

# Food diversification and household food security in urban and rural areas in Musi Rawas Raya Indonesia

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(RESEARCH ARTICLE)



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## Food diversification and household food security in urban and rural areas in Musi Rawas Raya Indonesia

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### Abstract

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This research was conducted with the aim of Analyze the relationship between diversification of local staple foods and imported staple foods with household food security in urban and rural areas in Musi Rawas Raya. The study was conducted in February-April 2023 in Musi Rawas Raya. The data collection method used was in the form of primary data and secondary data using food consumption questionnaires for each household. We also analyze through combination of eating frequency methods, disability of food quantities and food balance sheets. The data processing methods used include recording methods, statistical tests, multiple linear regression analysis, and spearman rank correlation tests. The results of this study are:1) the pattern of food consumption in rural communities is more diverse than urban communities at various income levels. Rural and urban communities in Musi Rawas Raya based on income groups consume more rice, noodles, yams, wheat flour, tapioca flour and potatoes.;2) The relationship between diversification of local staple foods and imported staple foods with household food security has no significant relationship. That's position in a weak level of strength and show the negative sign, which is at -0.047, while the sign of the relationship for imported food is positive at 0.049.

**Keywords:** Food Pattern; Staple Food; Wheat Flour; Import

### 1. Introduction

Food diversification is one of the main pillars in realizing food security. The Food Diversification Program in Indonesia creates alternative staple foods other than rice as an effort to reduce import levels due to limited rice availability and dependence on rice consumption in Indonesia. One of the staple foods that replace rice in Indonesia is wheat flour. Currently, variations of wheat flour-based foods such as bread and noodles, are starting to be able to shift rice as the main staple food in Indonesia. As an agricultural country, Indonesia has a source of carbohydrate and nutritional sources that can meet the food needs of its population, but wheat flour cannot be produced in this country (Pradeksa, et al., 2014; Trilaksana, J and Ihsan, 2020).

Diversification of local food resources is part of efforts to strengthen food security. Local food resources can be developed and improved into food products in the field of food security for food sovereignty at the national level (Rusdiana and Maesya, 2017). The pattern of food diversification must be based on the use of all local food sources to reduce dependence on imported food. However, import activities of staple food commodities do not fully affect national food security (Damanik, 2016).

The demand for flour as an imported staple food is inseparable from the many product innovations that can be produced from wheat. If processed into flour, this wheat derivative can be used to make a variety of foods. In terms of food

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modernity, wheat is superior to other cereal crops such as corn and rice. Wheat is one of the cereal crops that is a source of calories. Cereals have great potential as protein-enriching ingredients that in many purposes can be added up to 50 percent (Crabtree and James, 1982; Arifin, B et al, 2018; Rozi, F et al, 2023).

Based on the ranking of the 2021 City and Regency Food Security Index issued by the Center for Food Availability and Insecurity of the Food Security Agency of the Ministry of Agriculture, there are five cities in Indonesia with the lowest score, namely Subulussalam (27.85), Tual (41.83), Gunungsitoli (45.67), PagarAlam (47.09) and Lubuklinggau (53.91). Musi Rawas Raya areal is consisting three locations namely Lubuk Linggau, Musi Rawas Raya and Musi Rawas Utara. Food Security Index in Lubuk Linggau City is ranked 93 out of 98 cities in Indonesia. The surrounding districts, namely Musi Rawas are ranked 226 out of 416 districts in Indonesia with a food security index value around 75.33 and North Musi Rawas Regency is ranked 345 out of 416 regencies in Indonesia with a food security index around 60.33.

The low rating of Food Security Index in Musi Rawas Raya is still a contradictive because on the other hand Musi Rawas Raya is very rich in natural resources. This condition causes researchers to be interested in studying household food diversification in urban and rural communities and analyzing the relationship between diversification of local staple foods and imported staple foods with household food security in urban and rural areas in Musi Rawas Raya. Analyze the quantity and proportion of consumption of local staple foods and imported staple foods in urban and rural areas in Musi Rawas Raya. Analyze the relationship between diversification of local staple foods and imported staple foods with household food security in urban and rural areas in Musi Rawas Raya.

