ANALYSIS OF FOOD SECURITY LEVEL OF FARMERS HOUSEHOLD OF OIL PALM PLANTATIONS IN ASAHAN REGENCY, NORTH SUMATRA PROVINCE

VIRDA ZIKRIA[1], M.AKBAR SIREGAR*[2] and SITI SABRINA SALQAURA[3]

[1] Department of Agribusiness, Universitas Medan Area, Medan, Indonesia.

[2, 3] Study Program of Agribusiness Master in Postgraduate, Universitas Medan Area, Medan Indonesia. *email: makbarsiregar@staff.uma.ac.id

ABSTRACT

North Sumatra is one of the provinces with the largest palm oil production in Indonesia. The center of smallholder oil palm plantations in North Sumatra is Asahan Regency, which accounts for about 20% of all smallholder oil palm plantations in North Sumatra. However, according to the North Sumatra Province Publication in Figures (2020), Asahan Regency is one of the regencies with the highest level of poverty in North Sumatra Province. This study aims to determine the level of household food security of smallholder oil palm plantation farmers based on the level of welfare through the proportion of household expenditure. The research method was carried out quantitatively and qualitatively with data collection using a questionnaire containing questions about the food recall of smallholder oil palm plantation farmers which will lead to household welfare based on the level of food security through the proportion of expenditure. The results of the study found that smallholder oil palm plantation farmers' households had a proportion of food expenditure from total household expenditure of Rp. 1,815,000 or 62% with a household Energy Consumption Rate of 74% included in the sufficient category. The condition of food security of food insecure households is 38% and 29% is included in the condition of food security. Households with food insecure status and food insecurity were also found in the study area at 20% and 13%, respectively.

Keywords: Food Security, Palm Oil Plantation Farmers

Introduction

Indonesia is one of the developing countries with a high but uneven population growth that has an impact on increasing the number of poor families and unemployment. Poverty is closely related to food security where poverty causes limitations on food consumption. Food security is considered a pillar of the development of other sectors because no country can build its economy without solving its food problems first. Food security requires the fulfillment of two sides simultaneously, the first is the availability side, namely the availability of sufficient food for the entire population in terms of quality, safety, and affordability, which is prioritized over domestic products and the second side of consumption, namely the ability of each household to access sufficient food for each member to grow, be healthy and productive from time to time. Both sides require an efficient distribution system that can reach all segments of society (Food Security Council, 2005). Oil palm is a plantation crop that contributes a lot to the Indonesian economy. Apart from being a source of foreign exchange, it is also a sector that absorbs a large enough workforce so that it is expected to improve the people's economy or reduce poverty. Nearly 70 percent of oil palm plantations in Indonesia are located in Sumatra.

North Sumatra is one of the provinces with the widest area and the highest palm oil production in Indonesia. The center of smallholder oil palm plantations in North Sumatra is Asahan Regency, which is 77.11 thousand hectares of smallholder oil palm plantations or 20% of the entire smallholder oil palm plantations of North Sumatra.
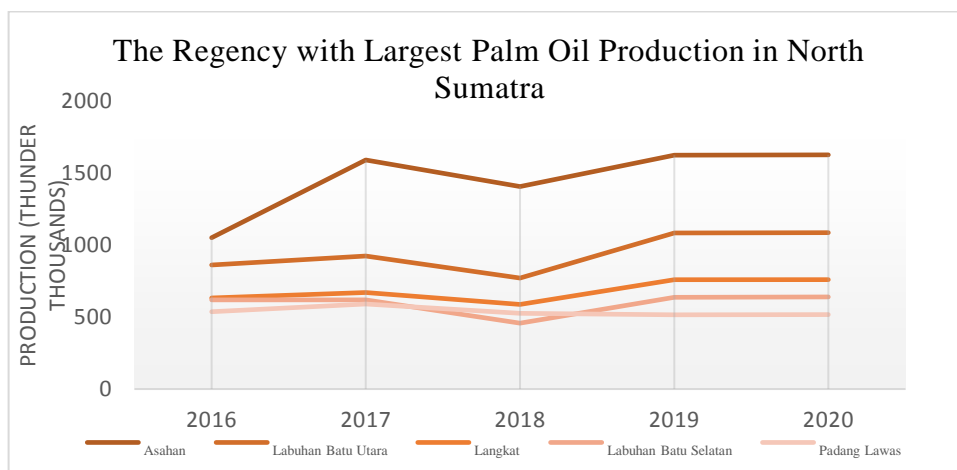

