ANALYSIS OF FARMERS' HOUSEHOLD FOOD SECURITY AROUND PT JEMBAYAN MUARA BARA TENGGARONG SEBERANG DISTRICT

ABSTRACT

Indonesia is an archipelagic and agricultural country, where there are many islands and the majority of the population makes their living as farmers. The food security condition of farming households is currently still fragile, at least the number of food-insecure people is relatively high. The research aims to determine the food security conditions of farming households around PT Jembayan Muara Bara, Tenggarong Seberang District. The research was carried out in 5 villages (Separi Mahakam, Mulawarman, Buana Jaya, Suka Maju, and Bukit Pariaman) which are close to the PT Jembayan Muarabara coal mine location from July 2023 to March 2024. The stages of research activities are as follows: research preparation, observation, sampling, data collection and analysis, and reporting. Sampling (respondents) used Non Proportional Random Sampling and the number of samples taken was 100 respondents based on the Slovin formula method. The data collected consisted of primary data obtained through direct interviews with respondents using questionnaires; and secondary data obtained from documents, reports, official records from the Village office, and relevant journals. The results of the research show that the level of food security conditions of farming households around PT Jembayan Muara Bara is 32% food secure. 50% lack food, 7% are food insecure and 11% are food insecure; There is no relationship between income diversification and food security of farming households around PT Jembayan Muara Bara, Tenggarong Seberang District with an Asymp-sig (2-Sided) value of 0.090.

Keywords: Food Security, Farmer Households

1. INTRODUCTION

One of the most basic needs for humans to be able to maintain their survival is food. According to Law Number 18 of 2012, food is anything that comes from biological sources, agricultural products, plantations, forestry, fisheries, animal husbandry, waters, and water, whether processed or unprocessed, which is used as food or drink for human consumption. It was stated by Prastiwi, et al (2023) that humans need energy to carry out daily activities, and the fulfillment of this energy is obtained through the food they consume.

The National Food Security Agency (2020) states that food security is based on Law No. 18 of 2012 is a condition for fulfilling food for the state and 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 the religion, beliefs, and culture of the community, to be able to live a healthy, active and productive life sustainably. Food security has always been a strategic issue because food security is a right of every citizen whose existence must be guaranteed.

To achieve food security, it is necessary to have food available in sufficient quantities, distributed at affordable prices, and safe for consumption for every citizen to support their daily activities at all times. Food security is the availability of food and a person's ability to access it. Based on this statement, meeting food needs is the main policy target for the government of a country in fulfilling the human rights of its population (Rahmi, 2013).

Household food security can be seen from indicators of availability, access to food use, and stability. FAO categorizes food security into four pillars, namely food availability, accessibility, utilization, and stability. These four pillars have different aspects of food security but must be intact for food security. Efforts to provide food, improve nutrition, and improve quality of life are set as goals in sustainable development. Food consumption is one of the important things to strengthen food security. It was stated by Haryanti and Rahmawiliyanti (2015) that farmers have a strategic position in food security because farmers act as both producers and consumers. In other words, farmers must be able to meet their own food needs.

The problems in realizing food security currently include the population continuing to increase, on the other hand, the production of crops, especially rice, tends to decline, thus affecting farmers' income in spending to meet basic needs, namely food.

The realization of sovereignty and food independence carried out by the Ministry of Agriculture of the Republic of Indonesia is by reducing the value of food insecurity because many households experience food insecurity. Efforts are being made to increase food security at the farming household level through food diversification and expanding sources of income (Rahmanto, et al. 2021).

PT Jembayan Muara Bara carries out mining activities in contact with the agricultural sector so rice production results are not optimal. Rice production has tended to decline in Kutai Kartanegara Regency in the last ten years, and in the last three years has reached deficit status, which is a very worrying condition and raises the risk of food

insecurity. In this way, researchers conducted research to find out the food security conditions of farming households around PT Jembayan Muara Bara, Tenggarong Seberang District.

2. RESEARCH METHODS

2.1. Time and Place

The research was carried out in 5 villages (Separi Mahakam, Mulawarman, Buana Jaya, Suka Maju, and Bukit Pariaman) which are close to the PT Jembayan Muarabara coal mine location, Tenggarong Seberang District, Kutai Kertanegara Regency, East Kalimantan Province, Indonesia from July 2023 to March 2024.

2.2. Research Activities

The stages of research activities are as follows: research preparation, observation, sample determination, data collection and analysis, and reporting.

