

# From Measurement to Action: Initiating the Simultaneous Alleviation of Poverty and Food Insecurity Policy in Indonesia

## *Dari Pengukuran ke Aksi: Menginisiasi Kebijakan Pengentasan Kemiskinan dan Kerawanan Pangan Secara Bersamaan di Indonesia*

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### Abstract

Indonesia is committed to achieving the Sustainable Development Goals (SDGs) by 2030, with a focus on eradicating poverty and hunger. However, current trends indicate a significant gap between the targets and the realities on the ground. This study addresses the intertwined issues of food insecurity and poverty, both of which present major obstacles to achieving the first and second SDG goals. Using the Alkire-Foster method to develop a multidimensional Food Insecurity Ratio, this research aims to trigger the simultaneous alleviation of food insecurity and poverty by utilizing the benefit of the food insecurity measure in Indonesia. Drawing on data from the 2022-2023 Socioeconomic Survey, the study highlights the persistent regional disparities in food insecurity, with Eastern Indonesia, particularly Papua and Maluku, facing the highest levels. The results indicate that while poverty rates have decreased, food insecurity persists, with 50% of food-insecure individuals also living in poverty. The findings underscore the need for integrated policies that address both issues simultaneously. By targeting specific regional challenges, such as access to food, nutrition, and vulnerability to shocks, this study offers policy recommendations to optimize resources and accelerate progress towards the SDGs.

### Keywords

Food Insecurity; Poverty; Alkire-Foster Method; Sustainable Development Goals; Measurement

### Abstrak

Indonesia berkomitmen untuk mencapai Tujuan Pembangunan Berkelanjutan (SDGs) pada tahun 2030, dengan fokus pada pengentasan kemiskinan dan kelaparan. Namun, tren saat ini menunjukkan adanya kesenjangan yang signifikan antara target dan kenyataan di lapangan. Studi ini membahas masalah yang saling terkait antara kerawanan pangan dan kemiskinan, yang keduanya merupakan hambatan utama untuk mencapai tujuan SDGs pertama dan kedua. Dengan menggunakan metode Alkire-Foster untuk mengembangkan Rasio Kerawanan Pangan multidimensi, penelitian ini bertujuan untuk menginisiasi penanggulangan kerawanan pangan dan kemiskinan secara bersamaan dengan memanfaatkan manfaat dari ukuran kerawanan pangan di Indonesia. Mengacu pada data dari Survei Sosial Ekonomi 2022-2023, studi ini menyoroti ketimpangan regional yang terus berlanjut dalam kerawanan pangan, dengan Indonesia Timur, khususnya Papua dan Maluku, menghadapi tingkat tertinggi. Hasilnya menunjukkan bahwa meskipun tingkat kemiskinan telah menurun, kerawanan pangan tetap ada, dengan 50% individu yang rawan pangan juga hidup dalam kemiskinan. Temuan tersebut menggarisbawahi perlunya kebijakan terpadu yang mengatasi kedua masalah tersebut secara bersamaan. Dengan menargetkan tantangan regional tertentu, seperti akses ke pangan, gizi, dan kerentanan terhadap guncangan, studi ini menawarkan rekomendasi kebijakan untuk mengoptimalkan sumber daya dan mempercepat kemajuan menuju SDGs.

### Kata Kunci

Kerawanan Pangan; Kemiskinan; Tujuan Pembangunan Berkelanjutan; Metode Alkire-Foster; Pengukuran

## 1. Introduction

Indonesia is one of the countries which have committed to actualize the Sustainable Development Goals (SDGs) in 2030. The SDGs are the global consensus adopted by The United Nations aiming to achieve peace and prosperity for people and the planet. Through Presidential Decree Number 59/2017, Indonesia has provided a roadmap to achieve all of 17 SDGs' goals. However, considering the current conditions, it is unlikely to be actualized especially on the first and the second goals.