Figure 1: The Largest Oil Palm Producing District in North Sumatra Province 2016-2020

As the largest palm oil exporting country in the world with an average export volume of 27,841,972 tons/year and an export value of 18,046,110 thousand US$/year, palm oil has become a leading commodity. The role of the oil palm plantation sector is not only national but also global. Workers or oil palm plantation farmers should get a decent and prosperous life. However, the fact are still many whose lives are not yet prosperous and decent, especially from the smallholder oil palm plantation sector.

Table 1: Regencies and Cities with the Largest Number of Poor Populations in North Sumatra

NO	County/City	Total Population (Thousand People)		Number of Poor Population (Thousand People)	
		2019	2020	2019	2020
1	Medan	2,247	2.264	204.22	186.454
2	Langkat	1.028	1.035	114.41	105.455
3	Deli Serdang	2.114	2,155	97.09	88,524
4	Simalungun	859	863	91.35	80,297
5	Asahan	718	724	83.67	74,137
6	South Nias	314	317	57.95	52,704
7	Batubara	409	412	50.91	51,781
8	Serdang Bedagai	612	614	56.93	50.486
9	Middle Tapanuli	363	370	53.05	48,534
10	Mandailing Natal	439	443	48.3	42,388

Source: BPS, 2021

According to the North Sumatra Province Publication (2021), Asahan Regency is the regency with the fifth highest poverty rate in North Sumatra Province even though this area is a center for oil palm production, so this study aims to know the level of food security and household welfare of smallholder oil palm plantation farmers in Asahan Regency, North Sumatra. This research can be used as a basis for evaluating agricultural policies in the plantation sector, especially smallholder oil palm plantations that place. Therefore, it is necessary to know beforehand the state of welfare and food security so that the form of policy transformation and smart governance is expected to be more precise and can encourage community welfare, in this case, the object is smallholder oil palm plantation farmers.

Food Security Concept

Food security is an integral part of the dimensions of availability, accessibility, and stability of food prices (Mun'im, 2011). Meanwhile, the Food Security Council (DKP) together with the World Food Program (WFP) has formulated indicators of food security which are grouped into three factors, namely factors of food availability, access, and utilization (DKP, 2009). Thus, it can be said that the food security system consists of three main subsystems, namely food availability, access, and absorption (Hanani, 2009).

Household Food Security Indicators

Food security contains three main elements, namely the availability, distribution, and consumption of food.

1. Food Availability

The availability of food for individuals and households to obtain food, both from an economic and physical perspective, is the scope of food security. Adequacy of food availability can be seen from the share of household expenditure. The large share of food expenditure reflects the level of household income.

2. Food Distribution

Food distribution includes food accessibility. The availability of food in an area may be sufficient, but not all households have adequate access both in terms of quantity and variety of food. The way households obtain food is also grouped into two categories, namely self-production, and buying (Anggraini, 2014).3.

3. Food Consumption

Food consumption is all food consumed by each household member. According to Jonsson and Toole (1991) in Maxwell et all (2000) states that food security can be measured by combining two cross indicators, namely the share of food expenditure and household energy consumption and energy adequacy (kcal), with the following criteria:

1. Households are food insecure, namely when the proportion of food expenditure is low (< 60% of household expenditure) and consumes sufficient energy (> 80% of the energy adequacy requirement).

2. Households lacking food, namely the proportion of low food expenditure (< 60% household expenditure) and less energy consumption (≤ 80% of the energy adequacy requirement).

3. Households are food insecure, namely when the proportion of food expenditure is high (≥ 60% of household expenditure) and consumes sufficient energy (> 80% of the energy adequacy requirement).

4. Households are food insecure, that is, if the proportion of food expenditure is high (≥ 60% of household expenditure) and the level of energy consumption is less (≤ 80% of the energy adequacy requirement).