2.3. Sampling Method

The research population was rice farmers in Tenggarong Seberang District with a total of 2,801 people. Sampling (respondents) used Non Proportional Random Sampling and the number of samples taken was based on the Slovin formula method (Sugiyono, 2015) with the formula:

$$n = \frac{N}{1 + N(e)^2}$$

Note: n = Number of Population N = Number of Samples; and E = Margin of Error 10%
From the calculation results, 100 respondents were obtained spread across 4 villages (Mulawarman, Buaya Jaya, Suka Maju, and Bukit Pariaman). A sample of 25 respondents was taken from each village.

2.4. Method of Collecting Data

Data collection is: primary data obtained through direct interviews with respondents using questionnaires; and secondary data obtained from documents, reports, official records from the Village office, and relevant journals.

2.5. Data Analysis Methods

The data processing method in this research will be carried out using SPSS 21, nutrisurvey, and Excel software. The general condition of the research area will be processed and presented in descriptive form, and the state of the population's income and consumption will be presented in tables and narrated.

Farming household food security is measured based on the percentage of food expenditure and energy consumption intake. Based on the cross-classification between the percentage of food expenditure and energy consumption (two indicators of food security), the level of food security is classified according to the method of Jonsson and Toole (1991) in Maxwell, et al (2000) as follows: (1) food insecure households, namely if the proportion high food expenditure (≥ 60% of household expenditure) and low energy consumption (≤ 80% of energy adequacy requirements); (2) a household lacks food, namely if the proportion of food expenditure is low (< 60% of household expenditure) and consumes less energy (≤ 80% of energy adequacy requirements); (3) food vulnerable households, namely if the proportion of food expenditure is high (≥ 60% of household expenditure) and consumes sufficient energy (> 80% of energy adequacy requirements); and (4) a food secure household, namely if the proportion of food expenditure is low (< 60% of household expenditure) and consumes sufficient energy (> 80% of energy adequacy requirements).

3. RESULTS AND DISCUSSION

3.1. General Description of Research Locations

Tenggarong Seberang District is one of the sub-districts located in the Kutai Kartanegara Regency, East Kalimantan Province, Indonesia. The Tenggarong Seberang District area consists of 18 villages, namely, Loa Lepu, Teluk Dalam, Perjiwa, Loa Raya, Loa Ulung, Embuat, Bukit Raya, Manunggal Jaya, Bangun Rejo, Kerta Buana, Separi, Bukit Pariaman, Buana Jaya, Mulawarman, Loa Pari, Sukamaju, Tanjung Batu, Karang Tunggal. The village which is the sub-district capital is Manunggal Jaya village.

PT Jembayan Muara Bara is located in Tenggarong Seberang District, Kutai Kartanegara Regency, East Kalimantan Province, the area covered includes 5 villages, namely Ring I: Separi Mahakam Village, Mulawarman Village, and Buana Jaya Village; Ring II: Suka Maju Village and Bukit Pariaman Village.

3.2. Population

Tenggarong Seberang District had an area of 443.4 km² in 2023. The population is 57,120 people or 18,979 households. The area, number of households, and population in 4 villages (research locations) are presented in Table 1.

Table 1. Area, Number of Households, and Population of research locations

Villages	Area	Number of Households	Number of Population
Mulawarman	24,7	724	2,387
Buana Jaya	37,00	1,316	4,441
Suka Maju	41,00	722	2,458
Bukit Pariaman	42,1	2,265	7,532
Amount	220,8	1451,179	21,208

Source: BPS Tenggarong Seberang Secondary Data 2023 (processed)

Based on Table 1, shows that the largest number of households in Bukit Pariaman Village is 2,265 with a population of 7,532, followed by Buana Jaya Village with 1,316, Mulawarman Village with 724, and the least in Suka Maju Village with 722 with a population of 2,458 souls.

3.3. Respondent's Household Income

Farmers' household income consists of farming income (on-farm) and non-farming income (off-farm). The average household income of respondents in the research location can be seen in Table 2.

Table 2. Average monthly household income of respondents

Villages	farming income (IDR month^{-1})	Non farming income (IDR month^{-1})	Total (IDR month^{-1})
Mulawarman	1.919.739 (47,27%)	2.142.308 (52,73%)	4.062.047
Buana Jaya	2.953.440 (65,00%)	1.621.875 (35,00%	4.575.315
Suka Maju	2.915.857 (64,00%)	1.625.000 (36,00%)	4.575.315
Bukit Pariaman	2.907.173 (62,30%)	1.759.000 (37,70%	4.666.173

Source: Primary Data 2024 (Processed)

Based on Table 2, shows that the amount of farming income of farmer households at the research location ranges from IDR 4,062,047- 4,666,173 per month (47.27- 65.00%). The highest farming income in Bukit Pariaman Village was IDR 2,907,173 per month (62.30%), and the lowest was in Mulawarman Village, namely IDR 4,666,173 per month. This income is obtained from farming income such as the results of working in rice fields and gardening, while non-farming income is obtained from the income of family members who work such as mining, trading, agricultural laborers, builders, employees, and teachers. This non-farming income becomes additional income for the household. The amount of non-farming income ranges from IDR 1,621,875 - 1,621,875 per month (35.00 – 52.73%).

