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Why Food Insecurity Occurs and How to Overcome it Study Case on ASEAN Countries

BY

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Abstract

Developing countries that have large populations and complex geographic diversity experience challenges in ensuring sufficient food availability and accessibility due to various factors. There is a need for appropriate strategies to overcome food insecurity in each country. This research was designed using a quantitative research approach using non-participant observation data collection methods. This research uses descriptive and path analysis techniques. The results of this research include, food availability and access to food have a negative and insignificant effect on economic openness, food utilization aspects have a positive and significant effect on economic openness, food availability, access to food and economic openness have a negative and insignificant effect on food insecurity, and aspects of food utilization have a positive and insignificant effect on food insecurity. Based on the results of this research, it is hoped that each country in ASEAN can maximize domestic production, including diversifying food products and strengthening foreign relations to cover domestic production deficiencies. Apart from that, increasing life expectancy in each country is a challenge in itself, so that densely populated countries are expected to implement birth restrictions because food insecurity will tend to occur due to the increasing size of the country's population as direct consumers. So, it is hoped that all countries that are members of ASEAN can have a sustainable food system.

Keywords: food insecurity, food production, GDP, life expectancy, openness

1. Introduction

The agricultural sector is one of the sectors that is currently being given more attention in international economic development, especially those related to the management and utilization of strategic results, especially those involving food commodities (Isbah and Iyan, 2016). Agricultural development aims to increase production to meet domestic food and industrial needs, increase exports, and expand employment opportunities to increase income, especially for farmers. The implementation of agricultural development is not only aimed at improving the status and welfare of farmers, but is also aimed at developing human resource potential both economically, socially, politically, culturally and environmentally through improvement, growth and change (Hendrickson, et al, 2008).

Asia is the most productive region in producing products in the agricultural sector compared to other areas because it is supported by a climate that is very suitable for agricultural activities. Figure 1 shows the development of the production value of the world agricultural sector from 2019 to 2021. The production value of the agricultural sector in Asia is the highest compared to other continents with an average production amount of $2.49 trillion with growth of 1.16% every year. This shows that Asian agriculture is growing and developing rapidly so that many countries from Asia are becoming exporters of agricultural products. Meanwhile, the continents of Australia and Oceania have the lowest average production value, namely $48 billion and $49 billion.

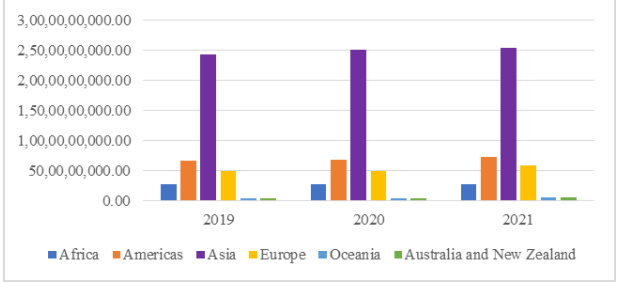

Figure 1 Development of World Agricultural Sector Production Value 2019-2021, (1000 $)
Source : FAOSTAT, 2023

The agricultural sector in the Southeast Asia region generally has an important economic and social impact. One of its essential roles is related to the basic needs of its people. Sufficient and stable food availability can contribute to the economic, social and political stability of a country. According to Hermawan (2013), around 45% of people's lives in ASEAN still depend on the agricultural sector. One of its essential roles is related to consumption, not only consumed for food and feed needs, but also energy. Sufficient and stable food availability can contribute to the economic, social and political stability of a country. Food availability refers to the sufficiency of food supplied through domestic production or imports (including food aid). This means that when national food production is unable to meet national food needs, a country experiences a food gap (Ara and Ostendorf, 2017). Food inequalities arise along with increasing population, changes in lifestyle, urbanization, natural disasters, land conversion and the threat of climate change which are driving factors for food insecurity (Jhamtani, 2008; Subejo et al, 2017).

