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## Relationship between rice farmers household food security and stunting incidence in Enrekang Regency

S Bulkis, I Summase, R A Nadja, Rahmadanah and Nirwan

Agribusiness Study Program, Faculty of Agriculture, Hasanuddin University, Makassar, South Sulawesi, Indonesia

E-mail: bulkisd@yahoo.com

**Abstract.** Food is one of the basic human needs. As a basic need, food must be sufficiently available at all times, safe, of good quality, affordable, of various types and nutritious. However, there are several health impacts due to this food, one of which is the incidence of stunting. Stunting describes a long-standing state of malnutrition and takes time for children to develop and recover. This study aims to analyze the relationship between household food security of rice farmers and the incidence of stunting and to analyze the factors that affect household food security of rice farmers and the incidence of stunting in Ongko Village, Maiwa District, Enrekang Regency. The analysis technique used is the simple Linear Regression and Chi-square test with the help of the SPSS version 23.0 application. The result of this study is that there is a significant relationship between food security and stunting variables, education variables (p-value = 0.033), parenting variables (p-value = 0.042), sanitation variables (p-value = 0.024).

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### 1. Introduction

Food is one of the basic human needs. As a basic need, food must be sufficiently available at all times, safe, of good quality, nutritious, and of various types at prices that are affordable to the purchasing power of the people. Viewed from the health aspect, food is declared safe which means healthy food. Healthy food is food that is free from biological, chemical and other contaminants that can harm and endanger human health [1]. Food sovereignty can be positioned as a key strategy to achieve national food development goals, it's called food security [2]. Food security is one of the strategic issues in the development of a country. In order to achieve food security, the agricultural sector is a very important sector because this sector is the main food provider, especially for developing countries, because it has a dual role, which is as one of the main targets of development and one of the main instruments of economic development [3].

The purpose of food security development itself is to ensure the availability and consumption of food that is sufficient, safe, of quality and nutritionally balanced, both at the national, regional and household levels. However, currently there are several health impacts related to food consumption, one of which is the incidence of stunting. Stunting is a condition where the body is very short to below the median length or height of the population which is the international reference, where the height is based on low age, or a condition in which the child's body is shorter than other children his age [4].



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Stunting describes a long-running state of malnutrition and takes time for children to develop and recover. A number of studies have shown a link between stunting with poor motor and mental development in early childhood, as well as cognitive achievement and poor school performance in late childhood [4]. Stunting in childhood can result in impaired cognitive development and stunted mental motor development [5]. Other consequences of stunting, according to several studies, are the increased risk of infection and death, delayed mental and motor development, and decreased work capacity [6].

Based on the results of the 2017 Nutrition Status Monitoring (PSG), the prevalence of stunting for children under five years of age (toddlers) in South Sulawesi reached 34.8%. Meanwhile, the province with the highest prevalence of children with stunting was East Nusa Tenggara at 40.3% and the lowest was Bali, which only reached 19.1%. In South Sulawesi Province, there are several districts that still have quite high rates of stunting, such as Enrekang, Bone, Tana Toraja, North Toraja, and Sinjai Regencies. Based on data from the Health Office, Enrekang Regency is the area with the highest stunting rate in South Sulawesi. The stunting rate in Enrekang Regency is comparable to the 2017 national stunting rate of 39.6 percent and South Sulawesi's 34.8 percent [7].

## 2. Research methods

This research was conducted in Ongko Village, Maiwa District, Enrekang Regency. The research began in April 2019. The determination of the sample size in this study was the census method based on the provisions put forward by [8], which states that saturated sampling is a sampling technique when all members of the population are used as sample [8]. The number of samples in this study were all members of the population in Ongko Village, Maiwa District as many as 30 households. The analysis technique used is Univariate and Bivariate analysis. In addition, a statistical test (SPSS version 23.0) will also be carried out using a simple Linear Regression and Chi-square test to determine the statistical significance of the relationship between the independent variable and the dependent variable. The Chi-square test was chosen according to one of its uses, namely to test the independence between two variables. In addition, statistical tests using the Chi-square test will be carried out to determine the statistical significance of the relationship. If the p value < 0.05 means that there is a statistically significant relationship.