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## 2. Material and methods

This research conducted in urban and rural areas South Sumatra Province. These areas are including three regions, namely Lubuklinggau City, Musi Rawas Regency and North Musi Rawas Regency. This research carried out starting in April 2023 until June 2023. The method used in this study is a survey method to obtain the necessary data and information about food consumption patterns and food diversification of the community, while to collect secondary data, we notice about the amount of consumption of carbohydrate sources of local staple foods, namely rice, local foods other than rice, and all consumption of imported food in this case flour, wheat and its derivative products. The withdrawal of sample respondents, namely households, was carried out with the first Simple Random Sampling system proposed by Sir Ronald A. Fisher in 1925. This technique with sampling is done by selecting sample members from the population randomly and each member has an equal chance of being selected. A simple random sampling process is carried out by take random sample members from the population. There are 60 respondents in urban area and 105 respondents in rural area.

The data collection method in this study is divided into two types of data collected, namely primary data and secondary data. The primary data collected includes: demographic data, data on food consumed and food diversification. The data is the average food consumption calculated in one recording with the 24-hour food recall method and monthly data consumption data information on household income levels, and household income. Followed by direct interviews with respondents through questionnaires guided by questions first. Based on the type of data obtained, the measurement of food consumption will produce qualitative and quantitative types of data.

Data obtained in the field are then processed quantitatively according to guidelines in the Guidelines for Measuring Household and Individual Dietary Diversity book formulated by Food and Agriculture Organization (FAO) experts, and / or in the book Measuring Household Food Consumption: A Technical Guide formulated by the Food and Nutrition Technical Assistance Project (FANTA). The results are presented in tabulations and then interpreted and explained descriptively in order to obtain answers to the problems and objectives of this research.

To answer the first objective, namely analyzing the quantity and proportion of food consumption, especially local staple foods and imported staple foods in urban and rural areas in Musi Rawas Raya using the following stages:

- Prepare a questionnaire containing a list of questions based on the Food Frequency Questionnaire from FAO which is adjusted to the household consumption of the Indonesian people.
- The data was taken by the 24-hour Re-call method which means taking data on household consumption the day before the interview took place.
- Use the food account method in converting the amount of food eaten.
- Tabulate and analyze the data that has been collected.

Food Account is a recording method carried out by the family recording every day all food purchased, received from others or from their own production. To answer the second objective, namely analyzing the relationship of diversification to household food security in urban and rural areas in Musi Rawas Raya obtained by calculating food security using the HFIAS method, then looking at the effect of income and consumption on HFIAS. The data collected in this study includes the level of household food security as measured by the HFIAS method. Then analyzed using the spearman rank correlation test.

$$H = \alpha + \beta_1 X_1 + \varepsilon \dots (1)$$

$$H = \alpha + \beta_2 X_2 + \varepsilon \dots (2)$$

Information:

H = Food Security Score (1,2, 3, and 4)  
 X1 = Food diversification with the value approach of local staple food consumption  
 X2 = Food diversification with the value approach of imported staple food consumption

### 3. Results and discussion

#### 3.1. Consumption

##### 3.1.1. Consumption by Number of Respondents

Consumption of various types of carbohydrates based on the number of respondents in rural and urban areas can be seen in Table 1 and Table 2. In Table 1., all respondents in all income groups in rural area consume rice. The number of respondents in high-income group consume more types of carbohydrates including rice, tapioca flour and noodles. About 100,00 percent respondents in each level of income group consume rice as a main carbohydrates source.

**Table 1** Distribution of Consumers Consuming Local Staple Food and Imported Staple Food in Rural Area

Types of Carbohydrates	Income Group					
	High		Moderate		Low	
	N	%	N	%	N	%
Rice	35	100.00	35	100.00	35	100.00
Yam	17	48.57	2	5.71	18	51.43
Cassava	14	40.00	12	34.29	9	25.71
Noodle	25	71.43	35	100.00	35	100.00
Vermicelli	1	2.86	0	0.00	13	37.14
Soun	1	2.86	9	25.71	13	37.14
Tapioca Flour	27	77.14	16	45.71	24	68.57
Flour	21	60.00	34	97.14	24	68.57
Rice Flour	13	37.14	11	31.43	16	45.71
Glutinous Rice Flour	13	37.14	2	5.71	0	0.00
Potato	23	65.71	5	14.29	24	68.57