Referring to [Ministry of National Development Planning \(2019\)](#), the poverty rate, which is the first goal of SDGs, is expected to be around 4 or 4.5 percent. Accordingly, the percentage of the poor in 2024 should be about 6.5 or 7 percent. In contrast, BPS-Statistics Indonesia in its press release ([Badan Pusat Statistik, 2024a](#)) revealed that the poverty rate in 2024 is 9.03 percent. Hence, there is a gap about 2 to 2.5 percent from the target poverty and the actual condition of poverty in Indonesia. Assuming no interventions and significant shocks, the current target could not be achieved in 2030, indicating an unattained target.

Likewise, the second goal of SDGs, eliminating hunger, also face the same trouble. In 2023, the prevalence of inadequate food consumption is expected to be around 5-6.5 percent to achieve the 2030 target which is 3.6-4.9 percent. However, according to [Badan Pusat Statistik \(2024b\)](#), the percentage is still high, that is about 8.53 percent. The gap is even worse than the poverty rate as it is in 2-3.5 percent. Considering those facts, Indonesia is experiencing a big challenge in maintaining its road to achieve the global consensus for the better life of its people.

Food insecurity and poverty are not opposites but are complexly interrelated. The similarity between the poverty and the food insecurity lies in calorie-based food consumption. One way to identify the poor, as also used in determining food poverty line, is by identifying people who lack calories as they can be defined as poor. Accordingly, people who has low calorie consumption are more likely to be undernourished. In this context, if the policy program can target those who are lack calories, poverty and food insecurity should be decreased simultaneously.

However, food insecurity is not that simple, so does poverty. [FAO \(1996\)](#) defines food insecurity as conditions where people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Thus, food insecurity is not only about lack of calories, but also covering a lot of aspect. Poverty, even if it is seen in the basic needs approach, is not about lack of food, but lack of basic needs that cover clothes, house, education, health and other types of consumption. Nevertheless, the wide range of the definition of both poverty and food insecurity does not deny that there is possibility that people who are poor are also food insecure.

When it comes to policy targeting, precaution action needs to be carefully taken. Concentrating the policy program to people who lack of calories and below the poverty line could exclude large proportion of people who are food insecure and not poor and vice versa. Thus, the much better understanding of poverty and food insecurity is needed to utilize the overlap effectively.

Considering those matters, our research aims to identify the appropriate number of targeting and most effective types of policy to alleviate poverty and food insecurity simultaneously. If the program for the elimination of poverty and food insecurity can be integrated, the budget could be optimized and focus on the people who are not poor but food insecure and vice versa. This way could be the way to put the progress to achieve the first and second goals of SDGs in its trajectory.

[Moncada et al. \(2022\)](#) revealed in their study that the method to define who is the poor and the people who food insecure is crucial especially when it is aiming to policy targeting. They added that the overlap between poverty and food insecurity can substantially vary between rural and urban areas within countries. Looking at Indonesia which is very heterogenous, it is important to consider its geographical area when choosing the method. Nevertheless, the method to identify the food insecurity is the most important since there is limited figure that can describe the food insecurity in many dimensions as defined by FAO.

The main challenge in the existing food security indicators is the inexistence of a measure that could

determine whether the individual is food insecure or not using all conditions entailed in the food security concept. For example, Food Security Index published by (National Food Agency, 2023) show the score and status of the food security in a regency. There is no information about the number of individuals who are food insecure. Similarly, the global food security index as calculated by (Economist Impact, 2022) is also able to show the progress in reducing the food security as they only provided the score, not the number of households. When discussing indicators that can show the number, it turns out to cover only one aspect of food security. One of the food security indicators as included in Indicator for SDGs (Ministry of National Development Planning, 2020) is the prevalence of undernourishment. This indicator is useful as it can tell the probability of the individual that is regularly in lack of their daily dietary needs. However, it still cannot tell the condition of physical, social and economic access to food as it is entailed in the food security concept.

Considering the challenge, it is necessary to initiate the food insecurity ratio for address the main objectives of the research. This ratio could help describing the distribution of food insecurity in Indonesia. Afterwards, the ratio is employed to see the extent of people who are poor and food insecure. It would provide the overlap between poverty and food insecurity, providing the estimated number for policy targeting. These steps would string up the best possible policy to accelerate the poverty and food insecurity alleviation.