Table 1 Average Value of Agricultural Sector Production and Population in 11 ASEAN Countries, 2019-2021

Country	Average Production (Million Tons)	Average Population (Million people)	Average Production Growth (%)	Average Population Growth (%)
Brunei Darussalam	0,23	442	3,03	0,83
Cambodia	25,48	16.398	5,16	1,17
Indonesia	568,50	271.731	1,19	0,70
Laos	16,65	7.319	10,75	1,44
Malaysia	117,57	33.193	-4,13	1,13
Myanmar	63,60	53.420	-1,09	0,70
Philippines	112,07	112.151	3,45	1,51
Singapore	0,82	5.906	-9,04	0,53
Thailand	217,57	71.462	-1,29	0,18
Timor Leste	0,35	1.300	-9,24	1,61
Vietnamese	123,67	96.631	0,78	0,85

Source: FAOSTAT, 2023
Table 1 shows that from 2019 to 2021, the largest agricultural sector production in all sub-sectors in ASEAN was Indonesia with an average of 568.90 million tons, while Thailand was second with an average production of 217.57 million tons. Indonesia is famous for having the largest population in ASEAN, so the level of domestic food demand has also increased. Rapid population growth causes the level of demand for agricultural products to increase rapidly. If it is not accompanied by a balanced and effective increase in production, there will be a shortage of supply for domestic demand. Every country must implement more effective and efficient agricultural policies in order to meet consumption needs in the future. Like the countries of Malaysia, Myanmar and Thailand, although production levels are greater than possible consumption due to their large population, their population growth is higher than the growth of agricultural sector production. This reflects that their production has not been effective in dealing with rapid population growth, so it is feared that the country, as a world producer of agricultural products, will experience food insecurity, thereby increasing the amount of food imports to meet domestic food needs.

The poverty factor shows the condition of society's limitations in obtaining food. Poverty is one of the symptoms that can lead to food insecurity (Cheong, 2021). The ability to purchase additional food supplies is different in each ASEAN country, meaning that it is possible that countries with a GDP that is not too high will find it more difficult to meet the food needs of their country (Rigg, 2006). In addition, the better the technology in creating a public health climate, the higher the chances of society having a longer lifespan. This relationship means that the longer a person lives, the higher the level of consumption of these foodstuffs. So apart from population growth, a person's life expectancy also influences the amount of food consumed which results in the possibility of food insecurity becoming higher in every country.

From this background, the problem of food availability, access to food, and aspects of food utilization that influence food insecurity and the role of economic openness in minimizing food insecurity in ASEAN countries emerge.

REASERCH ELABORATIONS

Concerns about the food crisis were first expressed by Thomas Robert Malthus (1766–1834), that the rate of population growth increased based on a geometric series, while food production was based on an arithmetic series. It can be said that Malthus's theory

reminds us that naturally future generations will have more complex problems related to food availability, compared to previous generations. The approach is focused on disequilibrium between population and food. To maintain this balance, the growth rate of food availability must not be lower than the population growth rate. Consequently, in this view food security is a closed economy, it mainly depends on food production and supplies, whereas in an open economy also food trade can play a relevant role. Although in 1996 the World Food Summit adopted, with great consensus, a much broader and more advanced definition of food security, which includes, in addition to availability, other fundamental dimensions of food security such as food access and utilization narrow sectoral focus on agricultural supply, productivity and technology still dominates international food security discourse and practice (Karen, 2015).

Initially the focus on the food sector was limited to agricultural production and food trade, but this was criticized by economists because it was too concentrated on a single economic sector. Food security cannot be seen as an exclusive problem of the agricultural and food sectors. Therefore, an effort was made to shift the analysis towards the national economy as a whole. This includes analysis variables such as Gross Domestic Product (GDP), economic growth. In a market economy, a stronger economic system allows for imports of goods such as food (Rigg, 2006). This entire approach can be considered as a way to increase aggregate food availability (Song, et al, 2022).