**Table 2** Distribution of Consumers Consuming Local Staple Food and Imported Staple Food in the Urban Area

Types of Carbohydrates	Income Group					
	High		Moderate		Low	
	N	%	N	%	N	%
Rice	20	100.00	20	33.33	20	100.00
Yam	9	45.00	4	6.67	4	20.00
Cassava	5	25.00	5	8.33	3	15.00
Noodle	11	55.00	16	26.67	17	85.00
Vermicelli	4	20.00	1	1.67	3	15.00
Soun	4	20.00	1	1.67	3	15.00
Tapioca Flour	9	45.00	10	16.67	12	60.00
Flour	6	30.00	9	15.00	14	70.00
Rice Flour	3	15.00	2	3.33	4	20.00
Glutinous Rice Flour	2	10.00	1	1.67	1	5.00
Potato	6	30.00	7	11.67	10	50.00

Table 2. show that all respondents in urban area consume rice. In the high-income group, urban people consume more types of carbohydrates including rice, noodles, yams and tapioca flour with percentages of 33.33 percent, 18.33 percent and 15.00 percent, respectively. Urban people with moderate income groups consume more types of carbohydrates rice, noodles and tapioca flour with percentages of 33.33 percent, 26.67 percent and 16.67 percent, respectively. Meanwhile, urban people with low-income groups consume more types of carbohydrates rice, noodles and wheat flour.

### 3.1.2. Average Amount of Local and Imported-Food Based Consumption

Consumption of various types of carbohydrates based on the average amount of carbohydrate consumption in rural and urban areas can be seen in Table 3.3.

**Table 3** Average amount of staple food consumption Local and Import in Rural and Urban Area

Types of Carbohydrates	Amount of Consumption in Rural Areal			Amount of Consumption in Urban Areal		
	High	Moderate	Low	High	Moderate	Low
	Kg/mo	Kg/mo	Kg/mo	Kg/mo	Kg/mo	Kg/mo
Rice	17.00	1800	14.86	20.80	19.65	18.25
Yam	1.06	1.00	1.56	1.71	1.00	1.80
Cassava	1.36	1.08	1.11	1.50	1.50	1.67
Noodle	1.91	1.06	1.53	1.27	1.96	3.78
Vermicelli	1.00	0.00	0.50	0.67	1.00	0.75
Soun	1.00	0.60	0.34	0.23	0.60	0.53
Tapioca Flour	2.31	2.69	3.23	3.82	2.22	2.92
Flour	2.33	3.24	3.13	4.14	2.50	2.79
Rice Flour	1.15	1.82	1.00	2.00	1.50	1.50
Glutinous Rice Flour	1.00	1.00	0.00	1.33	0.00	1.00
Potato	1.59	1.75	2.88	1.71	1.86	1.67



Table 3. show that there is a difference in the average amount of consumption of various types of carbohydrates in all income groups in rural areas per month. Rural communities with high income groups consume more types of rice carbohydrates with an average of 17.00 kg / month and wheat flour of 2.33 kg / month. Rural people with moderate consumption groups consume more types of rice carbohydrates with an average of 18.00 kg / month followed by wheat flour at 3.24 kg / month. While in rural communities with low consumption groups, they consume more types of rice carbohydrates with an average of 14.86 kg / month followed by tapioca by 3.23 kg / month.

There is a difference in the average amount of consumption of various types of carbohydrates in all income groups in urban areas per month. Urban people with high income groups consume more types of rice carbohydrates with an average of 20.80 kg / month followed by wheat flour of 4.14 kg / month. Urban people with moderate consumption groups consume more types of rice carbohydrates with an average of 19.65 kg / month followed by flour 2.50 kg. While in urban communities with low consumption groups, they consume more types of rice carbohydrates with an average of 18.25 kg / month followed by noodles as much as 3.78 kg / month.

### 3.1.3. Value of Consumption by Income Group

Consumption of different types of carbohydrates based on income groups in rural and urban areas can be seen in Table 4.

