

The Relationship of Food Fiscal Spending to Food Security in the Maluku Islands and Its Implications for the Free Nutritious Meal Program

Maryam Sangadji¹, Yusuf Wana Sanjaya², Fadhil Shafriandi Ramli³, Ali Tutupoho⁴

^{1,4} Faculty of Economics and Business, Universitas Pattimura, Indonesia

^{2,3} Directorate General of Treasury (DJPb) of Maluku Province

Email: maryam_sng@yahoo.co.id

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Abstract

Food security is a fundamental issue in the development of archipelago regions that face limited access and distribution of food. This study analyzes the relationship between food fiscal spending and food security in Maluku Province and its implications for the Free Nutritious Meal Program (MBG). Data for the 2019–2024 period includes the realization of food spending by the central and regional governments as well as the Food Security Index (IKP) from eleven districts/cities in Maluku. The analysis was carried out descriptively and quantitatively using the Fixed Effect regression model in three regions with complete fiscal data (Ambon, Southeast Maluku, and Tual).

The results show that food fiscal spending increased from IDR 58.30 billion (2019) to IDR 825.7 billion (2024) with an average growth of 9.99% per year, but the distribution is uneven and dominated by Ambon City. The average IKP increased from 57.69 (2019) to 63.26 (2023) and then decreased to 54.64 (2024). The data panel estimates showed a positive and significant relationship between fiscal expenditure and CPI ($R^2 = 0.737$; $p < 0.01$).

The findings confirm that increasing public spending has not automatically strengthened food security without effective governance, spatial equity, and integration of MBG with local food systems.

INTRODUCTION

Food security is one of the fundamental issues in national development, especially in the Maluku archipelago which faces geographical, infrastructure, and logistical challenges. As a region with 1,340 islands, most of them small and scattered, food availability and distribution is a crucial issue. Data from the National Food Agency (2024) shows that Maluku's Food Security Index (IKP) is still below the national average, ranking 31st out of 34 provinces, despite experiencing an upward trend from 58.30 in 2019 to 61.82 in 2024. This change illustrates an improvement, but also shows that there is still a gap between districts/cities. Some areas, such as Ambon City, tend to have higher IKP, while Aru or Tanimbar islands districts still face serious problems related to affordability and food utilization.

In terms of fiscal spending, the realization of ministries/institutions (K/L) expenditures for food in Maluku for the 2010–2024 period shows dynamics. Total spending in 2019 reached IDR 489.7 billion, down drastically in 2020 to IDR 359.4 billion due to the pandemic budget refocusing, but increased again in 2021 to IDR 654.97 billion and reached a peak of IDR 836.2 billion in 2023. For 2024, spending was recorded at IDR 825.7 billion. This surge shows a stronger fiscal commitment to support food security, although the distribution between regions is still uneven. Ambon City received spending of around IDR 24.85 billion in 2023, much larger than Tual City which was only around IDR 0.30 billion, or IDR 299 million. This inequality has the potential to affect the imbalance in the achievement of IKP between districts/cities.

Food fiscal spending in Maluku is sourced from various ministries and agencies such as the Ministry of Agriculture, the Ministry of Maritime Affairs and Fisheries, the National Food Agency, and the Ministry of Public Works and Public Housing. The characteristics of the program are also diverse, ranging from product certification, assistance for agricultural facilities, to the development of water resource infrastructure. However, consistency in the classification and distribution of spending is important to ensure its effectiveness. This is in line with the findings of Mogues et al. (2018) that in studies of agricultural public expenditure, differences in classification can lead to interpretation bias. Therefore, this study emphasizes the consistency of food spending measurement before associating it with IKP.

A number of national studies have examined the issue of food security, but they are generally descriptive or focus on only one aspect, such as agricultural production or logistics infrastructure. Research conducted by Maulana et al. (2024) through bibliometric analysis found that research trends in Indonesia are still dominant in the aspects of general policy and food regulation, not in the direct relationship between fiscal spending and food security outcomes. Another study showed that in 2020, around 15.8% of districts and 4% of cities in Indonesia had low-category IKPs, with the dominance of regions in Eastern Indonesia including Maluku (JIPAGI, 2020). This fact reinforces the urgency of the need for research that empirically examines the linkage of fiscal spending to food security, especially in vulnerable archipelagic areas.

Other studies show a similar pattern. Marson (2025) emphasized that public spending on agriculture in Africa has a significant effect on food security if supported by good governance. Kamenya (2022) in a study by ECOWAS (West Africa) found that agricultural public spending has a positive impact on four dimensions of food security: availability, access, utilization, and stability. Takeshima (2024) with cross-border data from SPEED shows that public spending in the social and food sectors is able to reduce poverty while improving people's nutrition, although the effects vary between countries. Meanwhile, Hossain (2020) in an OECD study shows that state social spending strengthens food access for the poor. All of these studies provide global evidence that fiscal spending can improve food security, but its effects are strongly influenced by the quality of governance, distribution, and local contexts.

Thus, this research has novelty in three aspects. First, methodologically, this study uses a quantitative approach with regression to analyze the relationship between food fiscal spending and IKP, which has not been widely done in the Indonesian literature. Second, substantively, this study focuses on the context of the Maluku archipelago region which has unique geographical characteristics and large food distribution challenges. Third, in terms of policy, this research is relevant to the implementation of the Free Nutritious Meal Program (MBG) which will start running in 2024. By linking fiscal spending, IKP achievements, and relevance to MBG, this research will enrich the academic literature and also provide strategic input for central and local governments.