## 3. Results and discussion

### 3.1. Characteristics of respondent households

The characteristics of the respondent's household include data related to the identity of the respondent and the respondent's family member. These data include age, education level, number of family dependents, farming experience, land area and total income. The characteristics of the respondent's household are presented in the following table:

**Table 1.** Characteristics of rice farmer household respondents in Ongko Village, Maiawa District, Enrekang Regency.

Description	Range	Average
Age	19 - 45 Years	34
Education Level	6 - 12 Years	6
Number of Family Dependent	1 - 6 Dependents	3
Farming Experience	1 - 11 Years	4
Land Area	0,3 - 1 Hectares	0,7
Total Income	IDR 500,000 – IDR 2,500,000	IDR 1,080,000

From table 1 above, it can be seen that the average respondent's income is IDR 1,080,000 with a range of IDR 500,000 - IDR 2,500,000. Family income is one of the determining factors for the

quality and quantity of food consumption, due to the tendency for high-income families to prioritize food quality more than low-income families. For households with limited income, the choice of food consumption is still dominated by how to get enough food in quantity, and not prioritizing the nutrition contained therein. This is in line with [9] who argues that income is an important factor in determining household expenditure, including family food consumption patterns [9]. If income increases, consumption patterns will be more diverse so that food consumption with high nutritional value will also increase.

### 3.2. Household expenditure<sup>8</sup>

Household expenses are costs incurred for the consumption of all household members. Household consumption is classified into 2, which is food consumption and non-food consumption. The following is the amount of household expenditure of the respondents in table 2.

**Table 2.** Average monthly household expenditure of respondent rice farmers in Ongko Village, Maiawa District, Enrekang Regency.

No.	Type of Expenditure	Average (IDR)	Percentage(%)
1.	<b>Food</b>		
	a. Grains	154,657	37.43
	b. Tubers	6,540	1.58
	c. Fish	13,000	3.14
	d. Meat	14,386	3.48
	e. Egg and Milk	11,122	2.69
	f. Vegetables	16,728	4.04
	g. Nuts	27,565	6.67
	h. Fruits	24,467	5.92
	i. Oil and Fat	13,133	3.17
	j. Drink	28,966	7.01
	k. Spices	24,027	5.81
	l. Other consumption	23,690	5.73
	m. Foods and Drinks	4,165	1.00
	n. Tobacco and betel	50,654	12.26
	o. Alcohol Drinks	-	-
	Amount	413.100	100
2	<b>Non Food</b>		
	a. House	53,099	14.52
	b. Various goods and services	98,778	27.10
	c. Costs of Education	59,746	16.40
	d. Health Costs	17,841	4.90
	e. Clothing	57,847	15.80
	f. Tax and Insurance	23,433	6.40
	g. Social purposes	53,089	14.40
	Amount	363.833	100
	<b>Total</b>	<b>776.933</b>	<b>100</b>

Table 2 shows the average monthly expenditure of the respondent's household. The amount of expenditure on food is IDR 413,100 and the non-food expenditure is IDR 363,833 so that the average household expenditure of the respondent is IDR 776,933. Expenditures for grains constitute the largest food expenditure, namely IDR 154,657 or 37.43%. Non-food expenditure of IDR 363,833. The largest expenditure was for various goods and services IDR 98,778 or 27.10%.

<sup>25</sup> Status of rice farmers household food security in ongko village, maiwa district, enrekang regency  
 Food security is a condition of fulfilling one's need for food. The food availability of a household can be an indicator in determining the food security. Rice farmer household food availability can be seen in the following table 3.