## 2. Methods

Our study employs two phases of analysis. Firstly, the focus is on forming the food insecurity ratio that serves as indicator to the food insecurity. To be align with our objectives, Alkire-Foster method developed by Alkire et al. (2015) to measure multidimensional poverty since it provides ways to use many dimensions and classify the individuals into the determined criteria. In addition, the spatial analysis is also conducted to map the provinces in Indonesia into the food insecurity level as the extended analysis of the ratio. Jenks natural breaks classification method is employed to do the classification. This method is quite unique and reliable as it utilizes the natural groups inherent in the data by putting the similar values together and maximizing the differences between classes.

Then, the contingency table is the second method employ to do the comparative analysis between poverty and food insecurity. Further explanation on the method is described in the following sections.

As for the data, this study utilizes Socioeconomic Survey (Susenas) conducted by Badan Pusat Statistik as the main data. The time period of the data is 2022 and 2023. Susenas provides many indicators that could depict the food security. In addition, it is also the main data used to compute the official poverty rate. Those conditions make it perfect to study the relationship between poverty and food insecurity.

### 2.1. Food Insecurity Ratio

Alkire-Foster counting methodology is well-known for its flexibility and its capability to oversee the composition of poverty. Multidimensional Poverty Index calculated by Alkire and Foster (2011) can give the flexibility in deciding the number of dimension and variable used as long as it aligns with the theory used. In addition, the cut-off chosen to determine whether someone is poor or not could also depends on the authors and the aim of the index. Furthermore, it is also possible to see indicators that contribute the most to the poverty and even the distribution of the compounding indicators. Those factors make it suitable to be applied in determining the food insecurity at the individual level and then aggregating it at the regency and national level. It would also enable the identification of the individual according to its food insecurity symptoms. Hence, the method to construct the food insecurity ratio utilize the AF method.

In the AF method, there are six necessary steps to be implemented, those are 1) choosing the dimension and indicators, 2) determining the deprivation or the condition where the people are poor, 3) calculating the deprivation score of all the indicators, 4) aggregating the poor which are those above the cut-off, 5) calculating the intensity of poverty and 6) calculating the multidimensional poverty index. However, since our goal is to estimate the number of individuals who are food insecure, only the first four steps are employed. Accordingly, the following is the steps to produce the food insecurity ratio.

**Table 1.** Dimension and Indicators used to Construct the Food Insecurity Ratio

Dimension	Definition	Indicators	Additional Notes
Food Availability	Focusing on the sufficiency of food for the daily activities and healthy life	- Consumption of calories per day per capita (Calorie Adequacy) - Consumption of protein per day per capita (Protein Adequacy).	
Access to Food	Measuring the adequacy of economical and physical access of the people to food	Economical access is depicted by the number of people expenditure (Economic Access).	The physical access is like the condition of the road or distance, but this indicator is not used due to limited data.
Food Utilization	Referring to whether the food consumed is safe and nutritious	- Access to source of the clean drinking water (Access to Drinking Water) - Access to the proper sanitation (Access to Sanitation).	Anthropometric indicators, such as stunting and wasting, cannot be included due to limited data.
Food Stability	Relating to the shock and vulnerability that enable the people to not possess any access every time	Approached by using the qualitative questions to measure vulnerability according to the Household Food Insecurity Access Scale (HFIAS) guideline (Coates et al., 2007).	According to Migotto et al., (2005), HFIAS indicators can describe the food vulnerability of the household so this measurement is used to cover the lack of data availability in this dimension.

**Source:** Compiled from various sources such as Ashby et al. (2016), Coates et al. (2007), FAO (2014), Migotto et al. (2005) and Shaibu et al. (2023).

The first step is to define the dimension and indicators used to calculate the food insecurity ratio. According to FAO, food security is a condition in which all people have economic, social, and physical access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 1996). From the concept, there are four dimension that can be employed, which are food availability, the access to food, food utilization and food stability (FAO, 2014). The more detailed explanation of the compounding indicators can be seen in the Table 1.