METHODS

Research Approach

This study uses quantitative and descriptive-analytical approaches to identify the relationship between food fiscal spending and food security in Maluku Province. A quantitative approach was used to test the empirical relationship between variables using a panel data regression model, while descriptive analysis was used to explore the spatial and temporal dynamics of the Food Security Index (IKP) between districts/cities.

The data used is secondary data that is time series and cross-section, covering the period 2019-2024. Data sources include:

1. Directorate General of Treasury (DJPb) of Maluku Province, data on the realization of fiscal expenditure food per district/city and ministries/institutions (K/L).
2. The National Food Agency (Bapenas) data on the Food Security Index (IKP) and its three dimensions (availability, affordability, and utilization).
3. Central Statistics Agency (BPS), supporting data such as GDP, population, and socio-economic indicators.
4. Supporting sources such as the ALCo 2025 Report, Maluku Portrait, and Laskar Maluku for data verification of the implementation of the Free Nutritious Meal Program (MBG).

This study uses two main variables:

- a. Dependent variable (Y): Food Fiscal Expenditure (BF), total realization of food sector expenditure by ministries/agencies and local governments (in rupiah).
- b. Independent variable (X): Food Security Index (IKP), a composite of three dimensions: food availability, food affordability, and utilization.

3.4 Population and Research Sample

The study population covers all 11 districts/cities in Maluku Province, but the specific available food fiscal spending data is only available in three regions: Ambon City, Southeast Maluku Regency, and Tual City. Therefore, quantitative analysis was carried out with an unbalanced small-N panel, while other districts/cities were analyzed descriptively to see the dynamics of IKP.

3.5 Analysis Methods

The analysis is carried out through two main stages:

1. Spatial and Temporal Descriptive Analysis, to describe the development of food fiscal spending and inter-regional IKP during the study period.
2. Quantitative Analysis of Panel Data Regression. The Fixed Effect Model (FEM) was used based on the results of the Chow Test and Hausman Test which showed a p-value < 0.10. Estimation was carried out using the EGLS (Cross-section SUR) method to overcome heteroscedasticity between observation units.

3.6 Analysis Tools

Data processing is carried out using:

1. Microsoft Excel 2024 for tabulation and calculation of IKP.
2. EViews 13 for data panel regression estimation and classical assumption test.

3.7 Interpretation of Results

The interpretation of the results is carried out by linking empirical findings to Musgrave's (1959) theory on the function of public spending allocation and Keynes' (1936) theory on the role of government spending on economic welfare. In addition, the results were compared with previous studies (Mogues et al., 2018; March, 2025; Kanya, 2022) to ensure empirical and theoretical relevance

DISCUSSION

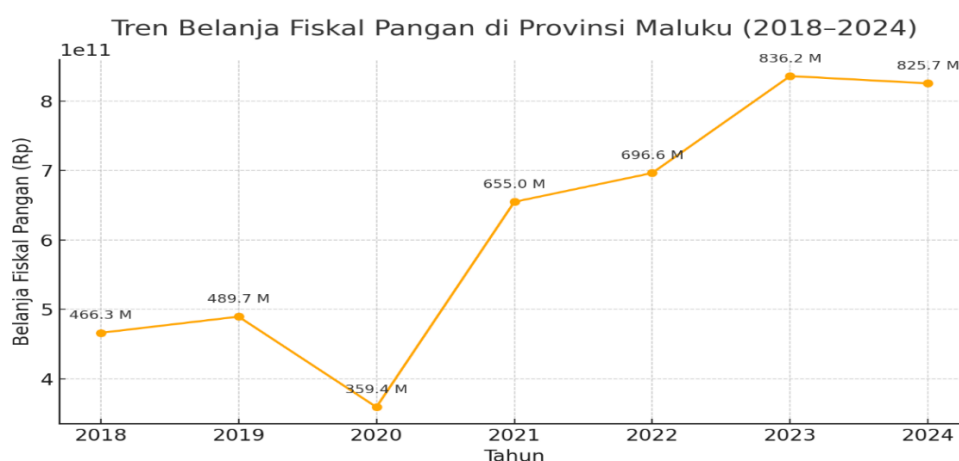
Development of Food Fiscal Expenditure in Maluku Province for the 2018–2024 Period.

Food fiscal spending in Maluku Province shows a dynamic trend throughout the 2018–2024 period. In 2018, total expenditure reached Rp466.3 billion and increased slightly to Rp489.7 billion in 2019. However, in 2020 there was a sharp decline of up to Rp359.4 billion or a decrease of 26.6% due to the budget refocusing policy for handling the COVID-19 pandemic. Post-pandemic, the allocation of food spending has increased significantly, namely IDR 654.9 billion (2021), IDR 696.6 billion (2022), until it peaked at IDR 836.2 billion in 2023. Although 2024 saw a slight decline to IDR 825.7 billion, the overall trend showed positive growth with an average rate of 9.99% per year (CAGR). These findings confirm the growing fiscal commitment to strengthening food security in the archipelago, especially after the pandemic crisis period. The significant increase in post-2020 spending is also in line with the government's priorities for food development programs and strengthening basic infrastructure in disadvantaged areas. However, if you look at each district, the city experiences inequality in distribution.

a. Distribution of Food Expenditure Between Regencies/Cities

The distribution of food fiscal spending shows that there is a fairly sharp spatial inequality. Ambon City was the largest recipient with a total of IDR 2.856 trillion (around 66% of the total provincial expenditure), followed by spending at the Maluku Province level of IDR 1.095 trillion (25.3%), and Southeast Maluku Regency of IDR 294.8 billion (6.8%). On the other hand, a number of other districts only received a very small portion, such as Tual City of IDR 58.1 billion (1.3%), Central Maluku IDR 10.1 billion, Eastern Seram IDR 4.4 billion, Western Seram IDR 3.4 billion, Buru Island IDR 3.2 billion, and South Buru IDR 3.0 billion. Thus, the allocation of spending in Ambon City was recorded to be almost 960 times greater than that of South Buru.