Share of Food Expenditure

Household expenditure is a proxy for the level of household income. The large share of food expenditure reflects the level of household income. Households with low income have a high share of food expenditure and conversely, households with high income have a low share of food expenditure. The greater the share of a household's food expenditure, the lower the level of household food security, and vice versa (Irawan, 2006). The greater the income, the less the proportion of expenditure spent on food consumption (Ilham and Sinaga, 2008). Household spending comes from income earned by households, so the large share of food expenditure shows the level of household income and vice versa.

Sani (2019) in a study entitled "Analysis of Household Food Insecurity and Its Coping Mechanisms in Western Ethiopia" revealed that in the research area, food insecurity was 53.62% with the depth and severity of food insecurity being 16.84% and 7, respectively, 32%. The results also showed that the average calorie intake of food insecure households was 1440.37 kcal/day with a minimum and a maximum of 597.65 kcal and 2048.13 kcal, respectively. Suyudi (2020) in a study entitled " The Study of Food Security" Mendong Farmer Households and Rice Farmers" shows that the degree of household food security based on Food Expenditure Share and Energy Consumption Level is in the low category for both mendong farmers and rice farmers because the status of food security is < 50%, and none is included food insecurity category for the two households. Asim (2018) in his research entitled "Food Security Analysis in Pakistan: A Multi-Indicator Approach" concludes that regardless of the overall increase in food production or food availability, the situation of food security deteriorates over time in Pakistan. Although agricultural production is increasing, the pace of this increase is slow compared to population growth. Because agricultural products are the only source of food supply. Yusuf (2018) in the research "Food Security Analysis of Household Paddy Farmers in Flooding Area" stated that most of the farmer households are in a condition of a food supply deficit, most of the farming households have high purchasing power, and most of the farmer households are in the category of moderate food quality. In general, the level of food security of farmer households is in the category of less food security. Research on food security and welfare of food farmers, horticulture, and other sub-sectors, as well as food security in certain households that are not farmers, can be found, but for the plantation sector, especially for smallholder oil palm plantation households, research in Asahan District have not

found any related research results with this research so that this research is considered important and can be a reference or input in the future.

Methodology

The method used in this research is quantitative and qualitative analysis. The data used are primary data and secondary data as supporting data. Collecting data by interview technique using a questionnaire. The research sample is the household of smallholder oil palm farmers in Asahan Regency.

Measuring Farmer Household Food Security

Measuring the level of household food security used a cross-classification of two indicators, namely the share of food expenditure and the adequacy of energy consumption (Jhonsson & Toole in Maxwell & Frankenberg, 1992). The classification can be done by looking at the following table.

Table 2: Food Security Measurement

No.	Energy Consumption Equivalent Unit	Food Expenditure Share	
		Low (< 60% Total Expenditure)	High (≥60% Total Expenditure)
1	Sufficient (> 80% Energy Adequacy)	Food Resistant (Secure)	Food Vulnerable (Vulnerable)
2	Less (≤80% Energy Adequacy)	Less Food (Less Secure)	Food Insecure (Insecure)

Source: Johnsson & Toole, 1991 in Maxwell & Frankenberg, 1992

From Table 2 can be classified:

a) Households with expenditures of less than 60% and energy sufficiency greater than 80% are categorized as food secure.

b) Households with food expenditure greater than 60% while the energy adequacy rate is greater than 80% then the household can be said to be food vulnerable.

c) Households with food expenditure of less than 60% and energy adequacy of less than 80% are categorized as less secure.

d) Households having a share of food expenditure more than 60% and energy adequacy of less than 80% are categorized as food insecure.