Subsequently, the cut-off for the deprivation is needed to determine whether someone can be defined as food insecure as Alkire et al. (2015) did on multidimensional poverty index. For example, someone is deprived if they

do not graduate from the primary school. Then, it is coded as one. The similar way is implemented in this study for all indicators. The detailed deprivation for every indicator can be found in the Table 2. Therefore, every people can be identified whether they are food insecure or not for each indicator. The aggregate of this deprivation can be utilized to spot the area with similar food insecurity symptoms, facilitate the policy targeting.

After determining the deprivation of each observation with code one if they are food insecure, the next step is to aggregate the score. The formula is simply aggregating all the indicators with weighting. The weight is divided equally across dimension, resulting in the four indicators with one-eight as weighting and the rest is one-fourth. The formula for the deprivation score is as followed.

**Table 2.** The Operational Definition of Indicators to Construct the Food Insecurity Ratio

Dimension	Indicators	Food Insecure if	Additional Notes
Food Availability	- Calorie Adequacy  - Protein Adequacy	- Consumption of calories per day per capita is below 1,764 kcal - Consumption of protein per day per capita is below 50 grams	The cut-off is obtained from the average value of the nutritional adequacy rate as mentioned in the Minister of Health Regulation Number 28 of 2019.
Access to Food	Economic Access	The total expenditure of the individual is below the food poverty line	Poverty line used is the poverty line at the province level which different for urban and rural area.
Food Utilization	- Access to Drinking Water - Access to Proper Sanitation	- The individual consumes drinking water from improper source - The individual uses improper sanitation facilities	The definition of proper drinking water source and sanitation facilities refer to <a href="#">WHO/UNICEF Joint Monitoring Programme (JMP) (2018)</a> .
Food Stability	Vulnerability	Approached by using the qualitative questions to measure vulnerability according to the Household Food Insecurity Access Scale (HFIAS) guideline ( <a href="#">Coates 2017</a> ).	According to <a href="#">Migotto (2005)</a> , HFIAS indicators can describe the food vulnerability of the household so this measurement is used to cover the lack of data availability in this dimension.

**Source:** Compiled from various sources such as [Ashby et al. \(2016\)](#), [Coates et al. \(2007\)](#), [FAO \(2014\)](#), [Migotto et al. \(2005\)](#) and [Shaibu et al. \(2023\)](#).

$$S_i = 0.125Calorie_i + 0.125Protein_i + 0.25Economy_i + 0.125Water_i + 0.125Sanitation_i + 0.25Vulnerability_i$$

Where:

$S_i$  = Deprivation Score of the i-th Individuals  
 $Calorie_i$  = Calorie Adequacy Deprivation of i-th Individuals  
 $Protein_i$  = Protein Adequacy Deprivation of i-th Individuals  
 $Economy_i$  = Economic Access Deprivation of i-th Individuals  
 $Water_i$  = Access to Drinking Water Deprivation of i-th Individuals  
 $Sanitation_i$  = Access to Proper Sanitation Deprivation of i-th Individuals  
 $Vulnerability_i$  = Vulnerability Deprivation of i-th Individuals

The final step to produce the food insecurity ratio is defining the percentage of people who are food insecure. This indicator is similar to headcount ratio on poverty. The cut-off used is similar to the AF method, which is one-third. Thus, if the total deprivation score of

individuals is below 0.33, then they are food insecure. In other words, the individuals who experienced more than one dimension of food insecurity can be defined as food insecure. Then, the food insecurity level cannot be determined only by one aspect and have to be the combination of other dimensions. If the individuals lack of calories but they still have access to the food economically, could afford safe and nutritious food and invulnerable to the shock, then they cannot be defined as food insecure in this study. Since food security is multidimensional and closely related, this definition should be sufficient to address it. To sum up, the food insecurity ratio is the sum of people whose deprivation score under 0.33 divided by the total number of people.