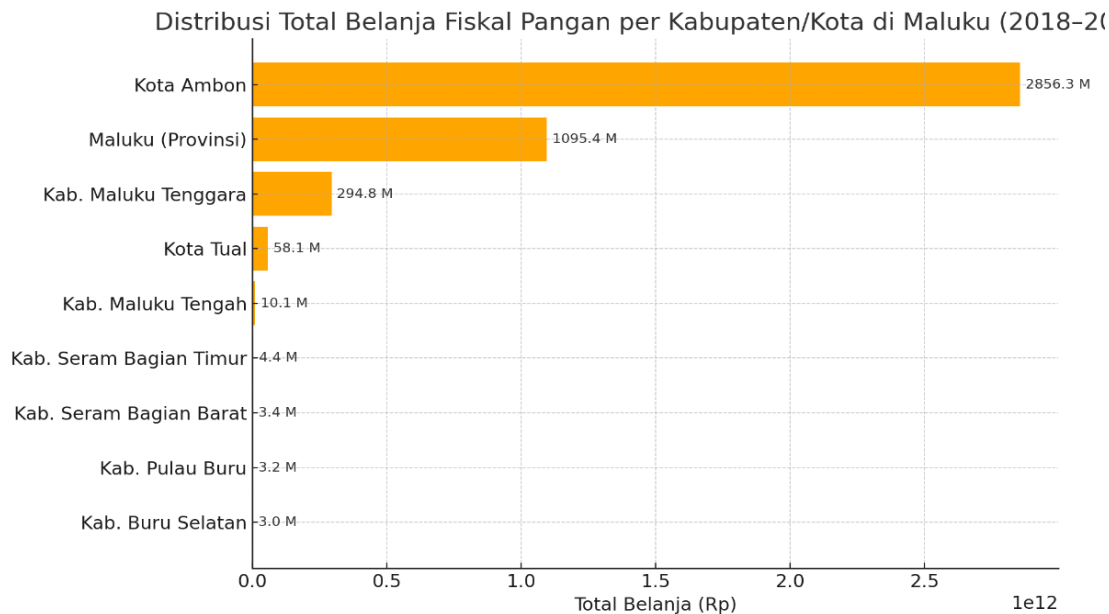
This inequality has serious implications for the achievement of food security. The city of Ambon, which functions as a logistics and administrative distribution center, does require a relatively large budget, but this dominance has the potential to widen the gap in the Food Security Index (IKP) between regions, especially for small island districts that have higher vulnerability in food access. This inequality can also be seen from the uneven distribution for city districts through the Ministry.



Graph 1. Food Fiscal Expenditure in Maluku Province 2018-2024

When reviewed based on ministry/institution sources, Maluku's food spending is dominated by the Ministry of PUPR with a total allocation of IDR 2.167 trillion (50.1%). This largest portion describes the role of water resources infrastructure and connectivity as the main

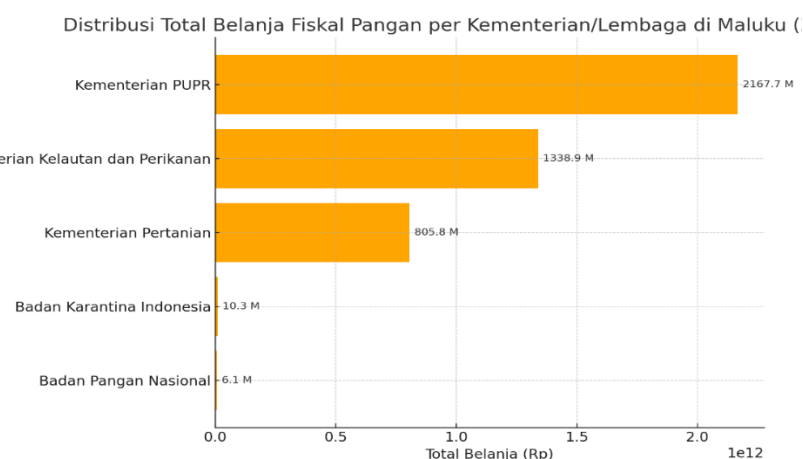
pillars supporting food security in the archipelago. The Ministry of Maritime Affairs and Fisheries (KKP) occupies the second position with a total of Rp1.339 trillion (30.9%), which shows the orientation of Maluku's food policy on the marine and fisheries sector, according to its geographical characteristics. Furthermore, the Ministry of Agriculture contributed IDR 806 billion (18.6%), mainly for land-based agricultural assistance, counseling, and food security programs.



Graph 2. Total Food Expenditure Per Regency/City in Maluku, 2018-2019

The Indonesian Quarantine Agency (IDR 10.3 billion) and the National Food Agency (IDR 6.1 billion) have relatively small contributions (less than 1% of the total), with the main functions being supervision, certification, and coordination of food policy. The findings that can be concluded are that food fiscal spending in Maluku rests on infrastructure (PUPR) and the marine sector (KKP), with the largest concentration in Ambon City.