**Table 3.** Proportion of respondent rice farmers household expenditure in Ongko Village, Maiawa District, Enrekang Regency.

No	Description	(IDR/Month)	Percentage (%)
1	Food Expenditure	413,100	53.17
2	Non Food Expenditure	363,833	46.83
	<b>Total</b>	<b>776,933</b>	<b>100</b>

The average amount of total expenditure in this study was IDR 776,933. Based on the table above, it can be seen that the expenditure for food is IDR 413,100 or 53.17% of the total expenditure and for non-food expenditure of IDR 363,833 or 46.83%, which means that household expenditure for food is higher than non-food raw materials. The same thing happened in research by [10] which states that the proportion (share) of household expenditure for food needs is much higher than household expenditure for non-food needs, which is an average of 78% for food needs, while 22 % for non-food needs [10].

**Table 4.** Average energy and protein consumption of respondent rice farmers in Ongko Village, Maiawa District, Enrekang Regency.

No	Nutrient content	Average	Recommended Nutritional Adequacy Rate	Adequate Level Of Nutrition (%)
1	Energy (kcal/person/day)	1942.02	2036.3	95.37
2	Protein (gram/person/day)	57.55	60.1	95.75

Based on the results of the calculation of the nutrit survey, the average household energy consumption of respondents was 1942.02 kcal/person/day and protein consumption was 57.55 grams/person/day. The amount of energy and protein consumption is equivalent to 95.37% energy adequacy level and 95.75% protein adequacy level. Which means that the average protein and energy consumption of farm households is high, in contrast to the results of [11] where the average protein consumption of farm households is moderate (80% - 90%), but for the average energy consumption is classified as a deficit because it is less than 70% [11].

**Table 5.** Distribution of rice farmers household energy and protein adequacy level categories in Ongko Village, Maiawa District, Enrekang Regency.

No	Nutrition Adequacy Level Category	Energy (kcal/person/day)		Protein (grams/person/day)	
		Total	%	Total	%
1	Heavy Deficit	7	23.33	6	20
2	Medium Deficit	3	10	3	10
3	Light Deficit	4	13.33	4	13.33
4	Normal	16	53.34	17	56.67
5	Over	-	-	-	-
	<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>

Based on the table above, there are 7 or 23.33% of households with heavy deficit status, 3 households or 10% medium deficit status, 4 households or 13.33% light deficit status, 16 households or 53.34% normal status, there are no households with over energy status. For protein adequacy, there are 6 or 20% of households with heavy deficit status, 3 households or 10% medium deficit status, 4 households or 13.33% light deficit status, 17 normal households or 56.67% and no household who have the status of over protein.

**Table 6.** Distribution of respondent rice farmer household food security in Ongko Village, Maiawa District, Enrekang Regency.

No.	Food Security Status	Number of Households	Percentage (%)
1	Resistant	5	16,67
2	Susceptible	16	53,33
3	Less	3	10
4	Insecure	6	20
	<b>Total</b>	<b>30</b>	<b>100</b>

Based on the status of household food security of rice farmers (table 6), with food susceptible status has the largest distribution with a percentage of 53.33% of all respondents. Households with food insecurity status rank second with a percentage of 20%, food resistant households have a percentage of 16.67% and households with less food have a percentage of 10%.

**Table 7.** Measurement results according to height, weight, age and body length of respondent rice farmers child in Ongko Village, Maiawa District, Enrekang Regency.

