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HOUSEHOLD FOOD SECURITY ANALYSIS PRE AND POST THE COVID-19 PANDEMIC IN BENGKULU PROVINCE

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ABSTRACT

Bengkulu Province is one of the provinces that experienced changes in the food security index pre and post the pandemic Covid-19. In 2018, the food security index (IKP) for Bengkulu Province was 70.77 and will decrease in 2022 to 68. Even though the IKP has decreased, Bengkulu Province is still in the food secure category. The aim of this research is to find out whether there are differences in food security conditions at the household level pre and post the pandemic Covid-19 using descriptive analysis and formal tests. The results of the analysis using the chi-square test show that the Pearson chi-square test shows a significance value of 0.00 (<a=5%). This demonstrates that the year and the food security of a household are related. In accordance with the initial assumption that the pandemic Covid-19 occurred in 2020 and 2018-2019 was the year before the pandemic and 2021-2022 was after the pandemic, it can be concluded that reject H0 where a connection between the impact of the pandemic Covid-19 and household food security. This is in line with the previous descriptive analysis where there was a relationship between the Covid-19 pandemic and household food security.

INTRODUCTION

Based on Law UU no. 18/2012 concerning food states that a state of having enough food, both in terms of quantity and quality, that is safe, diverse, nutritious, equitable, affordable, and does not conflict with community culture, religion, or beliefs is known as food security. It is the ability of people to live long, healthy, and productive lives in a sustainable way. Food availability, food

access, and food utilization are the three primary components of food security as defined by the World Health Organization. The ability to have enough food to meet basic needs is known as food availability. The ability to have the financial and material means to obtain wholesome food is known as food access. The capacity to appropriately and proportionately use food ingredients is known as food utilization.

Nutritional issues, such as malnutrition in children under five, will arise from not having access to nourishing food (Hackett et al. 2009; Motbainor et al. 2015). In addition, food insecurity has been linked to the prevalence of chronic diseases (Seligman et al. 2010; Gowda et al. 2012) and obesity in women (Franklin et al. 2011; Pan et al. 2012). In addition, food insecurity has been connected to poor pregnancy risk in women (Ivers & Cullen 2011), anxiety and depression, and risky sexual behavior (Vogenthaler et al. 2013). Even more widespread social effects of food insecurity include children's delayed mental development (Rose-Jacobs et al. 2008; Slopen et al. 2010).

Bengkulu Province is one of the provinces that experienced changes in the food security index pre and post the pandemic Covid-19. In 2018, the food security index (IKP) for Bengkulu Province was 70.77 and will decrease in 2022 to 68. Even though the IKP has decreased, Bengkulu Province is still in the food secure category. If broken down by district/city, the decline in the food security index occurred in Rejang Lebong, Central Bengkulu, Kepahiang Regencies, and the worst occurred in North Bengkulu Regency. This can be seen in table 1.

Table 1. Food security status of cities in Bengkulu Province

City in Bengkulu Provinsi	IKP 2018	Status 2018	IKP 2022	Status 2022
Bengkulu Selatan	71,55	Secure	73,67	Secure
Rejang Lebong	71,35	Secure	66,68	Resistant
Bengkulu Utara	72,92	Secure	58,31	Vulnerable
Kaur	67,68	Secure	71,51	Secure
Seluma	69,74	Secure	68,54	Secure
Mukomuko	74,6	Secure	71,78	Secure
Lebong	69,17	Secure	74,86	Secure
Kepahiang	73,44	Secure	67,14	Resistant
Bengkulu Tengah	72,63	Secure	62,12	Resistant
Bengkulu City	64,58	Secure	65,29	Secure
Bengkulu Province	**70,766**	**Secure**	**67,99**	**Secure**

Source: BPS

The concept of food security is very broad and complex; it has four main domains: availability, accessibility, and utilization; it also has a hierarchical

level, with levels at the community (district, province), macro (global, regional, and national), and micro (household and individual) (Adriani & Wirtjatmadi, 2012; Jones et al. 2013; Pinstrup-Andersen 2009; Purwaningsih 2008). Macrofood availability does not always translate into household food access (Sen 1981) or the attainment of optimal personal nutrition (Barrett 2010). Even though there may be enough food in one place, not every household may have access to it. As a result, the household is an essential institution for guaranteeing that each member of the household has access to food that is both sufficient in quantity and quality.

The ratio of net availability per capita to normative consumption serves as an indicator of food availability. FAO (2006) states that food security in households is not ensured by food availability on a national and worldwide scale. Regional food security is a requirement for achieving food security at the household level, even though Lantarsih et al. (2011) state that it does not ensure the creation of household food security.