In relation to the research objectives, the result of the food insecurity ratio is described by combining the

**Table 3.** The Operational Definition of Indicators to Construct the Food Insecurity Ratio

Island	Energy	Protein	Economic Access	Access to Clean Water	Access to Sanitation	Vulnerability	Food Insecurity Ratio	Poverty Rate
<b>Sumatera</b>	0.04	0.05	1.90	8.11	6.07	11.57	<b>3.11</b>	<b>9.27</b>
<b>Jawa</b>	0.12	0.12	1.77	3.14	4.05	8.84	<b>1.76</b>	<b>8.79</b>
<b>Bali and Nusa Tenggara</b>	0.06	0.08	3.56	4.55	6.08	20.52	<b>5.17</b>	<b>13.29</b>
<b>Kalimantan</b>	0.07	0.07	0.89	10.11	6.42	9.43	<b>3.01</b>	<b>5.67</b>
<b>Sulawesi</b>	0.05	0.05	3.03	5.59	6.33	11.58	<b>3.36</b>	<b>10.08</b>
<b>Maluku</b>	0.06	0.11	3.22	6.41	13.01	23.04	<b>7.93</b>	<b>12.29</b>
<b>Papua</b>	0.46	1.87	11.95	24.03	24.55	17.36	<b>14.30</b>	<b>24.76</b>
<b>Indonesia</b>	<b>0.10</b>	<b>0.12</b>	<b>2.12</b>	<b>5.31</b>	<b>5.36</b>	<b>10.64</b>	<b>2.72</b>	<b>9.36</b>

*Source:* National Socioeconomic Survey 2023, processed.

statistical descriptive analysis and spatial analysis. It aims to present the distribution of the food insecurity and facilitate the policy targeting. The food insecurity ratio would be first analysed across the island as well as its compounding indicators. Then, each province in Indonesia is classified by three groups according to its food insecurity level (low, medium, and high). The classification method is the natural breaks that is generally employed in the spatial analysis. This method classifies the data by looking at the pattern of the data, then divided according to the distances. This method groups data by looking at data patterns and then dividing them based on limits determined based on the largest range value (Shafira et al., 2023).

## 2.2. Comparative Analysis

The comparative analysis is done at the individual level to understand the similarity between the individual that is poor and food insecure. The classification of poor individual uses the poverty line in which the household with expenditure under the poverty line is poor. Since the food insecurity data has been measured at the

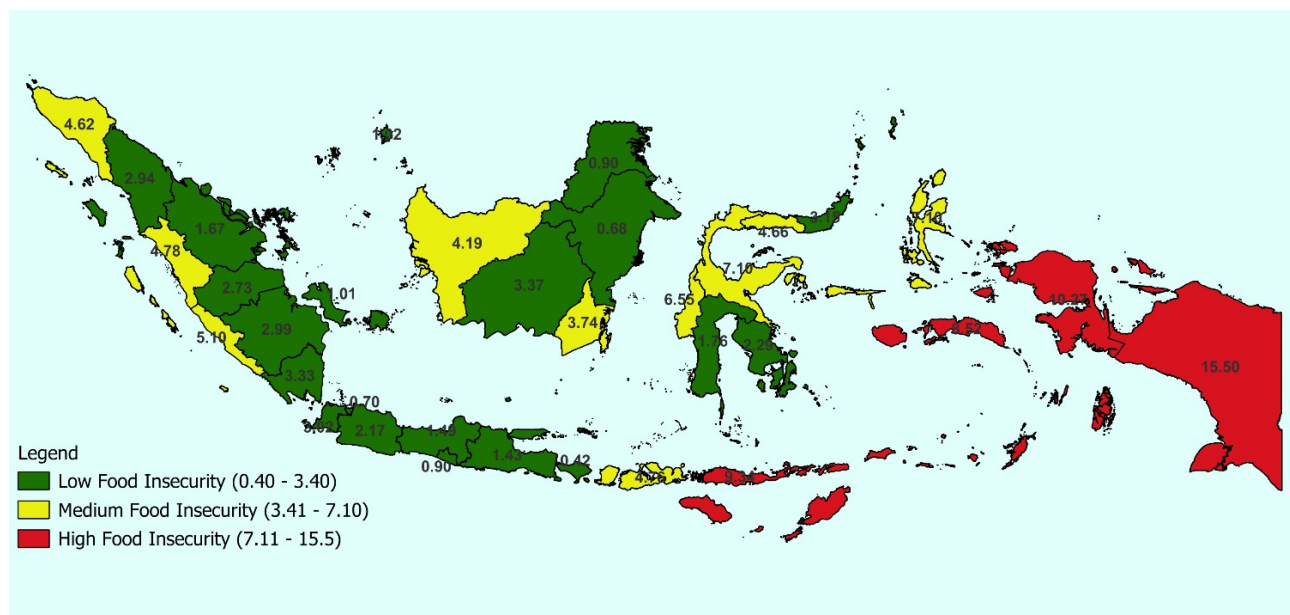
individual level, there is no necessary adjustment needed as it has been able to compare.

