incentives to encourage investment in food safety and quality.

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

7.0 Limitation and Future Research

It is a difficult task to achieve and maintain a truly worldwide solution to food insecurity. It will necessitate careful analysis of a wide range of FSCM issues with the capacity to combine both past and future effects (Brinkman et al., 2020; El Bilali et al., 2019). Farmers, processors, producers, distributors, wholesalers, retailers, consumers, governments, environmental groups, and a wide range of businesses that provide goods and services are responsible for enacting the policy changes and investment reforms necessary for a solution (Zhong et al., 2017). Additionally, because the Klang Valley was the only geographically restricted location included in this study, it is not appropriate to assume that the study's results accurately reflect the situation rather than the population of Malaysia. The future study must take ecological systems into account while examining food production and distribution networks, as well as integrate them with socio-cultural systems at various levels to solve the unique problems faced by the public as a whole.

8.0 Conclusion

Using the four aspects of food security; food availability, food accessibility, food utilization, and food stability, this study attempted to assess the contribution of different elements to the explanation of food security in Malaysia. Therefore, it emphasizes that to achieve food security at a maximum level, various factors should take into account to assure food security in the future, not just the population's access to food along the supply chain. Over the years, numerous action plans have been commissioned at a national and international level to address the problem of global food security and waste, with varying degrees of success. In a sense, the participants in the food supply chain possessed enough resources to be systematically and cogently mobilized in a direct way to improve capacity building in communities that are especially at high risk for food insecurity. The ability to effectively address the four pillars of food availability, accessibility, utilization, and stability and each of their unique problems is one suggested and highly regarded solution for food insecurity. Global value chains will face several significant obstacles in the coming years that must be overcome to guarantee a stable and sustainable food supply for the entire world's population. Due to the likelihood that inadequate food supplies may result in food-related riots and social

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

unrest, which have ethical and political repercussions in addition to having an economic and social impact, it is crucial to consider these four factors.

Acknowledgment

Our special thanks to Kementerian Pelajaran Malaysia and the Institute of Research Management & Innovation, UiTM Shah Alam. This study draws from FRGS- RACER Research Grant awarded by the Kementerian Pelajaran Malaysia; Project code: 600-IRMI/FRGS-RACER 5/3 (074/2019).

References

Ala, A. and Ridwan, I. (2020). Food security and sustainable agriculture. In *IOP Conference Series: Earth and Environmental Science*, 486, (1).

Alam, M.M., Siwar, C., Talib, B.A. and Wahid, A.N. (2017). Climatic changes and vulnerability of household food accessibility. *International Journal of Climate Change Strategies and Management*, 17, 331-346.

Anderson, J.C. and Gerbing, D.W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103 (3), 411-423.

Ashby, S., Kleve, S., McKechnie, R. and Palermo, C. (2016). Measurement of the dimensions of food insecurity in developed countries: a systematic literature review. *Public health nutrition*, *V* (19), 16, 2887-2896.

Bala, B.K., Alias, E.F., Arshad, F.M., Noh, K.M. and Hadi, A.H.A. (2014). Modeling of food security in Malaysia. *Simulation Modelling Practice and Theory*, *V*(47), 152-164.

Barnett, J. (2020). Climate Change and Food Security in the Pacific Islands. In *Food Security in the Small Island States*, 25-38.

Battersby, J. and Haysom, G. (2020). Urban food security. In *Urban Geography in South Africa*, 251-263.

Benton, T. G. (2016). Food Security. In *Encyclopedia of Applied Plant Sciences*, *V*(92), 6, 1505-1515.

Brinkman, M., Levin-Koopman, J., Wicke, B., Shutes, L., Kuiper, M., Faaij, A. and van der Hilst, F. (2020). The distribution of food security impacts of biofuels, a Ghana case study. *Biomass and Bioenergy*, (141).

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

Burns, C., Webster, K., Crotty, P., Ballinger, M., Vincenzo, R. and Rozman, M. (2000). Easing the transition: food and nutrition issues of new arrivals. *Health Promotion Journal of Australia*, 10 (3), 230-243.

Cafiero, C., Viviani, S. and Nord, M. (2018). Food security measurement in a global context: The food insecurity experience scale. *Measurement: Journal of the International Measurement Confederation*, 116, 146-15.