This research was designed for quantitative research purposes. The data used is secondary data sourced from The Food and Agriculture Organization (FAO) Statistics and World Bank Open Data. We analyzed the influence of food availability, access to food, and aspects of food utilization on food insecurity by including economic openness as an intervening variable in eleven ASEAN countries. The exogenous data used includes food availability which is measured using the food production index, access to food which is measured using GDP per Capita, aspects of food utilization which are measured using life expectancy at birth. Next, for endogenous variables, we use economic openness using data on the openness index, and food insecurity using data on the prevalence of severe food insecurity in the population. The analysis model used is panel data regression with path analysis.

RESULTS AND FINDING

4.1. Descriptive statistics

The data seen is the average (mean), standard deviation, maximum value, minimum value, and total research data.

Table 2 Results Descriptive Statistics

	Openness	Availability	Access	Utilization	Vulnerability
Mean	0.727327	106.5730	16685.13	75.52400	4.776667
Median	0.723900	103.7700	6719,500	75.56000	1.150000
Maximum	0.890000	133.2000	66837.00	84.47000	16.90000
Minimum	0.649100	94.36000	1171,000	68.81000	0.000000
Std. Dev.	0.076317	8.940238	22976.54	5.181620	5.581848
Observations	30	30	30	30	30

Source : Processed data , 2023

The results of the analysis above display statistical data for each research variable used, which can be explained as follows:

1) Food Availability
   The results of descriptive statistical testing for the food availability variable have the lowest (minimum) value of 94.2 percent and the highest (maximum) value of 133 percent with an average (mean) value of 106 and a standard deviation of 8.9 percent.
2) Access to Food
   The result of testing statistics descriptive variable access to food own mark the lowest (minimum) is US$ 1,171 and value The highest (maximum) is US$ 66,837 with the average value (mean) is US$ 16,685 and standard the deviation amounting to US$ 22,976.
3) Food Utilization
   The results of descriptive statistical testing of the food utilization variable have the lowest (minimum) value of 68.81 percent and the highest (maximum) value of 84.47 percent with an average (mean) value of 75.52 percent and a standard deviation of 5.18 percent.
4) Openness Economy
   The results of descriptive statistical testing for the economic openness variable have the lowest (minimum) value of 0.64 and the highest (maximum) value of 0.89 with an average (mean) value of 0.72 and a standard deviation of 0.07.
5) Food Insecurity

The results of descriptive statistical testing for the food insecurity variable have the lowest (minimum) value of 0 percent and the highest (maximum) value of 16.9 percent with an average (mean) value of 4.77 percent and a standard deviation of 5.58.

4.2 Determining the Regression Estimation Model

To choose the right model, there are several tests that can be carried out, namely:

1. Chouw test (Test Chow)

Based on the Chow test results in Table 3, it can be seen that the value probability cross-section chi-square 0,000 < 0.05 It means H 0 rejected And H 1 accepted, so this research uses model fixed effects.

Table 3 Results Test Chow

Effects Test	Statistics	df	Prob.
Cross-section Chi-square	83.198005	4	0.0000

Source: Data processed, 2023

1. Hausman test Based on the Hausman test results in Table 4, the probability value is known *Random cross section* 0.000 < 0.05 means H0 is rejected and H1 is accepted, then a *fixed effect* model is used . After carrying out the Chow and Hausman tests, it can be concluded that the model used is a *fixed effect model* .

Table 4 Results Hausman test

Test Summary	Chi-Sq. Statistics	Chi-Sq. df	Prob.
Cross-section random	315.227921	4	0.0000

Source: Data processed , 2023

4.3 Direct Effect Testing Testing of the direct influence of food availability, access and utilization on economic openness was carried out using the Eviews ver.10 program. then the results of the regression test are presented in Table 5.

Table 5 Testing the Direct Effect of Food Availability, Access and Utilization on Economic Openness

Variables	Coefficient	Std. Error	T-Statistics	Prob.
C	-0.322831	0.158453	-2.037387	0.0538
Availability	-0.001083	0.018117	-0.059792	0.9529
Laxcess	-0.020600	0.014186	-1.452155	0.1606
Utilization	0.016402	0.002537	6.464762	0.0000

Source: Processed data , 2023

Based on the regression results, the following structural equation can be drawn.