To classify the level of food security, there are two stages of calculation, namely determining the share of household expenditure and determining the percentage of energy adequacy. The calculation stages are:

1. Calculating the Share of Household Food Expenditure

Determining the share of food expenditure for households is done by dividing the total household expenditure on food by the total household expenditure multiplied by 100%, as follows:

$$SFE = \frac{FE}{TE} \text{ x } 100\%$$

Information:

SFE = share of food expenditure (%)
FE = expenditure on food expenditure (Rp/month)
TE = total household expenditure (Rp/month)

2. Calculating the Percentage of Energy Adequacy

The known energy absorption is then compared with the government recommended constant in the form of a percent. To determine the percentage of energy adequacy is calculated as follows:

LNA = KED / AKE x 100%

Information:

LNA = percentage of energy sufficiency (%)
ECR = energy and protein consumption per adult equivalent
RDA = energy adequacy rate (2,150 kcal/capita/day)

Household Poverty Level Analysis

This analysis can use the poverty line from BPS, namely by dividing the total household expenditure of oil palm smallholders in a year divided by the number of months so that the monthly expenditure will be obtained. With monthly expenditure divided by the number of household members, it can be seen the level of expenditure per capita per month of farmer households. The poverty rate criteria can also be used according to Sajogyo (1997) which is converted into the equivalent size of rice and calculated in kilograms. Average rice consumed by farmer households in Asahan District.

Results and Discussion

Age

Age level has effect on person's productivity. With increasing age, person's productivity will increase but will decrease after passing productive age. The following table shows the average age of family members in the respondent's household.

Table 3: Average Age of Respondents

No	Status	Age (Average)
1	Husband	59
2	Wife	53
3	Boy	25
4	Girl	23

Source: Data Processing

Table 3 shows that the average age of farmers is classified as productive age (15-64 years) so that they can do their farming work optimally to meet their household needs. The age difference between parents and children makes a difference in terms of nutritional fulfillment.

Level of Education

The level of education of a person who is getting better will increase the knowledge and insight of a person so that it is expected to be able to provide support in both social and economic activities. The following table shows the education level of respondent households in Asahan Regency.

Table 4: Farmer Education Level in Asahan Regency

No	Level of education	Amount
1	Husband	
	Not completed in primary school	8
	Primary School	24
	Junior High School	28
	Senior High School	12
	Bachelor	6
2	Wife	
	Not completed in primary school	10
	Primary School	18
	Junior High School	25
	Senior High School	9
	Diploma	3
3	Boy	
	Not completed in primary school	15
	Primary School	16
	Junior High School	17
	Senior High School	22
	Bachelor	9
4	Girl	
	Not completed in primary school	-
	Primary School	5
	Junior High School	7
	Senior High School	30
	Bachelor	8

Source: Data Processing

Based on Table 4, it can be seen that the education level of the head of the family is a junior high school graduate in majority, which is 28 people. In terms of food security, education affects household consumption, housewives play a role in making food consumption decisions. Serving food ingredients for all household members is the main task of housewives. Therefore, the higher the education level of the housewife, the higher the ability to make household consumption decisions, especially to meet the nutritional needs of all family members. The highest education level of housewives also graduated from junior high school with a total of 25 people. The education level of husband and wife is classified as a medium so it allows an open mindset. However, the results of the study prove that education does not significantly affect the mindset and knowledge of housewives on the nutrition of the food consumed.

Number of Family Members

The number of dependents is a characteristic related to increasing income, including household food expenditure and consumption, the more members of the household will require greater costs so that expenditure and consumption are also greater. The results of the research on the number of family members conducted in Asahan Regency can be seen in Table 5 below:

Table 5: Number of Family Members

No	Number of Family Members	Amount	Percentage (%)
1	1-2	10	10
2	3-4	40	40
3	5-6	32	32
4	7-8	18	18
Total		100	100

Source: Data Processing

Table 5 explains that the largest number of household members is 3-4 people. Farmer household members consist of a husband (head of a family), a wife, and children. A large number of family members will affect household expenditure and consumption. The more family members, the more expenses and food needs will be.

Income

Household income is the amount of money earned from work in one month. The sources of income of respondents come from farming and non-farming. According to the results of the study, the income of most of the respondents' households comes from the main job; oil palm farming. Apart from farming, the respondent's household also earns income from farming and livestock. Meanwhile, non-farm work is trading. In the following table, it can be seen that the average monthly income of the respondent's household

Table 6: Average Income of Oil Palm Smallholders

No	Source of Income	Total Income	Percentage
1	Farming	2,490,000	60.88
2	Non-Farming	1,600,000	39.12
Amount		4,090,000	100

Source: Data Processing

Table 6 shows that 60.88% of respondent farmer household income comes from oil palm farming, which is Rp. 2,490,000/month. This is because most of the people's livelihoods in Asahan Regency are oil palm farmers. The level of food consumption, both energy, and protein, will be influenced by the knowledge of household members about nutrition, especially parents.