Chan, L.L. and Idris, N. (2017). Validity and reliability of the instrument using exploratory factor analysis and Cronbach's alpha. *International Journal of Academic Research in Business and Social Sciences*. 7 (10), 400-410.

Dani, S. (2015). Food supply chain management and logistics: From farm to fork. *Kogan Page Publishers.*

de Amorim, W.S., Deggau, A.B., do Livramento Gonçalves, G., da Silva Neiva, S., Prasath, A.R. and de Andrade, J.B.S.O. (2019). Urban challenges and opportunities to promote sustainable food security through smart cities and the 4th industrial revolution. *Land Use Policy*. (87).

El Bilali, H., Callenius, C., Strassner, C. and Probst, L. (2019). Food and nutrition security and sustainability transitions in food systems. *Food and Energy Security*, *V*(8), 2.

Faridi, R. and Wadood, S.N. (2010). An econometric assessment of household food security in Bangladesh. *The Bangladesh Development Studies*, 97-111.

Fróna, D., Szenderák, J. and Harangi-Rákos, M. (2019). The Challenge of Feeding the World. *Sustainability*, *V*(11)*,* 20, 5816.

Fung, F., Wang, H.S. and Menon, S. (2018). Food safety in the 21st century. In *Biomedical Journal*, 41, 88-95.

Gibson, M. (2012). Food Security - A Commentary: What Is It and Why Is It So Complicated? *Foods*, 1 (1) 18-27.

Godfray, H.C.J., Beddington, J.R., Crute, I.R., Haddad, L., Lawrence, D., Muir, J.F., Pretty, J., Robinson, S., Thomas, S.M. and Toulmin, C. (2010). Food security: the challenge of feeding 9 billion people. *science*, 327 (5967), 812-818.

Hassan, F. A., Radam, A., & Dahlan, N. D. (2020). Food traceability and transparency in ensuring halal food supply chain assurance in Malaysia. Journal of Islamic Marketing, 11(4), 992-1004.

Hecht, A.A., Biehl, E., Barnett, D.J. and Neff, R.A. (2019). Urban Food Supply Chain Resilience for Crises Threatening Food Security: A Qualitative Study. *Journal of the Academy of Nutrition and Dietetics*, 119 (2), 211-224.

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

Heerwegh, D., Vanhove, T., Matthijs, K. and Loosveldt, G. (2005). The effect of personalization on response rates and data quality in web surveys. *International Journal of Social Research Methodology*, *8*(2), 85-99.

Hou, M.A., Grazia, C. and Malorgio, G. (2015). Food safety standards and international supply chain organization: A case study of the Moroccan fruit and vegetable exports. *Food Control*, *V*(55), 190-199.

Jereme, I.A., Siwar, C., Begum, R.A. and Abdul, B. (2017). Food wastes and food security: The case of Malaysia. *International Journal of Advanced and Applied Sciences*, *V*(4), 8, 6-13.

Jusoh, Z.M., Rahiman, N. and Saworo, Z.N.W. (2021). Factors Influencing Consumer Purchasing Behaviour Towards Online Food Delivery Services. *Malaysian Journal of Consumer and Family Economics* 27, 131-146.

Jusoh, A., Abdullah, A. M., Abdurahman, N. H., & Md Nor, N. (2021). Overview of the food supply chain in Malaysia: Challenges and opportunities. Food Research, 5(2), 294-303.

Kamrath, C., Wesana, J., Bröring, S. and De Steur, H. (2019). What do we know about chain actors' evaluation of new food technologies? A systematic review of consumer and farmer studies. *Comprehensive Reviews in Food Science and Food Safety*, *V*(18), 3, 798-816.

Khan, R.E.A., Azid, T. and Toseef, M.U. (2012). Determinants of food security in rural areas of Pakistan. *International Journal of Social Economics*, *V*(28), 5, 1689-1709.

Lawlis, T., Islam, W. and Upton, P. (2018). Achieving the four dimensions of food security for resettled refugees in Australia: A systematic review. *Nutrition & Dietetics*, *V*(7), 2, 182-192.

Lim, C. H., Ismail, M. N., & Bujang, J. S. (2021). Food supply chain assurance in Malaysia: Issues, challenges and future prospects. International Food Research Journal, 28(1), 9-19.

Ling E.K. and Wahab, S.N. (2020). The integrity of Food Supply Chain: Going beyond Food Safety and Food Quality. *International Journal of Productivity and Quality Management*, *29*(2), 216-232.