The analysis used to do the comparison is the contingency table for 2x2 table. This analysis can represent the number of events from two categories of two different variables with crosstabulation (Ott & Longnecker, 2016). This way enables us to examine the relationship between poverty and food insecurity. The percentage is done by the overall total so it can present the number of people that are poor and food insecure. It is a useful number for policy targeting.

## 3. Results and Discussion

As we aim to depict the food insecurity distribution in Indonesia and the number of people that are poor and food insecure, this section is divided into two subsections. First, the discussion would be about the result of the food insecurity ratio. It explains the number of people that are insecure across island and provinces. Secondly, the relation between food insecurity and poverty is discussed in terms of its decrease and the people that are both poverty and food insecure. It could





**Figure 1.** The Operational Definition of Indicators to Construct the Food Insecurity Ratio (Source: National Socioeconomic Survey 2023, processed).

give the knowledge and specific number of people that can be addressed for integrated poverty and food insecurity alleviation program.

### 3.1. The Distribution of Food Insecurity

The result of the food insecurity ratio as presented in the Table 3 reveals the tendency of the higher rate in the Eastern Indonesia. The percentage of the food insecure household in 2023 is 2.72 percent or about 7.5 million people, where it is only Java Island whose percentage below the national figure. Meanwhile, the percentage of food insecurity is high in Papua Island. It even shows the high gap with the second-high percentage, Maluku Island, for about 6.35 different. The result gives a similar description of poverty that is also quite unequal in the Eastern Indonesia.

In terms of indicators, most indicators have a high percentage in Papua Island that explain the reason of high proportion of food insecure people in Papua. Most indicators are the highest except the vulnerability indicator that is high in Maluku. This could be due to the risk of disaster in Maluku that could affect the resistance of people to shock. If the area has a high risk to disaster, there is a high potential that the people could be vulnerable and instable. The disaster risk index calculated by [Badan Nasional Penanggulangan Bencana \(2023\)](#)

displayed that Maluku Province has the second highest of disaster risk (160.03) in 2023 while all the index in Papua Island is below North Maluku (148.71).

The interesting findings from the food insecurity ratio and its component is the island with the second highest percentage on each indicator. As an example, Java Island that has the lowest food insecurity ratio (1.76 percent) is the second highest in terms of calorie and protein consumption. It means the individuals that are lack of protein and calorie consumption concentrate in Java Island after Papua Island. Considering its economy and infrastructure in Java that is the best of all, this finding is quite surprising. One of the factors could be due to people in Java are quite busy, there is tendency that most of them consume fast food that is not nutritional. Yet, it points out the importance of calorie and protein consumption in Java Island that can be addressed with programs such as providing nutritious food at the offices or schools.

The second highest percentage of other indicators reflects the variation of the main food security issues since all of the indicators is in different islands. In terms of economic access, Bali and Nusa Tenggara is the second highest on this indicator. Meanwhile, Kalimantan Island is the highest for access to clean water indicator and Maluku is for the sanitation. This variation suggests that

**Table 4.** The Number and Percentage of People Who are Food Insecure and Poor in Indonesia, 2022 and 2023

Year	Food Insecurity		Poverty	
	Number of People	Percentage	Number of People	Percentage
2022	8,944,782	3.26	34,653,191	12.64
2023	7,533,592	2.72	25,898,646	9.36

**Source:** Socioeconomic Survey 2022 and 2023, processed.

the types of policy in order to empower the food security should consider the characteristic of the areas that becoming the policy targeting.