Expenditure

Household expenditures are divided into food and non-food expenditures. Household food consumption in Asahan Regency consists of rice, drinking water, vegetables, fish, meat, fruits, eggs, milk, sugar, coffee, tea, cooking oil, noodles, spices, and cigarettes. Food expenditure is

calculated in average expenditure per month. The following table shows the average food expenditure of farmers.

Table 7: Average Food Expenditure

No	Food Expenditure	Amount (IDR/Month)	Percentage
1	Rice	350,000	19.3
2	Vegetables	100,000	5.5
3	Fruits	100,000	5.5
4	Fish	500,000	27.5
5	Meat (Chicken and Meat)	120,000	6.6
6	Egg	50,000	2.8
7	Milk	20,000	1.1
8	Sugar	35,000	1.9
9	Coffee	30,000	1.6
10	The	25,000	1.4
11	Cooking oil	85,000	4.7
12	Herbs	50,000	2.8
13	Tobacco	350,000	19.3
TOTAL		**1,815,000**	**100**

Source: Data Processing

Non-Food Expenditure

Non-food expenditures consist of several costs, including electricity costs, education costs, clothing costs, transportation costs, telephone costs, kerosene costs, toiletries costs and other costs. For clarity, the following table details the average non-food expenditure

Table 8: Average Non-Food Expenditure

No	Non-Food Expenditure	Amount (IDR/Month)	Percentage
1	Clothing Cost	100,000	9.0
2	Cost of Toiletries and Cosmetics	70,000	6.3
3	Health Fee	150,000	13.6
4	Social Cost	200,000	18.1
5	Fuel Cost	35,000	3.2
6	Cost of education	100,000	9.0
7	Tax costs	300,000	27.2
8	Electricity cost	150,000	13.6
	TOTAL	**1.105.000**	**100**

Source: Data Processing

Table 8 shows that the largest non-food expenditure of farmer households in Asahan Regency is on tax and social expenses, which are 27.2% and 18.1% of the total non-food expenditure, respectively.

Proportion of Food Consumption Expenditure to Total Household Expenditure

The proportion of food consumption expenditure to total household expenditure is the percentage of food expenditure compared to total expenditure. The following table shows the proportion of household expenditures.

Table 9: Proportion of Consumption Expenditure

No	Expenditure	Amount (IDR/Month)	Proportion (%)
1	Food Expenditure	1,815,000	62.2
2	Non-Food Expenditure	1.105.000	37.8
Total		2,920,000	100

Source: Data Processing

The proportion of food expenditure which is higher than the proportion of non-food expenditure indicates that the respondent's farmer household is still not prosperous. The welfare of the population greatly influences household economic access to food so it also affects the quantity and quality of food consumed (Yudaningrum, 2011).

Household Energy and Protein Consumption

Household energy and protein consumption food consumption can be assessed from the consumption of nutrients; protein, and calories. Consumption that is calculated is not only stapled food but also other foodstuffs such as fruits and so on. To find the nutritional content in a food, it is necessary to know the consumption pattern of each household member. The results of the study obtained information on the consumption patterns of household farmers in Asahan Regency as follows:

Table 10: Respondents' Household Consumption Patterns in Asahan District

No	Meal Time	Comsumption Pattern				Seldom
		Pattern 1	Pattern 2	Pattern 3	Pattern 4	
1	Morning	Bread + Milk	White Rice + Omelet + Coffee/Sweet Tea	White Rice + Fried Mackerel + Coffee / Sweet Tea	Fried Rice + Egg	Beef, Mutton
2	Day and night	White Rice + Chicken + Sweet Tea	White Rice + Spinach + Sambal Fish	White Rice + Bloated Fish + Cassava Leaves	White Rice + Tofu / Tempe + Egg + Water Spinach	