Mc Carthy, U., Uysal, I., Badia-Melis, R., Mercier, S., O'Donnell, C. and Ktenioudaki, A. (2018). Global food security–Issues, challenges, and technological solutions. *Trends in Food Science & Technology*, *V*(77), 11-20.

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

Mohd Noor, N., Leman, Z., Jaafar, H. S., & Shaharudin, M. R. (2022). A systematic review on food supply chain traceability systems: Towards improving food safety and security. Food Control, 133

Mohamed Arshad, F. and Hameed, A.A.A. (2010). *Global food prices: Implications for food security in Malaysia (p. 21-38).*

Norazman, U.Z., Khalid, H. and Ghani, G.M. (2018). Food inflation: A study on key determinants and price transmission processes for Malaysia. *International Journal of Business and Society*, *V*(19), 1, 117-138.

Nunnally, J. C. (1978). Psychometric theory (2nd ed.). *New York: McGraw-Hill*.

Peng, W., Berry, E.M., Ferranti, P., Berry, E. and Anderson, J. (2019). The concept of food security. *Encyclopedia of Food Security and Sustainability*, *V*(2), 1-7.

Prosekov, A.Y. and Ivanova, S.A. (2018). Food security: The challenge of the present. *Geoforum*, *V*(91), 73-77.

Rylander, R.G., Propst, D.B. and Mcmurtry, T.R. (1995), "Nonresponse and recall biases in a survey of traveler spending", Journal of Travel Research, Vol. 33 No. 4, pp. 39-45.

Sam, A.S., Abbas, A., Padmaja, S.S., Kaechele, H., Kumar, R. and Müller, K. (2019). Linking Food Security with Household's adaptive capacity and drought risk: Implications for sustainable rural development. *Social Indicators Research*, *V*(142), 1, 363-385.

Sharif, Z.M. and Ang, M. (2001). Assessment of food insecurity among low-income households in Kuala Lumpur using the Radimer/Cornell food insecurity instrument–a validation study. *Malaysian Journal of Nutrition*, 7, 15-32.

Solaymani, S. (2018). Impacts of climate change on food security and agriculture sector in Malaysia. *Environment, Development and Sustainability*, 20 (4), 1575-1596.

Suhaimi A., Othman A.A., Sundram V.P.K., Ghazali A.F. (2021). Consumers' purchase decision based on intrinsic and extrinsic factors related to food safety issues: A review. IOP Conference Series: Earth and Environmental Science, 756 (1), 12010. https://doi.org/10.1088/1755-1315/756/1/012010.

Suhaimi, A., Othamn, A.A., and Sundram, V.P.K. (2022). Visualizing Food Safety Influence on Consumers' Purchase Intention Along the Supply Chain: A Bibliometric Analysis. *Malaysian Journal of Consumer and Family Economics* 28, 315-334.

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

Sulaiman, S.S. (2020). Regulating Good Agriculture Practices (GAPs) in Enhancing Sustainability of Halal Food: Malaysian Experience. *Malaysian Journal of Consumer and Family Economics* 24, 32-45.

Sundram, V.P.K., Chandran, V.G.R., Atikah, S.B., Rohani, M., Nazura, M.S., Akmal, A.O. & Krishnasamy, T. (2016). *Research methodology: Tools, methods, and techniques.* MLSCA, Selangor.

Trienekens, J.H., Wognum, P.M., Beulens, A.J. and van der Vorst, J.G. (2012). Transparency in complex dynamic food supply chains. *Advanced Engineering Informatics*, 5 (26), 55-65.

Unnevehr, L. (2015). Food safety in developing countries: Moving beyond exports. *Global food security*, 4, 24-29.

Van Meijl, H., Shutes, L., Valin, H., Stehfest, E., van Dijk, M., Kuiper, M., Tabeau, A., van Zeist, W.J., Hasegawa, T. and Havlik, P. (2020). Modeling alternative futures of global food security: Insights from Food Secure. *Global Food Security*, V (25), 22-32.

Willows, N.D. (2005). Determinants of healthy eating in Aboriginal peoples in Canada: The current state of knowledge and research gaps. Canadian Journal of Public Health, *V*(96), 3, 32–36.

Zhong, R., Xu, X. and Wang, L. (2017). Food supply chain management: systems, implementations, and future research. *Industrial Management & Data Systems*, 117 (9), 2085-2114.