3.4. Food and Non-Food Consumption Expenditures

The research results regarding the percentage of food and non-food expenditure are presented in Table 3.

Table 3. Expenditure data for food and non-food at the research location

Villages	Percentage of food (IDR month^{-1})	Percentage of non-food (IDR month^{-1})	Total (IDR month^{-1})
Mulawarman	1.707.640 (51,00%)	1.656.560 (49,00%)	3.364.200
Buana Jaya	1.820.520 (53,00%)	1.627.600 (47,00%)	3.448.120
Suka Maju	1.757.940 (51,00%)	1.684.840 (49,00%)	3.442.780
Bukit Pariaman	1.893.700 (55,00%)	1.580.440 (45,00%)	3.474.140

Source: Primary Data 2024 (Processed)

Based on Table 3, shows that the highest average total expenditure is in Bukit Pariaman Village, IDR 3,474,140, for food IDR 1,893,700 (55%) and non-food IDR 1,580,440 (45%), while the average expenditure The lowest total was

in Mulawarman Village at IDR 3,364,200 for food at IDR 1,707,640 (51%) and non-food at IDR 1,656,560 (49%). In general, high income usually supports someone to buy more than enough. The ability of a household to provide good nutritional intake for its family depends on its purchasing power and the number of dependent household members and is related to the level of household income.

3.5. Respondents' Energy and Protein Consumption

Energy and protein consumption can be seen in food consumption. Food consumption is calculated from the food and drink consumed without considering the origin of the food. Energy consumption is the amount of food energy expressed in kcal consumed per person per day. Protein consumption is the amount of protein expressed in grams consumed on average per person per day. Average energy and protein consumption per capita per day for each research location can be seen in Table 4.

Table 4. Average Energy and Protein Consumption of Respondent Households

Villages	Nutrient content	Consumption	AKG which is recommended	TKE
Mulawarman	Energy (kcal/cap/day)	1503	2.100	72
	Protein (g/cap/day)	43	57	75
Buana Jaya	Energy (kcal/cap/day)	1559	2.100	74
	Protein (g/cap/day)	54	57	95
Suka Maju	Energi (kcal/cap/day)	1542	2.100	73
	Protein (g/cap/day)	45	57	79
Bukit Pariaman	Energi (kcal/cap/day)	1624	2.100	77
	Protein (g/cap/day)	55	57	96

Source: Primary Data 2024 (Processed)
Information AKG = nutritional adequacy rate; TKE = energy consumption rate

Data in Table 3 shows that the average household energy consumption in Mulawarman Village is 1,503 kcal/capita/day; Buana Jaya Village is 1,559 kcal/capita/day, Suka Maju Village 1,542 kcal/capita/day. And Bukit Pariaman Village 1,624 kcal/capita/day. The average household protein consumption in Mulawarman Village is 43 g/capita/day. Buana Jaya Village 54 g/capita/day, Suka Maju Village 45 g/capita/day, and Bukit Pariaman Village 55 g/capita/day.

Energy Consumption Level is a comparison between energy consumption divided by the recommended nutritional adequacy figure. The level of energy consumption in Mulawarman Village is 72% and the level of protein consumption is 75% (classified in the low category). Buana Jaya Village has an energy consumption level of 74% and 95% protein consumption level (classified as moderate); Suka Village's energy consumption level is 73% and protein consumption level is 79% (classified as moderate); and Bukit Pariaman Village, the energy consumption level is 77% and the protein consumption level is 96% (classified as moderate).

The average energy consumption level of farmer households around PT Jembayan Muara Bara in Tenggarong Seberang District ranges from 72 - 77% AKG, this level of energy consumption is still relatively low because the energy source is mostly obtained from staple foods only and not supplemented by additional foods Others, protein needs are classified as moderate because they are fulfilled by side dishes that are sourced from animal or vegetable protein.

3.6. Respondent Household Food Security

Food security can be seen from the consumption side and its relationship to the proportion of household expenditure. The proportion of food expenditure and energy consumption are components for determining household food security. The distribution of respondent household food security in the 4 research villages is presented in Table 5.