**Table 4** Consumption Value by Group Income in the Rural

Types of Carbohydrates	Income			Income		
	High	Moderate	Low	High	Moderate	Low
	IDR/month	IDR/month	IDR/month	USD/month	USD/month	USD/month
Rice	194.000	217.142	170.000	12.60	217.14	170.14
Corn	27.235	14.000	22.000	1.77	14.00	21.56
Yam	10.294	5.000	15.000	0.67	5.00	24.94
Cassava	6.142	20.083	20.000	0.40	20.08	19.89
Noodle	57.200	36.029	59.000	3.71	36.03	59.29
Vermicelli	6.000	0	11.000	0.39	0.00	11.38
Soun	6.000	18.000	7.000	0.39	18.00	7.38
Tapioca Flour	24.238	18.062	5.800	1.57	18.06	57.83
Flour	24.238	32.558	4.300	1.57	32.56	42.71
Rice Flour	20.538	16.363	29.000	1.33	16.36	28.88
Glutinous Rice Flour	8.000	8.000	0	0.52	8.00	0.00
Potato	17.217	15.000	36.000	1.12	15.00	36.08
Total	401.102	400.237	379.100	26.05	400.24	480.09
Average	33.425	33.353	31.592	2.17	33.35	40.01

In Table 4. Above it can be seen that there is a difference in the average expenditure on consumption of various types of carbohydrates in all income groups in rural areas per month. Viewed based on the production group of rural communities. Rural communities with high expenditure groups consume more types of rice carbohydrates with an average expenditure of Rp. 194,000/month followed by noodles of Rp. 57,200/month. Rural people with moderate expenditure groups consume more types of rice carbohydrates with an average expenditure of Rp217,142/month followed by noodles of Rp36,029/month and wheat flour of Rp32,558/month. Meanwhile, in rural communities with low expenditure groups, they consume more types of rice carbohydrates with an average expenditure of Rp170,142/month, followed by noodles of Rp59,285/month.

### 3.2. The Relationship of Diversification of Basic Foods with Food Security

#### 3.2.1. The Relationship of Local Staple Food Diversification with Food Security

**Table 5** Results of the Spearman Rank Correlation Test on Local Food

			Food Security Score	Rice Consumption
4 Spearman's rho	Food Security Score	Correlation Coefficient	1.000	-0.047
		Sig. (2-tailed)	0.0	0.548
		N	165	165
	Rice Consumption	Correlation Coefficient	-0.047	1.000
		Sig. (2-tailed)	0.548	0.0
		N	165	165

Based on the results above, it was found that the significance value or sig (2-tailed) was 0.548 in other words, the sig value of  $0.548 > 0.05$  which means that there is no significant relationship between food security score and wheat consumption. Furthermore, it is known that the resulting correlation coefficient value is 0.047. The value shows that the level of strength generated between the food security score variable and flour consumption is included in the very weak interval. Meanwhile, the resulting correlation coefficient value is negative at -0.047, this indicates that the direction of the relationship between the two variables is not unidirectional.

#### 3.2.2. The Relationship between Diversification of Imported Basic Foods and Food Security

The following are the results of the spearman rank correlation test on imported food.

**Table 6** Results of the Spearman Rank Correlation Test on Imported Food

			Food Security Score	Rice Consumption
4 Spearman's rho	Food Security Score	Correlation Coefficient	1.000	-0.049
		Sig. (2-tailed)	0.0	0.530
		N	165	165
	Rice Consumption	Correlation Coefficient	-0.049	1.000
		Sig. (2-tailed)	0.530	0.0
		N	165	165

Based on the results above, it was found that the significance value or sig (2-tailed) was 0.414 in other words, the sig value was  $0.530 > 0.05$  which means that there is no significant relationship between food security score and rice consumption. Furthermore, it is known that the resulting correlation coefficient value is 0.049. The value shows that the level of strength generated between the food security score variable and rice consumption is included in the very weak interval. Meanwhile, the resulting correlation coefficient value is positive at 0.049, this shows that the direction of the relationship between the two variables is unidirectional.

## 4. Conclusion

The pattern of food consumption in rural communities is more diverse than urban communities at various income levels. Rural and urban communities in Musi Rawas Raya based on income groups consume more rice, noodles, yams, wheat flour, tapioca flour and potatoes. The relationship between diversification of local staple foods and imported staple foods with household food security has no significant relationship. That's position in a weak level of strength and show the negative sign, which is at -0.047, while the sign of the relationship for imported food is positive at 0.049.

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**Compliance with ethical standards**

*Disclosure of conflict of interest*

No conflict of interest to be disclosed.

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