The percentage of the population living in poverty, the percentage of households spending more than 65% of their total consumption on food, and the percentage of households without access to electricity are all indicators of the food access subsystem. A family's food consumption habits and other household expenses are significantly influenced by their income. Income growth will lead to more varied consumption patterns, which will increase the consumption of foods high in nutrients (Yudaningrum, 2011). Food expenditures will outweigh non-food expenditures in impoverished households, which will affect nutritional fulfillment and ultimately determine household food security. The degree of consumption will depend on how well the food fulfills nutritional needs. The level of energy consumption will rise in proportion to the nutritional value of the food consumed. The same is true for protein intake. If there are still issues with resilience, as evidenced by a decline in welfare and income, a village cannot be considered independent (Purwaningsih et al., 2008).

In coastal areas, according to Sukiyono et. al. (2015), fishermen's and farmers' demands also set limits on food security. It follows that food kinds are also categorized based on how essential they are to doing tasks. Vegetables, side dishes, and staple foods are the kinds of food that need to be available, as was covered in the previous section. Depending on the kind of farming and fishing community, different key indicators may be used to determine these limits. The sustainability of healthy eating patterns that are ingrained in social institutions and that can be developed individually is another crucial indicator to take into account. Apart from that, whether or not there are basic necessities obtained by borrowing also determines whether the household in question is experiencing food insecurity or not.

Therefore, information is needed about the picture of food security in Bengkulu Province, both in general and on formal tests of the impact of the Covid-19 pandemic.

The aim of this research is to find out whether there are differences in food security conditions at the household level pre and post the pandemic Covid-19 using descriptive analysis and formal tests. The benefits of the research " Household food security analysis pre and post the pandemic Covid-19 in Bengkulu Province" can be used as a basis for strategic steps for regional government policy making in Bengkulu Province to maintain household food security in Bengkulu Province.

RESEARCH METHODS

This research uses secondary data, namely the National Socioeconomic Survey (SUSENAS) from 2018 before the Covid-19 pandemic to 2022 after Covid-19 ends. The first step taken was to calculate the response variable, namely household food security using an expenditure approach (Maxwel S, et al, 2000). The response variable is measured by the proportion of food expenditure and level of energy consumption. The proportion of food expenditure is the proportion between household food expenditure to total household expenditure which can be calculated by formula:

$$PF = \frac{PP}{TP}\ x\ 100\%$$

With:
PF = Proportion of Food Expenditure
PP = Household Food Expenditures (Rp/Month)
TP = Total Household Expenditures (Rp/Month)
(Ilham and Bonar, 2008)

The formula is used to determine the energy or food consumption levels based on the amount of food consumed and the consumption of nutrients found in food:

$$TKE = \frac{\sum Energy\ Consumption}{Recommended\ AKE}\ x\ 100\%$$

With:
TKE = Energy Consumption Rate (%)
∑Energy Consumption = Total Energy Consumption (kcal/capita/day)
Recommended AKE = Recommended Energy Adequacy Rate (kcal/capita/day

A cross-classification of these two indicators is used, as shown in the table below, to assess the level of food security at the household level.

Table 2. Measuring the Degree of Household Food Security

Energy Consumption	Proportion of Food Expenditure (Proportion of Food Expenditures to Total Expenditures)	
	Low (<60% Total Expenditures)	High (≥60% Total Expenditures)
Sufficiently (>80% recommended energy consumption)	I (Food Security)	II (Food Vulnerability)
Less (≤80% recommended energy consumption)	III (Lack of Food)	IV (Food Insecurity)

Source : Ilham & Bonar, 2008

Table 2. shows that household food security is four category ordinal data, namely food security, food insecurity, food insecurity and food insecurity with the following explanation:

1. A household is considered to be in food security if its total spending on food is less than 60% and its energy consumption is more than 80% of the recommended Energy Adequacy Rate (sufficient). The food needs of households in this category are satisfied and they have access to food.
2. A household is considered to be food vulnerable if the amount spent on food is more than or equal to 60% of total expenses and the amount of energy consumed exceeds 80% of the recommended Energy Adequacy Figure (sufficient). Although food is available to households in this category, meeting their nutritional needs remains their top priority when it comes to spending.
3. A household is considered to be in food shortage if the amount spent on food is less than 60% of total expenses and the amount of energy used is less than or equal to 80% of the suggested Energy Adequacy Figure (less). This category of households prioritizes spending on non-food needs even though their food needs are not yet satisfied.
4. A household is considered to be food insecure if the percentage of expenses related to food is more than or equal to 60% of total expenses and the percentage of energy consumed is less than or equal to 80% of the suggested Energy Adequacy Rate (less). These households do not have access to food, and their food needs are not currently being satisfied.