No	Name	Age (Years)	Weight (Kg)	Height (Cm)	Index		Status
					W/A	H/A	
1	RS	2	11.5	89	36 Inutrition	Short	Stunting
2	AD	2	8.3	72	Good Nutrition	Short	Stunting
3	MA	4	11	82.2	Good Nutrition	Short	Stunting
4	RA	4	12.2	85.1	Good Nutrition	Short	Stunting
5	RW	4	12.8	70	Good Nutrition	Short	Stunting
6	HY	4	11.8	90	Malnutrition	Very Short	Stunting
7	FH	5	10.4	87.6	Malnutrition	Short	Stunting

Measurement of body weight/age, there are 3 children who are included in the under nutrition category and 4 of them are good nutrition. Height/age, there is 1 child who is included in the very short category and 6 of them in the short category. Based on the anthropometric index which is the benchmark for children in determining the stunting category, the status of height/age, although in the table above there are 4 children in the good nutrition category, on other indices the child is classified as a short category, so it can be concluded that there are 7 children who are stunting out of 30 children of rice farmers in Ongko Village, Maiawa District, Enrekang Regency.

#### 3.4 Relationship of food security and stunting incidence of rice farmers household children.

The analysis used to see the relationship between the variables studied, both the independent variable of food security and the dependent variable for the incidence of stunting (health services, environmental health, education, infection status, breastfeeding, parenting and sanitation) used bivariate level analysis, where the test will be conducted. Statistically using the chi square test to determine the relationship between food security and the incidence of stunting in rice farmer household children in Ongko Village, Maiawa District, Enrekang Regency. The results of the chi square test can be shown in table 8.

Based on the results of the above research, it can be concluded that there is a significant relationship between food security and the stunting variable in the education variable (p-value = 0.033), the parenting style variable (p-value = 0.042), and the sanitation variable (p-value = 0.024).

#### 3.5 Factors affecting food security and incidence of stunting in rice farmer household children

The analysis used to see the effect of the variables under study, both the independent variable food security and the dependent variable on the incidence of stunting using univariate level analysis, will be carried out using a simple linear regression test to determine the factors that affect food security and the incidence of stunting in children. Rice farmer household. The simple linear regression test results are as follows in table 9:

**Table 8.** Results of the relationship between food security and stunting incidence of respondent rice farmer household children in Ongko Village, Maiawa District, Enrekang Regency.

<i>Chi-Square Tests</i>			
Variabel <i>stunting</i>	Value	df	Asymptotic Significance (2sided) p
Health Service	3,040 <sup>a</sup>	3	,386
Environmental Health	6,563 <sup>a</sup>	3	,087
Education	6,820 <sup>a</sup>	2	,033
Infection Status	2,740 <sup>a</sup>	4	,602
Breastfeeding	3,547 <sup>a</sup>	4	,471
Parenting	6,298 <sup>a</sup>	4	,042
Sanitation	5,425 <sup>a</sup>	4	,024

**Table 9.** Results of simple linear regression calculation for respondent rice farmer households in Ongko Village, Maiawa District, Enrekang Regency.

<i>Variabel</i>	<i>B</i>	<i>thitung</i>	<i>Sig.</i>
(Constant)	0,776	1,170	0,253
Health Service	0,617	0,634	0,154
Environmental Health	0,490	0,630	0,535
Education	0,224	3,102	0,037
Infection Status	0,918	0,935	0,358
Breastfeeding	1,796	1,997	0,056
Parenting	0,412	3,223	0,016
Sanitation	0,320	3,704	0,003

Based on the results obtained in this study, it was found that the variables that had a significant effect on food security in rice farmer households in Ongko Village, Maiawa District, Enrekang Regency were the educational variables of 0.037, the parenting variable was 0.016 and the sanitation variable was 0.003. Meanwhile, the variable that had the greatest influence on food security for rice farmer household children in Ongko Village, Maiawa District, Enrekang Regency was sanitation at 0.003.

### 30 Conclusion

There is a significant relationship between food security and stunting variables, education variables (p-value = 0.033), parenting variables (p-value = 0.042), sanitation variables (p-value = 0.024). The variables that have a significant effect on food security are education (Sig. 0.037), parenting (Sig. 0.016) and sanitation (0.003). Meanwhile, the variable that has the greatest influence on food security for rice farmer household children in Ongko Village, Maiawa District, Enrekang Regency is sanitation.

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