Remote archipelago areas that face high food vulnerability are relatively neglected in fiscal allocations. The implication of this condition is the need for a more equitable fiscal redistribution policy between districts/cities in Maluku, so that interventions are not only concentrated in urban centers, but also reach areas that have greater food access challenges. In addition, coordination between ministries and agencies also needs to be strengthened so that food spending does not overlap, but complements each other according to the institutional mandate



Graph 3. Total Food Expenditure Per Ministry/Institution in Maluku 2018-2024

4.2. Dynamics of the Maluku Province Food Security Index (IKP) 2019-2024

The analysis of the dynamics of food security in Maluku Province is carried out through three main dimensions, namely food availability, affordability, and utilization.

The Food Security Index (IKP) is compiled based on three main dimensions: 1. Availability: measures the extent to which food is physically available, both from local production and supply distribution.

2. Accessibility: describes the ability of households to access food, both economically (purchasing power, price) and physically (transportation and market access).

3. Utilization: measures the extent to which the available food is actually consumed effectively to support nutritional status, including consumption patterns, sanitation, nutrition education, and health.

The data used is a recap of the district/city IKP for 2019–2024. The following is presented the results of the analysis of the average development of the province, changes between times, and differences between districts/cities. The Food Security Index (IKP) in Maluku Province and 11 districts/cities during the 2019-2024 period shows quite sharp fluctuations. Based on the results of data processing, the average provincial IKP increased slightly from 57.69 in 2019 to 63.26 in 2023, but decreased again to 54.64 in 2024. The decline in the past year shows that structural vulnerabilities have not fully recovered, especially due to limited food availability and distribution between archipelago regions.

In general, the three main dimensions of IKP are food availability, affordability, and utilization, showing different dynamics between districts/cities. The year 2024 will be an important year of evaluation because it shows the contrast between regions with good food access (Ambon, Buru, Central Maluku) and areas with high vulnerability (Aru Islands, Tual, Southeast Maluku, Tanimbar, and South Buru).

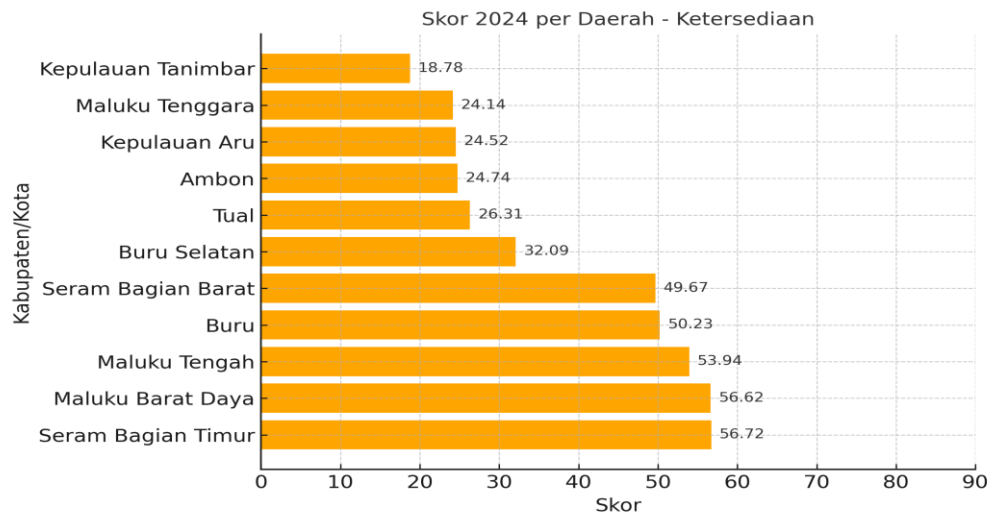
Table 1. Regency/City Food Security Index (IKP) Data in Maluku Province in 2019–2024

City Districts	2019	2020	2021	2022	2023	2024	Average	Criteria
Central Maluku	72,22	72,27	72,27	69,86	72,04	63,38	70,34	Good
Southeast Maluku	46,57	46,70	46,70	47,60	54,73	45,37	47,95	Highly Vulnerable
Tanimbar Islands	41,02	42,87	42,87	42,36	62,27	45,22	46,10	Highly Vulnerable
Hunt	77,74	78,43	78,43	80,25	81,73	63,49	76,68	Good
Eastern Horror	64,83	57,86	57,86	67,28	69,90	60,94	63,11	Medium
Horror of the West	56,24	57,23	52,23	61,29	59,71	59,42	58,52	Vulnerable
Aru Islands	39,37	38,85	38,85	40,35	41,83	48,42	41,28	Highly Vulnerable
Maluku Batrat Daya	67,28	67,97	67,97	66,93	65,36	56,04	65,26	Medium
South Hunt	58,26	54,27	54,27	56,82	58,46	48,31	55,06	Vulnerable
Ambon	77,97	82,71	82,71	81,94	85,50	60,65	78,58	Good
Tual	33,95	40,39	40,39	44,98	54,84	49,81	44,06	Highly Vulnerable

Source: DJPb Mlauku Province, Data processed

• **Food Availability Dimension**

The image below shows a comparison of the 2024 food availability score across all districts/cities in Maluku Province.



Graph 4. Food Availability,

The highest availability score in 2024 was achieved by Eastern Seram (56.72), Southwest Maluku (56.62), Central Maluku (53.94), Buru (50.23), and West Seram (49.67). Meanwhile, the lowest scores were recorded in the Tanimbar Islands (18.78), Southeast Maluku (24.14), and Aru Islands (24.52). This condition shows the inequality of food distribution between regions, where small and remote island areas face major challenges in local food supply and logistics.

