

Towards Sustainable Development through Food Security Nexus

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Abstract. Food security as an indicator of macroeconomic stability. Food security in a region is a fundamental foundation of the country's economic security and one of the most important prerequisites for sustainable development. This study aimed to analyze the correlation in between food strategy nexus through food availability, food affordability, and food utilization to food security in Indonesia, particularly in East Kalimantan Province. Method of this research is correlation analysis. Highlight of the result analysis are all indicators of food security nexus have a correlation significantly.

1 Introduction

The regional development strategy in 2024 align with the macro policy focus on accelerating economic transformation, inclusive development, sustainable development, and realizing economic stability. The study aims to leverage the achieving of sustainable development through food security nexus perspective. In relation to sustainable development, it is necessary to pay attention to environmental aspects to optimize resources so as to be able to meet current needs and for future generations.

Sustainable development efforts are directed at maintaining economic competitiveness. Thus, increasing economic competitiveness is carried out through structural reforms that include improving the investment climate [11]

In achieving development targets in 2024, economic stability is needed that is able to create a conducive economic climate and reduce uncertainty. Macroeconomic stability in 2024 is sought to continue to support the economic recovery process after the COVID-19 pandemic and maintain the good performance of macro-fiscal indicators to ensure the sustainability of development in the medium-long term.

In the short term, it is directed to continue to provide space for the completion of the 2024 development agenda. In addition, pursuing long-term growth requires economic transformation towards sustainable growth. The focus of macro policies, among others, is related to the acceleration of economic transformation which is directed at creating an ecosystem in an effort to strengthen the structure of the economy with high added value.

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Inclusive development is directed at creating increased access and broad opportunities for all levels of society and is able to reduce gaps between groups and between regions. Food security in a region is a fundamental foundation of the country's economic security and one of the most important prerequisites for sustainable development. An important step in solving the problem of physical and economic food availability for all residents is to develop a regional food security strategy. [10] call it a food security strategy. With regard to other macroeconomic stability indicators, food security is a condition for the fulfillment of food for the state to individuals, which is reflected in the availability of sufficient food, both in quantity and quality, safe, diverse, nutritious, equitable, and affordable and does not conflict with religion, beliefs and culture of the community, to be able to live healthy, active and productive lives in a sustainable manner. The development of food security and nutrition is carried out systemically by involving cross-sectors. This approach is directed at realizing adequate food availability through domestic food production and trade; achieving macro-meso and micro stability in food availability and access; achieving adequate quality (diversity and food safety) and quantity of food consumption supported by infrastructure improvements. In order to realize these conditions, macroeconomic policy support is needed that is able to realize economic stability to ensure the stability of food supply and prices. In order to determine the level of food security of an area and its supporting factors, an assessment system has been developed in the form of a Food Security Index that refers to the definition of food security and the subsystems that make up the food security system. The indicators used in the preparation of the Food Security Index are derived from three aspects of food security, namely food availability, affordability and utilization. [8] argue that food security and food self-sufficiency are part of national security and self-sufficiency. Agricultural modernization innovation strategy should be considered as the highest priority of the country's development. Macroeconomic settings, domestic policy objectives, and food security indicator data are used to assess the implications of simulations on food availability and stability [5] Table 1 below shows previous studies that are relevant to the research to be conducted. The division is based on the topic of food security.

Table 1. Food Security Topic

Food Security Topic		
[12]	Looking at the effect of climate change and economic growth in terms of GRDP and rice production on food security.	<i>Common Effect Model</i>
[6]	Analyze the relationship between food security and economic growth	<i>Systematic Literature Review</i>
[4]	Econometrically test the analysis of climate change on food security and others that include economic growth, population growth and the agricultural sector.	<i>Vector Autoregressive (VAR), Autoregressive Distributed lag mode (ARDL)</i>
[1]	Determine factors that affect food security at the regional level	Diagnostic test
[3]	Examining the impact of population growth and agricultural productivity on economic growth	OLS Method

[10]	Modeling regional food security strategies by taking into account the peculiarities of development and production and potential resources.	SPACE Analysis
[9]	Analyze the agricultural sector as a factor that ensures the competitiveness of the national economy in general, and a factor that ensures food security.	Descriptive Statistic
[2]	Testing the impact of food security, using food availability as a proxy for economic growth	Regression Analysis
[7]	Develop scientific approaches and models to determine the effect of agricultural insurance on the development of the agricultural sector and the level of food security.	<i>Structural Equation Model (SEM)</i>

2 Method

Formulate a Food Security Model in East Kalimantan Province, Indonesia resilience model variables food security nexus used Food Availability Index (X1), Food Affordability Index (X2), Food Utilization Index (X3), and Food Security Index (Y).