Table 5. Distribution of Respondents' Household Food Security

No.	Food Security Category	Mulawarman		Buana Jaya		Suka Maju		Bukit Pariaman		Total
		n	%	n	%	n	%	n	%	
1	Food Security (Low Proportion of Food Expenditure <60%, Adequate TKE >80%)	5	20	9	36	7	28	11	44	32
2	Food Insufficiency (Low Proportion of Food Expenditure <60%, Less TKE <80%)	13	52	10	40	16	64	11	44	50
3	Food Insecurity (High Proportion of Food Expenditure <60%, Low TKE <80%)	2	8	3	12	1	4	1	4	7
4	Food Vulnerability (High Proportion of Food Expenditure <60%, Sufficient TKE >80%)	5	5	3	12	1	4	2	8	11
	Total	25	100	25	100	25	100	25	100	100

Source: Primary Data 2024 (Processed)

The data in Table 5 shows that the food security status of farming households in the research location with food security status is 32 respondents; 50 respondents lack food, 7 respondents are food insecure, and 11 respondents are food insecure. The highest food insecurity status is in Bukit Pariaman Village with 11 respondents (44.00%), the highest food insecurity is in Suka Maju Village with 16 respondents (64.00%), and food insecurity in Mulawarman Village with 2 respondents (8.00). %), food insecurity in Mulawarman Village was 5 respondents (5.00%). The results of similar research reported by Rahmi, et al (2013) show that farming households in Ponjong Village, Gunung Kidul are not classified as food insecure, because farming and non-farming income can cover food expenses. Furthermore, it was reported by Rahmawati, et al. (2020) that the level of food security of farming households in Pawindan Village, Ciamis District, Ciamis Regency, as seen from the food subsistence level indicator, is low, the household accessibility indicator is high, and the food expenditure share indicator is low. Thus, in general, the level of food security of farming households in Pawindan Village, Ciamis District, and Ciamis Regency is classified as high. Prastiwi (2022) reported that the food security conditions of rice farmer households in the Samin Watershed, Karanganyar Regency are 42% food insecure, 28% food insecure, 18% food insecure, and 12% food insecure; Zariah et al (2023) reported that the food security conditions of rice farming households in Waihatu Village, West Kairau District, West Seram Regency are on average food insecure. The distribution of food security categories for lowland rice farmer households is 3% categorized as food secure, and 97% categorized as food deficient. As reported by Rochmania, et.al. (2023) that the food security conditions of farming households in Nalumsari District, Jepara Regency include 34.09% food secure, 20.45% food vulnerable, and 22.73%, food insecure and food insecure. It was reported by Mantouw et al (2024) that the food security condition of farming households in Negeri Haruku Village, Haruku Island District, Central Maluku Regency is in the food secure category as indicated by the percentage of food expenditure was 58.56%, and non-food expenditure 41.44% (less than 60%).

3.7. The Relationship between Income Diversification and Respondents' Food Security

The relationship between income diversification and food security of respondents' households in the research location was analyzed descriptively using the SPSS 16 for Windows program. Data regarding the verified correlation between income and food security of respondents' households in the research location is presented in Table 6.

Table 6. Relationship between Income Diversification and Respondents' Food Security

Food Security Level	Income Diversification Index						
	Low		Medium		High		Total
	n	%	n	%	n	%	
Food Security	6	33,3	4	20	22	35	32
Lack of Food	11	61,1	9	45	30	48	50
Food Vulnerability	1	5,6	3	15	8	13	12
Food Insecurity	0	0,0	4	20	2	3	6
Total	18	100	20	100	62	100	100
Asymptotic Significance (2-Sided)							0,090

Source: Primary Data 2024 (Processed)

The data in Table 6 shows that the Asymptotic Significance (2-sided) is 0.090, this value is greater than 0.05, which means that there is no significant relationship between income diversification carried out by respondent households and their food security status. The research results reported by Rochmania, et.al. (2023) that the relationship between income diversification and food security of farming households in Nalumsari District, Jepara Regency shows a 2 Sided Asymp-sig result of 0.248 which means that there is no significant relationship between income diversification and food security.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. Conclusion

Based on the results of the research and discussion, conclusions are drawn, namely as follows:

1. The level of food security conditions of farming households around PT Jembayan Muara Bara is food security at 32%. 50% lack food, 7% are food insecure, and 11% are food insecure.
2. The relationship between income diversification and food security of farming households around PT Jembayan Muara Bara, Tenggarong Seberang District, namely that there is no significant relationship, indicated by an Asymp-sig (2-Sided) value of 0.090.

4.2. Suggestion

Based on the results of the research and discussion, suggestions that can be given are as follows:

1. Counseling about food security is carried out on an ongoing basis, especially to housewives regarding good food consumption patterns.
2. The government must limit the conversion of agricultural land to other forms of land use.
3. The government and related parties should strive to generate income opportunities in the area and support farmers to increase productivity through supportive policies including utilization of inputs and creating markets for their products.

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