According to Musgrave's (1959) allocation theory, this condition indicates a failure of the market that demands fiscal intervention to guarantee the availability of food as a public good. However, the results of the study show that the allocation of food spending is still concentrated in Ambon, so the effect is not spatially even. In a Keynesian framework, public spending is supposed to strengthen food production and distribution capacity, but in Maluku spending is more absorbed in infrastructure and the marine sector, rather than on land food production. This condition is in line with the findings of Mogues et al. (2018) and Kamenya (2022) that fiscal inequality hinders the improvement of food security in remote areas. Therefore, strengthening availability needs to be focused on redistributing fiscal spending, developing inter-island food logistics, and integrating the Free Nutritious Meal Program (MBG) with local supply chains

Food Affordability Dimension (Accessibility)

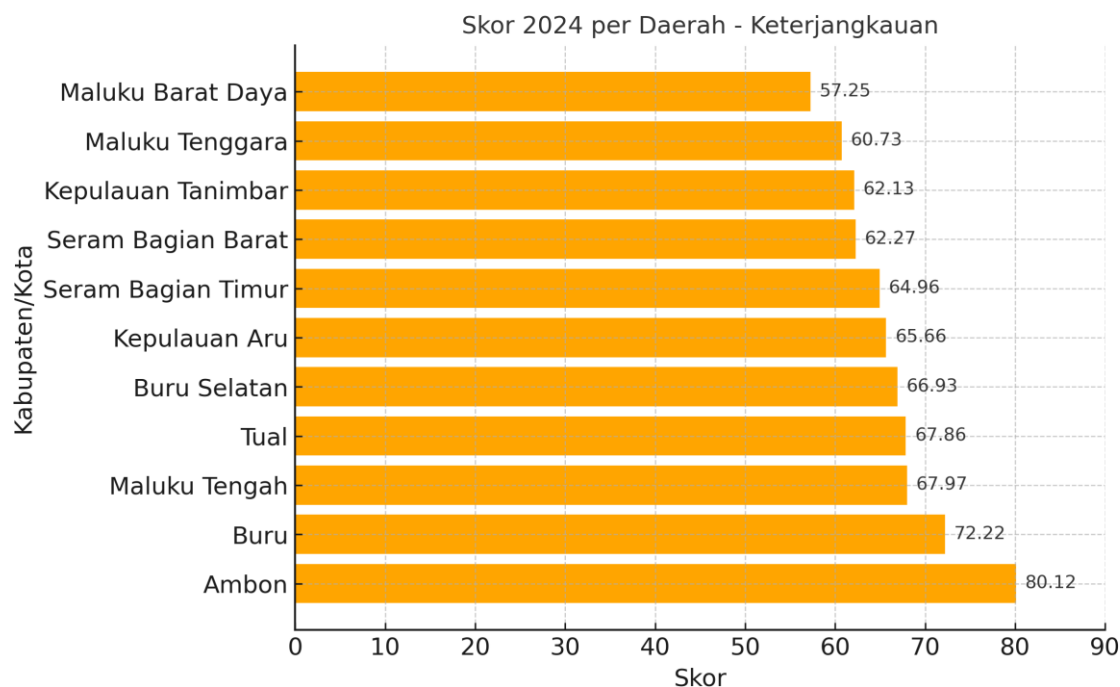
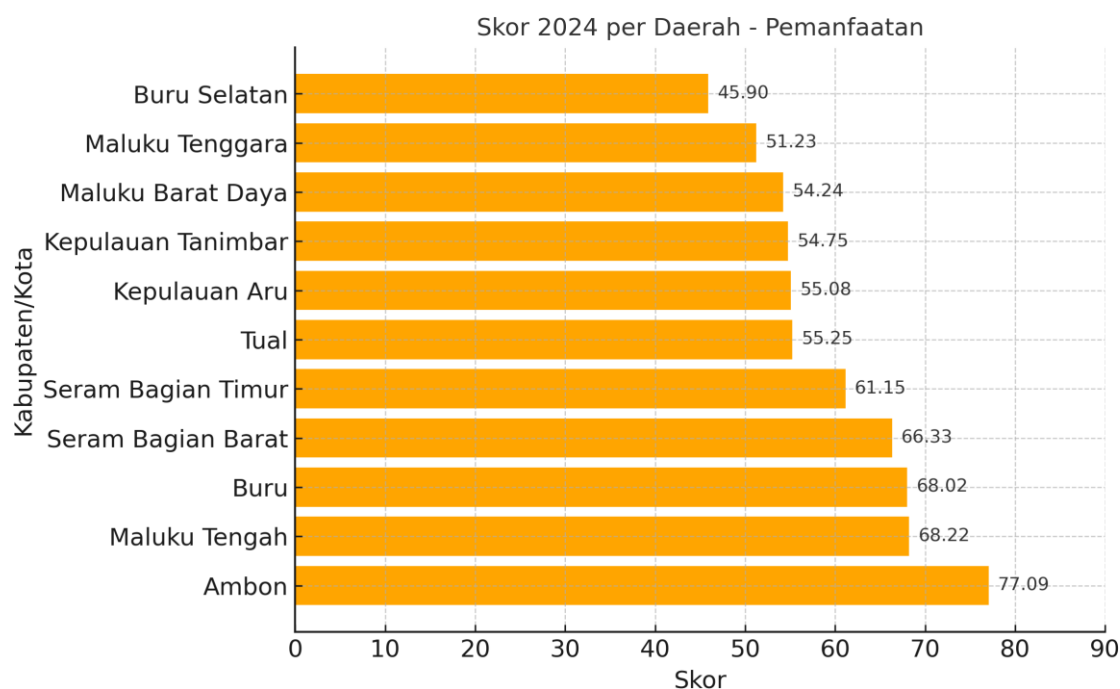