The following action is to perform a descriptive analysis to determine whether the circumstances surrounding household food security pre and post the Covid-19 pandemic differ. This descriptive analysis compares household

food security in 2018-2022. The results of this descriptive analysis will later be compared and validated using a formal chi-square test.

A non-parametric comparative test called Chi Square is used to compare two variables whose data scales are the same. A chi square test is performed (i.e., the test at the lowest degree must be used) if, out of the two variables, one has a nominal scale.

The most popular non-parametric test is the chi square test. It is important to note that there are certain requirements for this test, such as a high sample size or frequency of respondents, as there are multiple scenarios in which chi square can be applied, including:

1. There are no cells with a real frequency value or also called Actual Count (F0) of 0 (Zero).
2. If the contingency table is in the form of 2
3. If the table shape is more than 2 x 2, for example 2 x 3, then the number of cells with an expected frequency of less than 5 cannot be more than 20%. To understand what a "cell" is, look at the table below:

Table 3. Contingency Coefficient

Household Food Security	Year					Total
	2018	2019	2020	2021	2022	
Food Security	A	b	c	d	e	a+b+c+d+e
Food Vulnerability	F	g	h	i	j	f+g+h+i+j
Lack of Food	K	l	m	n	o	k+l+m+n+o
Food Insecurity	P	q	r	s	t	p+q+r+s+t
Total	a+f+k+p	b+g+l+q	c+h+m+r	d+i+n+s	e+j+o+t	N

Source : Ilham & Bonar, 2008

This test is related to the chi-square test because based on the coefficient test formula it is impossible for this coefficient to be calculated without first knowing the value of chi-square. So, the logic is to calculate the chi-square first, then calculate the contingency coefficient.

This research uses the assumption that the Covid-19 pandemic occurred in 2020 and that 2018-2019 was the year before the pandemic and 2021-2022 was after the pandemic. The hypothesis used is as follows:

H0 = There is no relationship between time and household food security

H1 = There is relationship between time and household food security

RESULTS AND DISCUSSION

Based on the results of data grouping for Bengkulu Province in 2022, the people of Bengkulu Province are still dominated by households in the food secure category at 40.9%, followed by food insecure at 37.14%. Households in the food vulnerable category show that the majority of people in Bengkulu Province still prioritize their spending on food consumption.

Table 4. Household Food security in Bengkulu Province in 2022

Code	Household Food Security	Total
1	Food Security	40,90%
2	Food Vulnerability	37,14%
3	Lack of Food	14,31%
4	Food Insecurity	7,66%
	Grand Total	**100,00%**

Source: Susenas BPS

Table 5. shows that, if breaking down by district and city in 2022, the city with the largest contribution to food security is Bengkulu City with a contribution of 5.4%, followed by Muko-Muko Regency with a contribution of 4.75% and North Bengkulu Regency with a contribution of 4.51%.

Table 5. Household food security in Bengkulu Province based on city in 2022

City	Food Security	Food Vulnerability	Lack of Food	Food Insecurity	Grand Total
Bengkulu Selatan	4,04%	3,83%	0,92%	0,78%	9,57%
Rejang Lebong	4,42%	3,41%	1,95%	0,90%	10,69%
Bengkulu Utara	4,51%	3,67%	1,64%	0,87%	10,69%
Kaur	3,29%	5,01%	0,66%	0,57%	9,54%
Seluma	3,90%	3,99%	0,90%	1,13%	9,92%
Muko-Muko	4,75%	3,25%	1,29%	0,59%	9,89%
Lebong	2,87%	5,46%	0,64%	0,57%	9,55%
Kepahiang	3,64%	3,55%	1,46%	0,89%	9,54%
Bengkulu Tengah	4,09%	3,48%	1,08%	0,75%	9,40%
Kota Bengkulu	5,40%	1,48%	3,76%	0,59%	11,23%
Grand Total	**40,90%**	**37,14%**	**14,3%**	**7,66%**	**100,0%**

Source: Susenas BPS

In the food vulnerable category, the district with the largest contribution is Lebong District with a contribution of 5.46%, followed by Kaur District with a contribution of 5.01% and South Bengkulu District with 3.83%. In the food shortage category, the city with the largest contribution is Bengkulu City with a contribution of 3.76, followed by Rejang Lebong Regency with a contribution of

1.95% and North Bengkulu Regency with a contribution of 1.64%. In the food insecurity category, the district with the largest contribution is Seluma Regency with a contribution of 1.13%, followed by Rejang Lebong Regency with a contribution of 0.9% and Kepahiang Regency with a contribution of 0.89%. It can be concluded that Bengkulu City is the largest contribution to food security, but Bengkulu City is also the largest contribution to food shortages. The largest contribution to food insecurity is Lebong Regency and the largest contribution to food insecurity is Seluma Regency.