Structural Equation I
Ŷ1 = β1X1+ β2X2+ β3X3
Ŷ1 = -0.001Lketer–0.02LAaccess+ 0.016Utilization

Testing the influence of food availability, access and utilization and economic openness on food insecurity was carried out using the Eviews ver.10 program, the results of the regression test are presented in Table 6.

Table 6 Testing the Effect of Food Availability, Access and Utilization and Economic Openness on Food Insecurity

Variables	Coefficient	Std. Error	t-Statistics	Prob.
C	31.08820	20.94685	1.484147	0.1526
Openness	-4.836192	25.85077	-0.187081	0.8534
Availability	-0.994576	2.196841	-0.452730	0.6554
Laxcess	-2.336177	1.800603	-1.297441	0.2086
Utilization	0.035232	0.523851	0.067257	0.9470

Source: Processed data , 2023

Based on the regression results, the following structural equation can be drawn.

Structural Equations II
Ŷ 2 = β 4 X 1 + β 5 X 2 + β 6 X 3 + β 7Y1
Ŷ 2 = -4.836192 Openness-0.994576 Lketer – 2.33 Access + 0.03 Utilization

Thus, the results of testing the direct influence hypothesis can be explained as follows.

1. Food availability influential negative And No significant to economic openness with mark probability s is 0.952 > 0.05.
2. Access to food matters negative And No significant to economic openness with mark probability s is 0, 160 > 0.05.
3. Food utilization influential positive And significant to economic openness with mark probability s of 0, 000 < 0.05.
4. Economic openness has an influence negative and No significant to food insecurity with mark probability s is 0.853 > 0.05.
5. Food availability has an influence negative and No significant to food insecurity with mark probability s is 0.655 > 0.05.
6. Access to food matters negative and No significant to food insecurity with mark probability s is 0, 208 > 0.05.
7. Food utilization has an influence positive and No significant to food insecurity with mark probability s is 0.947 > 0.05 .

4.4 Indirect Effect Testing

The indirect effect of a variable on other variables in this study is presented in Table 7 , tested using the Sobel Test.

Table 7 Indirect Influence of Research Variables

Connection Intervariables	Variable Mediation	Sobel Test	Information
X 1 2	YY 1	0 .017	No Significant
X 2 2	YY 1	0.018	Not Significant
X 3 Y 2	Y 1	-0.0187	Not Significant

Source: Processed data , 2023

Information
X1 = Food availability
X2 = Access to food
X3 = Food utilization
Y1 = Economic Openness
Y2 = Food insecurity

Based on Table 7, it shows that the indirect effect of food availability on food insecurity is through economic openness has a

calculated Z value of 0.017 < 1.96, then H0 is accepted and H1 is rejected, which means that food availability has no indirect effect on food insecurity through economic openness.

Based on Table 7, it shows that the indirect effect of access to food on food insecurity is through economic openness has a calculated Z value of 0.018 < 1.96, then H0 is accepted and H1 is rejected, which means that access to food has no indirect effect on food insecurity through economic openness.

Based on Table 7, it shows that the indirect influence of food utilization on food insecurity is through economic openness has a calculated Z value of 0.0187 < 1.96, then H0 is accepted and H1 is rejected, which means that food utilization has no indirect effect on food insecurity through economic openness.

CONCLUSION

The results of this research include, food availability and access to food have a negative and insignificant effect on economic openness, food utilization aspects have a positive and significant effect on economic openness, food availability, access to food and economic openness have a negative and insignificant effect on food insecurity, and aspects of food utilization have a positive and insignificant effect on food insecurity. Based on the results of this research, it is hoped that each country in ASEAN can maximize domestic production, including diversifying food products and strengthening foreign relations to cover domestic production deficiencies. Apart from that, increasing life expectancy in each country is a challenge in itself, so that densely populated countries are expected to implement birth restrictions because food insecurity will tend to occur due to the increasing size of the country's population as direct consumers. So, it is hoped that all countries that are members of ASEAN can have a sustainable food system.

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