Chart 5. Food Inclusivity

Based on the graph, Ambon City (80.12) has the highest affordability score, followed by Buru Regency (72.22) and Central Maluku (67.97). The three regions with medium scores were Tual (67.86), South Buru (66.93), and Aru Islands (65.66), while the lowest scores were recorded in Southwest Maluku (57.25) and Southeast Maluku (60.73). This condition shows that economic and physical access to food in Maluku is quite varied. The city of Ambon benefits from price stability and high purchasing power, as it is the capital of Maluku Province, and the seat of government, while the small archipelago district faces high logistics costs and inter-island import dependence.

Based on the results of the first and second objectives, it shows that the amount of food fiscal spending is not always directly proportional to the achievement of the Food Security Index (IKP) in each district/city. Ambon City showed positive consistency, where the high fiscal allocation was followed by a significant increase in IKP. However, Southeast Maluku and Tual City, despite having a high allocation of food spending, actually occupy a low position in the achievement of IKP, ranking fourth and second lowest respectively in the last five years on average. On the other hand, Buru and Central Maluku Regencies have high IKP but relatively small fiscal allocations, ranking second and fifth lowest in terms of spending.

Food Utilization Dimension



Graph 6. Food Utilization

The utilization dimensions show a slightly different pattern. The highest scores were obtained by Ambon (77.09), Central Maluku (68.22), Buru (68.02), and West Seram (66.33). Meanwhile, the lowest scores were recorded in South Buru (45.9), Southeast Maluku (51.23), and Aru Islands (55.08). These results show that access to nutritious food, sanitation, and health services is still uneven. Urban areas, such as the city of Ambon, are superior in the quality of nutrition and health infrastructure, while areas outside the mainland still face limited facilities.

These three dimensions are combined, it can be seen that Buru Regency, Central Maluku, and Ambon City consistently occupy the top three positions with the highest IKP score in recent years. In contrast, the Tanimbar Islands, Southeast Maluku, and Aru occupy the bottom positions in almost all dimensions. From the results of this analysis, it can be concluded that: (1) Maluku's food security has not been spatially evenly distributed; (2) The dimension of food availability is the main weak point; and (3) The increase in provincial IKP in 2019-2024 is more supported by the dimensions of affordability and utilization, not by the availability of local food.

Based on the results of the first and second objectives, it shows that **the amount of food fiscal spending is not always directly proportional to the achievement of the Food Security Index (IKP)** in each district/city. Ambon City showed positive consistency, where the high fiscal allocation was followed by a significant increase in IKP. However, **Southeast Maluku and Tual City**, despite having **a high allocation of food spending**, actually occupy a low position in the achievement of IKP, ranking fourth and second lowest respectively in the last five years on average. On the other hand, **Buru and Central Maluku Regencies** have **high IKP** but **relatively small fiscal allocations**, ranking second and fifth lowest in terms of spending.

This condition illustrates the inefficiency **and spatial mismatch** between fiscal allocation and real needs on the ground. In **Musgrave's (1959) perspective**, this phenomenon shows the weak function of fiscal allocation, where the distribution of the budget is not effectively directed to correct the failures of the food market in the areas most in need. Keynesian, although public spending is supposed to promote welfare through the effect of aggregate demand, **its impact is weakened** when the structure of spending does not directly touch the dimensions of production, distribution, and access to food for the community.

From an empirical perspective, these results are in line with the findings of **Mogues et al. (2018)** and **Kanya (2022)** that the effectiveness of public spending in the food sector **is not only determined by its quantity, but also by the quality of governance and relevance of programs**. In Maluku, most of the spending is directed at **public infrastructure and central administration (Ambon)**, while archipelago areas such as **Tual and Southeast Maluku** face **high distribution costs, limited technical manpower, and weak coordination between ministries/agencies**

4.3. The Relationship of Food Fiscal Expenditure to Food Security in the Province Maluku

The analysis on the third objective is focused on assessing the extent of the relationship between food fiscal spending and food security (IKP) in Maluku Province. However, because the food fiscal spending data that is consistently and separately available is only available in three districts/cities, namely: Ambon City, Southeast Maluku Regency, and Tual City, the analysis was carried out in an *unbalanced small-N panel* with an observation period of 2019–2024. And it is also illustrated from the results of the first and second goals Where the first goal of the allocation of fiscal expenditure is very high in three districts while the IKP value for Southeast Maluku and Tual is still low compared to the city of Ambon, does fiscal spending necessarily have a positive effect on food security. Phenomenally, most districts/cities in Maluku, food security programs have not been explicitly separated in the APBD nomenclature, but are still incorporated into spending on agricultural, fishery, social, or welfare affairs. Thus, the results obtained from these three regions are interpreted as empirical indications that represent the fiscal-food linkage in Maluku Province in a partial but meaningful way. .

Model Test Results and Approach Selection

To determine the best panel model, a series of model specification tests were performed: Chow Test, Hausman Test, and Lagrange Multiplier Test. The results of the Chow Test showed a p-value of 0.0033 (< 0.05), indicating that the Fixed Effect Model (FEM) model was more accurate than the Common Effect Model (CEM).