Turning to the food insecurity map, food Insecurity pattern in Indonesia is bluntly displayed in [Figure 1](#) showing the concentration of food insecurity in Eastern Indonesia. In average, there is a gap for about 5.65 percent between provinces with high food insecurity (10.91 in average) with the medium food insecurity group (5.26 in average). The gap is even higher with the provinces with low food insecurity ratio (1.90 in average) that reach 9.10 percent. Then, the facts just underline the inequality of food security distribution across provinces in Indonesia.

The concentration of food insecurity, which is in Eastern Indonesia, has the similar pattern with poverty in Indonesia. As broadly known, Eastern Indonesia is infamous for its high poverty rate. In 2023, Papua and Papua Barat are the provinces with the highest poverty rate with 34.49 percent and 29.20 percent ([Badan Pusat Statistik, 2024c](#)). Similarly, the food insecurity ratio is also the highest with 15.50 percent for Papua and 10.2 percent for Papua Barat. On the other hand, the province with the lowest poverty rate is Bali with 4.25 percent, which also has the lowest food insecurity ratio with 0.42 percent. This similarity suggests the strong relationship between food insecurity and poverty at the province level.

Furthermore, the provinces with low food insecurity concentrates in Java Island. It aligns with the previous analysis mentioning Java Island with lowest ratio of food insecurity. However, in relation with the poverty, poverty in Java is not the lowest in average. According to the

[Badan Pusat Statistik \(2024c\)](#), Kalimantan has the lowest average of poverty for around 5.7 percent. As for other Islands, there are always provinces with different level of food insecurity (medium and low level). Those condition indicates that the similar landscape of poverty and food insecurity may only work at the condition where the food insecurity is high.

This hypothesis strengthens the previous research that was done among children. [Wight et al. \(2014\)](#) revealed that the food insecurity incidence tends to go up as the downfall of income-to-needs ratio. Accordingly, this finding may support the new hypothesis that the finding from Wight et al could also occur at the individuals, not only children.

### 3.2. Food Insecurity and Poverty Nexus

The nexus between poverty and food insecurity can be first explained by comparing the trend of poverty and food insecurity. Referring to table 4, there is a decrease of 0.54 percent for individuals who are food insecure. In terms of number, the fall reach to 1.4 million people from 2022 to 2023. The numbers show positive improvement of food insecurity alleviation in Indonesia.

In relation to the poverty, there seems to be conformity with the poverty rate in the last two years. As presented at table 4, the reduction of the food insecurity is escorted by the decline in poverty rate. However, the decline in poverty rate is higher than the food insecurity. The poverty rate declines for about 3.28 percent or around 8.7 million. In comparison, the decrease is around one sixth or can be interpreted that every one person who is food insecure become food secure is accompanied by six poor people who is no longer poor.



**Table 5.** The Result of Crosstabulation between Food Insecurity and Poverty in 2022 and 2023

Food Insecurity	Units	Poor				Total	
		No		Yes		2022	2023
		2022	2023	2022	2023		
No	Millions of People	235,288	247,192	29,971	22,061	265,259	269,253
	Percentage (%)	85.81	89.31	10.93	7.97	96.74	97.28
Yes	Millions of People	4,263	3,697	4,681	3,837	8,945	7,534
	Percentage (%)	1.55	1.34	1.71	1.39	3.26	2.72
Total	Millions of People	239,551	250,888	34,653	25,898	274,204	276,787
	Percentage (%)	87.36	90.64	12.64	9.36	100	100

**Source:** National Socioeconomic Survey 2022 and 2023, processed.

It also indicates that the elimination of food insecurity is slower than poverty alleviation.