Source: Data Processing

In the research area, the consumption pattern of farmer households is dominated by rice, eggs, and fish. Rice is the staple food menu, eggs are the most affordable and easiest to serve, while mackerel fish are the most frequently consumed. Meanwhile, the cooking time is only in the morning and afternoon because the lunch and evening menus are similar. Nutrient consumption, both energy and protein, was obtained by looking at the Food Composition List

and adjusted to the daily consumption pattern of the respondent's household. While the Recommended Dietary Allowance (RDA) is adjusted to the standards set based on age and gender. Level of Nutritional Adequacy (LNA) is the nutrition consumption level obtained from the percentage comparison between nutritional consumption and the recommended RDA. The following is the average consumption of energy and protein in Asahan Regency.

Table 11: The Average of Energy and Protein Consumption of Respondents in Asahan Regency

Information	Energy (kcal/day)		Protein (Grams/day)	
	Household	Individual	Household	Individual
Energy Consumption	6,536	1,520	210	49
RDA	8.815	2.050	258	60
LNA (%)	74	74	81	82

Source: Data Processing

Based on Table 11, it can be seen that both household energy LNA and per family member in the study area are still moderate (>70%). The percentage of protein LNA in households in the study area is also moderate because it has reached 80-99% of the RDA, which is 82%. In the research area, fish consumption is the largest food expenditure compared to other expenditures. Fish has a high protein content, but because it is eaten less varied, the percentage of LNA is still classified as moderate and not high. Each RDA is different depending on age and gender. This difference is because each family member has different nutritional requirements. The food menu consumed by all family members depends on the menu served by the housewife. Therefore, housewives should be able to serve more variety of food. The adequacy of good protein in the household of respondents in the study area has been fulfilled by the intake of animal protein from eggs and fish even though animal protein in the form of meat is very lacking.

Household Food Security

Enough or not food will affect the nutrition of food. Therefore, to determine household food security, cross-classification is needed between the proportion of food expenditure and the level of household energy consumption. The following is the distribution of food security in farmer households in Asahan Regency.

Table 12: Distribution of Household Food Security of Respondents in Asahan Regency

NO	Food Security Category	Proportion of Food Expenditure (%)	Energy Consumption Rate (%)	Number of Households	%
1	**Food Resistant,** If Proportion of Expenditure on Food is Low (<60%), ECR Enough (>80%)	41	89	29	29
2	**Food Vulnerable,** If Proportion of Expenditure	72	92	38	38

	on Food is High (≥60%), ECR is Enough (≥80%)				
3	**Less of Food**, If the Proportion of Expenditure on Food is Low (<60%), ECR is Less (≤80%)	57	56	13	13
4	**Food Insecure**, If the Proportion of Expenditure on Food is High (≥60%), ECR is Less (≤80%)	71	77	20	20
	Amount			100	100

Based on Table 12, it can be seen that 38 households, or 38% of households are classified as vulnerable. This means that 38% of farming households have a high proportion of food expenditure and a sufficient level of energy consumption. Then as many as 29 households with food security status. However, as many as 20% and 13% of households are less food and insecure. Households belonging to the food insecurity category have a proportion of food expenditure of 71% and the highest level of energy consumption is 77%. In the food insecurity category, it means that the proportion of household food expenditure is high and the level of energy consumption is less. The percentage of food expenditure proportion and energy consumption level proves that the level of farmers' welfare or food security is still low. Therefore, households in this category are advised to increase family income and consume more nutritious food. Improving the quality of food can be increased by paying attention to the quantity and quality of the food itself.

Conclusion

1. The proportion of food expenditure from the total expenditure of oil palm farmer households in smallholder oil palm plantations in Asahan Regency is IDR 1.815.000/month or 62%. Meanwhile, 74% of household ECR is included in the sufficient category.

2. The condition of household food security based on the proportion of food expenditure and energy consumption of oil palm plantations in Asahan Regency are vulnerable 38% and 29% are included in the condition of food security. Households with less food status and food insecurity were also found in the study area at 20% and 13%, respectively.

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