Table 2. Chow Test Results

Redundant Fixed Effects Tests

Equation: EQ01

Test cross-section fixed effects

Effects Test	Statistic	D.F.	Prob.
Cross-section F	8.823357	(2,14)	0.0033

Source: *Output Eviews*

The results of the Hausman Test gave a probability value of 0.0782 (< 0.10), thus reaffirming that the FEM model is more suitable than the Random Effect Model (REM). The Fixed Effect model was chosen because it is able to capture differences in structural characteristics between regions (Ambon, Southeast Maluku, and Tual City) that reflect variations in fiscal capacity, budget governance, and local economic conditions.

Table 3. Hausman Test Results

Correlated Random Effects - Hausman Test

Equation: EQ01

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. D.F.	Prob.

Cross-section random	3.101821	1	0.0782
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** WARNING: robust standard errors may not be consistent with assumptions of Hausman test variance calculation.

** WARNING: estimated cross-section random effects variance is zero.

Source: *Output EvIEWS*

Data Panel Regression Results

The results of the data panel analysis showed that there was a positive and significant relationship between food fiscal spending (BF) and the Food Security Index (IKP) in Maluku Province, with the Fixed Effect Model (FEM) model as the best model. The selection of FEM was supported by the results of the Chow Test ($p=0.0033$) and Hausman Test ($p=0.0782$) which showed structural differences between regions (Ambon, Southeast Maluku, and Tual City). This model statistically explains 78.37% of the variation in food fiscal spending between districts/cities and between times (Adjusted $R^2 = 0.737$).

The regression coefficient of 4.66×10^9 shows that every one-point increase in the IKP increases food fiscal spending by $\pm Rp4.66$ billion, with a significance level of 1% ($p = 0.0007$). A correlation value (R) of 0.952 indicates a very strong relationship between the variables of food security and food fiscal spending.

Table 4. Regression Data Panel

Dependent Variable: BF

Method: Panel EGLS (Cross-section SUR)

Date: 11/04/25 Time: 20:02

Sample: 2019 2024

Periods included: 6

Cross-sections included: 3

Total panel (balanced) observations: 18

Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.15E+11	6.44E+10	-1.783146	0.0962
CD	4.66E+09	1.07E+09	4.362499	0.0007

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.783752	Mean dependent var	1.913197
Adjusted R-squared	0.737413	S.D. dependent var	2.295117
S.E. of regression	1.018834	Sum squared resid	14.53232
F-statistic	16.91352	Durbin-Watson stat	1.564162
Prob(F-statistic)	0.000063		

R value (Correlation value) 0.952436

CROSSID	Effect
1	1.79E+11
2	-9.27E+10

3	-8.64E+10

Source: *Output Eviews*

Based on the results of the regression above, a regression line equation can be obtained as follows:

Regression Equation of Maluku Province and Per Regency/City

1. $BF = -1.15E+11 + 4.66E+09KP + e$ (Maluku Province)
2. $BF = 6.40E-12 + 4.66E+09KP + e$ (Ambon City)
3. $BF = -9.39E-10 + 4.66E+09KP + e$ (Tual City)
4. $BF = -8.76E-10 + 4.66E+09KP + e$ (Southeast Maluku Regency)

The above equation shows that Ambon has the highest fiscal response and strong institutional capacity, while Tual and Southeast Maluku show fiscal inefficiency due to limited distribution and logistics infrastructure. The effectiveness of fiscal spending in Maluku is spatial and asymmetrical.

This finding is in line with Musgrave's (1959) theory about the function of fiscal allocation, namely the role of the government to correct market failures in the provision of public goods such as food. However, empirical results show that the allocation function has not been geographically evenly distributed. From a Keynesian perspective, public food spending in Maluku acts as a socio-economic stabilizer, but the impact is not uniform because it depends on the local economic structure and program efficiency.

These results are also in line with the studies of Mogues et al. (2018) and Kamenya (2022), which found that the effectiveness of public spending on food security is highly dependent on governance, geographical context, and regional capacity. Takeshima (2024) emphasized that the fiscal impact on food security is only real when directed to local needs-based programs.

Overall, the results of the data panel showed that food fiscal spending has a positive and significant relationship to food security in Maluku Province, but its effectiveness is highly dependent on the spatial context and regional governance. Ambon City is an example of fiscal efficiency, while Southeast Maluku and Tual show fiscal inefficiency due to the mismatch between the budget size and the outcome of the IKP. These findings reinforce Musgrave's and Keynesian theories that fiscal policy plays a strategic role in ensuring food security, but its success requires equity, effectiveness, and integration between regions

4.4. Implications of the Linkage of Food Fiscal Spending to Food Security for the Implementation of the Free Nutritious Meal (MBG) Program in Maluku

The results of the study show that food fiscal spending has a positive and significant influence on food security in Maluku Province, as evidenced by the Fixed Effect Panel Data model with an Adjusted R² value of 0.737 and a correlation of 0.952. These findings affirm the strategic role of fiscal policy in strengthening food systems in the archipelago, but their effectiveness has been proven to be spatial and asymmetrical. Ambon City showed a high fiscal response and Food Security Index (IKP) achievements, while Southeast Maluku and Tual City showed an imbalance between the size of the budget allocation and the achievement of the IKP. This condition indicates fiscal inefficiency and limitations in the governance and distribution of programs in the archipelago.

Empirically, these results are closely correlated with the implementation of the Free Nutritious Meal Program (MBG) in Maluku which will start to be implemented in 2024. Based on the DJPb report and the results of field monitoring until June 2025, the implementation of MBG has only reached 14% of the total target of 488,994 recipients, or as many as 66,552 students. The distribution of recipients is still concentrated in mainland areas such as Ambon City (20,666 students) and Central Maluku (14,018 students), while archipelago districts such as Southeast Maluku, Tual, and Southwest Maluku recorded the lowest coverage. The total budget realization

until May 2025 is IDR 1.657 billion, with the support of 21 active SPPGs, 768 field officers, and 13 local suppliers, most of whom come from coconut plantation groups and the smallholder agricultural sector.