Contingency analysis reveals that in 2023, approximately 1.39 percent of the population was affected by both poverty and food insecurity. Additionally, 14.82 percent of those living in poverty were also food insecure. When compared to 2022, there was a significant reduction of around 2.96 percent in the poor population that was not food insecure, which in turn caused a notable increase of 3.5 percent in the proportion of people who were not poor but still faced food insecurity. These results imply that while the poverty reduction programs in 2023 were successful in lowering poverty rates, they had limited impact on improving food security.

On the other hand, the decline in the non-poor yet food-insecure group was about 0.21 percent, while the poor and food-insecure population dropped by roughly 0.32 percent. Although it is unclear which specific programs contributed to this decrease, these numbers suggest that tackling poverty and food insecurity can be done simultaneously, albeit at certain thresholds of either issue. This is supported by the greater reduction in the population experiencing both poverty and food

insecurity compared to the drop in those who were food insecure but not poor. Since this relationship is not obvious in poverty alleviation efforts alone, the decline in food security may be a contributing factor. Further analysis is needed to provide more clarity on this hypothesis.

The distribution of food-insecure individuals is particularly noteworthy because it encompasses half of the poor population. In 2023, 3.8 million out of 7.5 million people (50.67%) were both poor and food insecure, while the remaining population was not. This trend mirrors the conditions in 2022, where 4.7 million of 8.9 million individuals (52.33%) were in poverty and food insecure. This indicates that while only 14.81 percent of the population is classified as poor, half of those experiencing food insecurity is stuck in poverty. This suggests that programs targeting both poverty and food insecurity could potentially reduce food insecurity among nearly half of Indonesia's affected population. Programs like the non-cash food assistance (BPNT) may be key in addressing both poverty and food insecurity. Research by [Nadhifah & Mustofa \(2021\)](#) found that BPNT significantly reduced poverty levels as also [Fadhli & Nazila \(2023\)](#), while [Hidayat & Hanri \(2023\)](#)

demonstrated that BPNT boosted national calorie intake by 4.8 points, contributing to improved food security in Indonesia.

#### 4. Conclusion

This study aims to find the certain number of people who experienced poverty and food insecurity in order to alleviate both issues simultaneously. Accordingly, the result show that there is around 1.39 percent or about 3.8 million people who are poor and food insecure. This group of number are scattered around Indonesia with different types of food insecurity issues, pointing out the different approach of policies need to be implemented depending on the areas.

In terms of the distribution, the trends of poverty and food insecurity tend to be similar in the areas where poverty and food insecurity is high. Papua and Papua Barat are the provinces with the highest rate of poverty and also the highest percentage of food insecurity. However, in the low and medium level of food insecurity, the poverty has more variation. In addition, the main issues of poverty also have more variation in not high level of food insecurity such as calorie and protein intake in Java Island, vulnerability dimension in Maluku, economic access in Bali and Nusa Tenggara and clean water in Kalimantan.

Turning into deeper connection of poverty and food insecurity, the decrease of poverty is accompanied by the decline in food security. The fall is slower in food insecurity with the comparison for about one sixth. It means that every one person who is no longer food insecure in 2023 was accompanied by six people whose consumption increased above the poverty line. The program such as the non-cash food assistance that is proven to alleviate poverty and food insecurity could be the main contributor of the decrease and can be expanded to support the integration of this combined effort.

Finally, this paper has set a foundation to the analysis of food insecurity at the individual level. There are at least two efforts that need to be confirmed by the further research. First, does BPNT really able simultaneously decrease poverty and food insecurity? This question needs to be confirmed and has been made possible by the existence of the ratio calculated in this research. Then, if

we have been given by the depiction of different main food insecurity issues in different Islands, there is no any description on whether the food insecurity issues differ across the level of food insecurity level. What would be the main driver of food insecurity at high level of food insecurity? Hence, further research is needed.

Of all those matters, the existence of food insecurity ratio that can show the number of people open could be used by the government to complement the food insecurity alleviation strategy. It can help to initiate the policy that consider the characteristics of the areas and types of policy that is suitable as described in the previous conclusion. Furthermore, the ratio can also be used as evaluation and monitoring tool for supervising the effectivity of the government program.

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