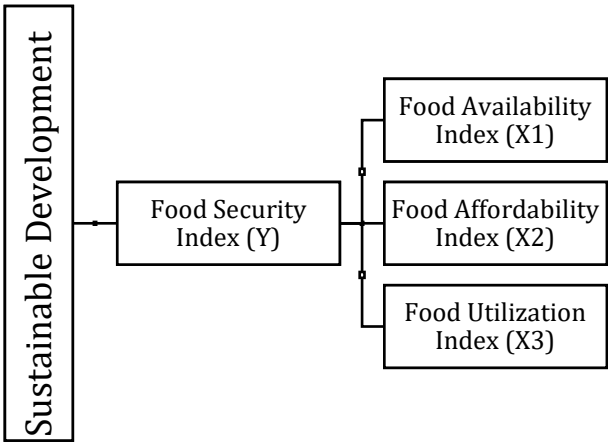


Figure 1. Model Analysis

Based on the correlation diagram model in Figure 1, it has equality correlation as following :

- Connection correlation between from Food Availability Index (X1) with Food Security Index (Y), if Food Affordability Index (X2) and Food Utilization Index (X3) remains that is

$$Y = \rho_{YX1} X_1$$
 Equation above state connection direct from predictor variable (X1) with variable criteria (Y)
- Connection correlation between from Food Affordability Index (X2) with Food Security Index (Y), if Food Availability Index (X1), and Food Utilization Index (X3) remains that is

$$Y = \rho_{YX2} X_2$$

- Equation above _ state connection direct from predictor variable (X2) with variable criteria (Y)
3. Connection correlation between from Food Utilization Index (X3) with Food Security Index (Y), if Food Availability Index (X1), and Food Affordability Index (X2) remains that is

$$Y = \rho_{YX3} X_3$$

- Equation above _ state connection direct from predictor variable (X3) with variable criteria (Y)
4. Correlation model analysis equation :

$$Y = \rho_{YX1} X_1 + \rho_{YX2} X_2 + \rho_{YX3} X_3 + \rho_{Ye}$$

3 Result and Discussion

Aspects of food security in the East Kalimantan Province, Indonesia, has the most significant correlation with food availability and affordability with a sig of 1%. The utilization aspect sig at 10%. So this is the key word, namely the availability and affordability of food in East Kalimantan province, Indonesia most determines food security in the province. The utilization aspect depends on affordability, while the affordability aspect itself depends on availability. This aspect is also the keyword for food utilization and food security. Availability itself correlates with affordability and resilience. The result analysis highlighted the relation in between food security nexus (food availability, affordability, and utilization) to sustainable development is needed.

$$Y = 0.988 X_1 + 0.851 X_2 + 0.566 X_3$$

Correlations					
		Food Availability	Food Affordability	Food Utilization	Food Security
Food Availability	Pearson Correlation	1	.771*	.445	.988**
	Sig. (2-tailed)		.042	.318	.000
	N	7	7	7	7
Food Affordability	Pearson Correlation	.771*	1	.768**	.851**
	Sig. (2-tailed)	.042		.009	.002
	N	7	10	10	10
Food Utilization	Pearson Correlation	.445	.768**	1	.566
	Sig. (2-tailed)	.318	.009		.088
	N	7	10	10	10
Food Security	Pearson Correlation	.988**	.851**	.566	1
	Sig. (2-tailed)	.000	.002	.088	
	N	7	10	10	10

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

In relation to food security as an indicator of macroeconomic stability, the Government seeks to encourage and support the development of food production centers and food security clusters particularly at the East Kalimantan region as an upcoming Indonesia’s New Capital City to increase local production. In order to maintain price stability of strategic food commodities, the Provincial and Regency/City Governments continue to work together and coordinate with various parties including Bank Indonesia to implement strategic programs to

minimize price spikes, manage demand, diversification programs and community food security. Therefore, further analysis is needed on what food security analysis through the approach of aspects of food availability, affordability and utilization in East Kalimantan Province, Indonesia to support community food security.

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