Copyright © 2018 Malaysian Consumer and Family Economics Association (MACFEA).
This is an open access article under the CC BY-SA
https://creativecommons.org/licenses/by-sa/4.0/

Download Print Save to PDF Add to List Create bibliography

Malaysian Journal of Consumer and Family Economics • Volume 30, Pages 99 - 121 • 2023

Document type
Article

Source type
Journal

ISSN
15112802

View more

Food Supply Chain Assurance: Malaysian Consumer Household Perspective

Roslan, Azreen[a]; Ghapar, Farha[b]; Lian, Chew Li[c]; Wahab, Siti Norida[a]; Muhamed, Ariff Azly[a] ;
Sundram, Veera Pandiyan Kaliani[a]
Save all to author list

[a] Faculty of Business and Management, Universiti Teknologi MARA, UiTM Cawangan Selangor, Kampus Puncak Alam, Selangor, Malaysia

[b] Universiti Poly-Tech Malaysia, Cheras, Kuala Lumpur, Malaysia

[c] Binary Business School, Binary University, Selangor, Malaysia

Full text options Export

Abstract

Food supply chain assurance refers to the measures and processes that are put in place to ensure the safety, quality, and reliability of the food supply chain from farm to fork. Food supply chain assurance aims to minimize the risk of foodborne illnesses, ensure the integrity of the supply chain, and build trust between consumers and producers. Hence, this paper aims to provide empirical evidence on the effects of the dimensions of food security and their impacts on the food supply chain in the context of households in Malaysia. This research primarily focuses on individuals as the unit of analysis, and 498 households in the Klang Valley, Malaysia, were invited to take part in the survey. Subsequently, out of the invited households, 350 responses were received and considered valid for data analysis. The results of this study show that each of the hypotheses is true and that food security in the supply chain is affected by all four aspects of food security: how easy it is to get food, how much food is available, how

Cited by 0 documents

Inform me when this document is cited in Scopus:

Set citation alert >

Related documents

A retrospective analysis of climate adaptation strategies and implications for food and nutrition security among small-scale farmers in South Africa
Kori, D.S. , Zhou, L. , Sibanda, M.
(2023) Frontiers in Sustainable Food Systems

Raising awareness about food security using a massive open online course
Stevens, C.J. , Whittle, R. , Davies, W.J.
(2020) Plants People Planet

Cybersecurity for Smart Farming: Socio-Cultural Context Matters
Van Der Linden, D. , Michalec, O.A. , Zamansky, A.
(2020) IEEE Technology and Society Magazine

View all related documents based on references

Find more related documents in Scopus based on:

Authors > Keywords >

it is used, and how stable it is. This study is one of the first to help partners in the food security supply chain better understand the effects of food security mechanisms. This will help consumers become more aware of the food security supply chain in the long run. © 2018 Malaysian Consumer and Family Economics Association (MACFEA).

Author keywords

food accessibility; food availability; food stability; food supply chain security; food utilization

Sustainable Development Goals 2023 New

SciVal Topics

Metrics

Funding details

References (52) View in search results format >

All

Export Print E-mail Save to PDF Create bibliography

1 Ala, A., Ridwan, I.
Food security and sustainable agriculture

(2020) *IOP Conference Series: Earth and Environmental Science*, 486 (1), art. no. 012110. Cited 3 times.
https://iopscience.iop.org/journal/1755-1315
doi: 10.1088/1755-1315/486/1/012110

View at Publisher

2 Alam, M.M., Siwar, C., Talib, B.A., Wahid, A.N.
Climatic changes and vulnerability of household food accessibility
(2017) *International Journal of Climate Change Strategies and Management*, 17, pp. 331-346.

3 Anderson, J.C., Gerbing, D.W.
Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach

(1988) *Psychological Bulletin*, 103 (3), pp. 411-423. Cited 28953 times.
doi: 10.1037/0033-2909.103.3.411

View at Publisher

4 Ashby, S., Kleve, S., McKechnie, R., Palermo, C.
Measurement of the dimensions of food insecurity in developed countries: A systematic literature review

(2016) *Public Health Nutrition*, 19 (16), pp. 2887-2896. Cited 59 times.
http://journals.cambridge.org/PHN
doi: 10.1017/S1368980016001166

View at Publisher