However, the implementation of MBG faces two main problems. First, the scope of the program is not even because it has only reached seven out of eleven districts/cities in Maluku. Second, the quality of implementation and supervision is still weak, characterized by reports of unfit food and the lack of involvement of supervisory institutions such as BPOM and regional nutritionists. This condition shows that the amount of public spending is not always directly proportional to the increase in food security if it is not accompanied by governance and program design based on local needs.

In a theoretical context, this result reinforces the fiscal allocation function of Musgrave (1959), that the government needs to intervene through public spending to correct food market failures, especially in archipelagic areas that have logistical and production barriers. From a Keynesian perspective, MBG can be seen as a fiscal stimulus instrument that not only encourages the aggregate demand of the local food sector, but also strengthens the social dimension of food security through increased nutritional consumption of school children. However, the effectiveness of this policy is highly dependent on the quality of distribution, fiscal governance, and regional institutional capacity.

These empirical findings are also in line with the results of studies by Mogue et al. (2018) and Kamenya (2022) which confirm that the impact of public spending on food security is more determined by the effectiveness and spatial relevance of policies than just the amount of allocation. In the context of Maluku, this is reflected in the disparity between Ambon City which has high fiscal responsiveness and archipelago districts that are still facing an implementation gap. Meanwhile, areas such as Buru and Central Maluku that have relatively small expenditures actually show high IKP because they are based on food independence.

Thus, the Free Nutritious Meal Program (MBG) in Maluku needs to be directed as an instrument for strengthening *the local food system*, not just a short-term consumption program. The integration of food fiscal spending, logistics infrastructure, and school nutrition programs is the main key in creating a sustainable multiplier effect on agricultural production and the welfare of the archipelago.

Policies that can be touched so that fiscal policy can increase IKP and have implications for MBG are:

1. Fiscal Integration and MBG Programs, Synergy is needed between central and regional government spending through food system budgeting so that food infrastructure spending, nutrition education, and MBG complement each other across sectors.
2. Spatial Approach Based on IKP, Regencies with IKP below 60 such as Aru Islands, Tual, Tanimbar, South Buru, and Southeast Maluku need to be a priority for MBG locations to reduce food security inequality.
3. Strengthening the Local Supply Chain, MBG must prioritize food from local production to strengthen food independence and support the community's economy.
4. Multi-Level Governance Collaboration. Close coordination is needed between provincial, district/city governments, and ministries/agencies to ensure fiscal synchronization and program sustainability.

The findings illustrate the linkage between food fiscal spending and food security in Maluku Province providing a strong empirical basis for the success of the MBG Program. However, the success of this program depends not only on the amount of funds allocated, but also on policy design that is adaptive to the archipelago context, spatial equity, and the effectiveness of fiscal

governance. This research confirms that food security and nutrition programs will only be sustainable if they are managed as a single local fiscal, social, and economic system

CONCLUSION

This study examines the relationship between food fiscal spending and food security in Maluku Province during the 2019-2024 period and its implications for the Free Nutritious Meal Program (MBG). Based on the results of the analysis, the following conclusions were obtained:

Food fiscal spending has increased but has not been evenly distributed between regions. Total food spending grew from IDR 466.3 billion (2018) to IDR 825.7 billion (2024), with Ambon City dominating (66% of the total). Inequality between districts/cities shows that fiscal allocation is still centralized and has not been effective in reaching vulnerable island areas.

Food security is increasing but unstable and spatially unstable. The province's average Food Security Index (IKP) rose from 57.69 (2019) to 63.26 (2023), but fell back to 54.64 (2024). The cities of Ambon, Buru, and Central Maluku show high food security, while Tual, Tanimbar, and Southeast Maluku are still low, especially in the dimension of food availability.

Food fiscal spending has a positive and significant effect on food security. The results of the panel regression showed a strong relationship ($R^2 = 0.737$; $p < 0.01$), where an increase in CPI was followed by an increase in public spending. However, the effects are uneven: Ambon shows high effectiveness, while Tual and Southeast Maluku experience fiscal inefficiency.

The implications for the MBG Program underscore the importance of fiscal integration and governance. The implementation of MBG until June 2025 has only reached 14% of the target (66,552 students). Limited coverage, weak surveillance, and suboptimal local supply chains indicate that increased spending has not automatically strengthened food security without spatial and collaborative planning.

Recommendations

Fiscal Equity Based on Vulnerability. The allocation of food spending needs to be directed based on the level of food vulnerability between districts/cities, not just administrative capacity.

Integration of MBG with Local Food Systems. The MBG program must be synergized with agriculture, fisheries, and nutrition spending to strengthen local supply chains and village economies.

Strengthening Fiscal Governance and Accountability. A data-based planning system and integrated supervision between local governments, BPOM, and educational institutions are needed to ensure the quality and effectiveness of food spending.

Priority is given to districts with low IKP. The islands of Aru, Tual, Tanimbar, Southeast Maluku, and South Buru, West Seram need to be the focus of intervention through a combination of MBG, logistics development, and local production capacity building.

Multi-Level Governance Collaboration. Coordination across ministries and between government levels must be strengthened so that public spending in the food sector is more synchronized, efficient, and sustainable.

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