The results of the analysis from 2018-2022 in Bengkulu Province based on the household food security category, the data shows a negative trend where there is a decrease in the percentage of the food security and food vulnerability category and an increase in the food security and food insecurity category. Before the Covid-19 pandemic in 2018, the food security category was 43.29% and after the Covid-19 pandemic in 2022 it decreased to 40.9%. Before the Covid-19 pandemic in 2018, the food vulnerable category was 40.03% and after the Covid-19 pandemic in 2022 it decreased to 37.14%. Before the Covid-19 pandemic in 2018, the food shortage category was 10.39% and after the Covid-19 pandemic in 2022 it increased to 14.31%. Before the Covid-19 pandemic in 2018, the food insecurity category was 6.3% and after the Covid-19 pandemic in 2022 it decreased to 7.66%. It can be concluded that there has been a decline in the level of energy consumption after the Covid-19 pandemic in all expenditure percentages, whether dominated by food or non-food expenditure. It can also be concluded that the results of the descriptive analysis show that there is a link between the impact of the pandemic Covid-19 and household food security.

Table 6. Household food security in Bengkulu Province in 2018-2022

Household Food Security	2018	2019	2020	2021	2022	Grand Total
Food Security	43,29%	46,03%	43,65%	43,98%	40,90%	43,54%
Food Vulnerability	40,03%	35,15%	38,34%	37,31%	37,14%	37,57%
Lack of Food	10,39%	11,50%	10,56%	11,79%	14,31%	11,75%
Food Insecurity	6,30%	7,32%	7,45%	6,91%	7,66%	7,14%
	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%

Source: Susenas BPS

The chi-square test results show that the Pearson chi-square test shows a significance value of 0.00 (<α=5%). This shows that there is a connection between year and household food security. In accordance with the initial assumption that the Covid-19 pandemic occurred in 2020 and 2018-2019 was the year before the pandemic and 2021-2022 was after the pandemic, it can be concluded that reject H0 where there is a relationship between the impact of the Covid-19 pandemic and household food security. . This is in line with the

previous descriptive analysis where there was a link between the pandemic Covid-19 and household food security.

Table 7. Chi-Square Test of the Impact of the Pandemic on Household Food Security in Bengkulu Province

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	90.576[a]	12	,000
Likelihood Ratio	89,256	12	,000
Linear-by-Linear Association	26,439	1	,000
N of Valid Cases	27586		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 361.82.

Source: Susenas BPS

CONCLUSIONS AND POLICY IMPLICATIONS

Conclusions

In 2022, the people of Bengkulu Province will still be dominated by households in the food secure category at 40.9%, followed by food insecure at 37.14%. Households in the food vulnerable category show that the majority of people in Bengkulu Province still prioritize their spending on food consumption.

If broken down by city in 2022, Bengkulu City is the largest contribution to food security, but Bengkulu City is also the largest contribution to food shortages. The largest contribution to food insecurity is Lebong Regency and the largest contribution to food insecurity is Seluma Regency.

Based on the household food security category, an analysis conducted in Bengkulu Province from 2018 to 2022 shows that energy consumption levels decreased following the Covid-19 pandemic in all expenditure percentages, with food and non-food expenditures predominating. The descriptive analysis's findings indicate a connection between household food security and the Covid-19 pandemic's effects.

The results of the analysis using the chi-square test show that the Pearson chi-square test shows a significance value of 0.00 (<α=5%). This shows that there is a connection between year and household food security. In accordance with the initial assumption that the Covid-19 pandemic occurred in 2020 and 2018-2019 was the year before the pandemic and 2021-2022 was after the pandemic, it can be concluded that reject H0 where there is a connection between the impact of the Covid-19 pandemic and household food security. This is in line with the previous descriptive analysis where there was a relationship between the Covid-19 pandemic and household food security.

Suggestion

The suggestion from this research is that further research is needed regarding the dynamics of the pandemic's impact on household food security. The government needs to pay additional attention to the impact of the pandemic, especially on Bengkulu province due to it has been proven that the pandemic give impact on food security

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