Household food security of women farming group members in city and village during the Covid-19 pandemic in Lampung Province

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Abstract. This research aims to analyse the food security level and the influencing factors on household (HH) food security level of the Women Farming Group (WFG) members in the City and Village in Lampung Province. The village of Sumber Agung, Kemiling District, Bandar Lampung City and The Village of Giri Tunggal, North Pagelaran District, Pringsewu Regency were chosen as the research location. There were 60 HHs of WFG member involved as research samples. Data collection was carried out in 2021 when the Covid-19 pandemic was still occurring. The FSL in this study was analysed by cross-classifying between the level of energy adequacy and the percentage of food expenditure. Factors affecting HHs' food security level were analysed using the logit loglinear analysis. The results showed that both in the city and in the village the majority of HHs (>50%) were categorized as food secure. Some HHs were less food secure (30%), vulnerable (10%) and food insecure (7%) in the city, while in the village there were HHs that are food vulnerable (37%). Factors that affect FSL were the quantity of HHs' members, the tempeh price, age of wife and location.

Keywords: Covid-19, food security level, HHs, pandemic, WFG

1. Introduction

As a basic need, food must be met by every human being for their survival. Food is a basic component in the realization of quality human resources, and even becomes the main pillar in national development to maintain economic, political, and social stability, so it can be said that food security is an important point for national development to form quality humans [1]. However, in reality, not everyone is able to meet their food needs because of some reasons. The pandemic of Coronavirus disease 2019 (Covid-19) that broke out in early 2020 not only caused public health problems, but also had an impact on all sub-sectors in Indonesia, including the agricultural sector. Policies aimed at preventing the Covid-19 pandemic from spreading further, such as Large-Scale Social Restrictions (LSSR), have also had a broad impact, including the disruption of food circulation, obstruction of the access to food of physical and economic, and others which ultimately disrupt individual, family, regional to national food security. Therefore, Therefore, the Agency of Food Security of the Agricultural Ministry [2] at that time prepared solution, one of which was to implement the Sustainable Food Yard (SFY) program. Activities of

SFY are carried out to support programs implemented by the government to address areas that are prioritized to receive stunting intervention and improvements to escape food insecurity or become food secure. The activities are carried out through the utilization of yards, sleeping land, or non-productive empty land, as food makers to meet household (HH) nutrition and food needs and can be sold in the market to increase HH income. The program of SFY was attended by woman farming group (WFG) members, in both cities and rural areas. Based on data from the Covid-19 Task Force, one City of the areas that had red zone status or high Covid-19 risk is Bandar Lampung. The status as a red zone required the city government to tighten health protocols. This had an impact on FSL in Bandar Lampung. One of WFG in Bandar Lampung City that had the opportunity to participate in this program was WFG of Mekar Agung which is located in Sumber Agung Village, Kemiling District. Whereas, WFG of Mekar Jaya in Pekon Giri Tunggal, Pagelaran District of Pringsewu Regency was also selected to receive the benefits of the SFY program in 2020. In addition to the SFY program, there must be other influencing factors on the achievement of HH food security level. Based on above description, this study aims to analyse HH food security level and the factors that influence HH food security level of WFG members in cities and villages in Lampung Province during the Covid-19 pandemic.

2. Methods

This study was conducted by survey method. The research location was chosen purposively in WFG of Mekar Agung, Sumber Agung Village, District of Kemiling, Bandar Lampung and in WFG of Mekar Jaya located in Pekon Giri Tunggal, Pagelaran District, Pringsewu Regency. Both are WFGs selected receiving SFY benefits in cities and villages in Lampung Province. Research data was collected from March to July 2021 when Covid-19 pandemic was still ongoing. The research samples were 60 households (HHs) consisting of all 30 HHs of Mekar Agung members in Bandar Lampung City and all 30 HHs of Mekar Jaya members in Pringsewu Regency.

The first objective is analysed by performing a classified cross-calculation between the percentage of food expenditure and the level of energy adequacy [3]. The percentage of food expenditure is the comparison between HH's food expenditure to its total expenditure. Household food consumption data was obtained by conducting a two days 24-hour food recall on non-consecutive days, calculating the energy content, then averaging it in kilocalories per day. The amount of energy content of each food ingredient can be determined by calculating the nutritional content of the food ingredient using the nutritional content calculation template based on the Indonesian Food Composition Table [4]. Furthermore, the energy adequacy level is calculated quantitatively, namely the percentage of real energy intake to the recommended energy adequacy figured in percent units. Measurement of the level of food security is carried out using cross-tabulation between the portion of food expenditure and the level of energy sufficiency as presented in Table 1.

The second objective is statistically analysed by logit regression to determine the effect of the number of HH members (X1), husband's education level (X2), housewife's education level (X3), cooking oil price (X4), eggs price (X5), tempeh price (X6), HH income (X7), mother's age (X8) and location (Dummy) on the food security level of WFG members in the city and in the village. Food security level is used as a dummy variable with D1 = 1 for food security in the category of food secure and food shortage, D1 = 0 for food security in the category of food vulnerable and food insecure. Location was the second dummy variable with D2 = 0 for city and D2 = 1 for village locations.

Table 1. Cross-classification of food security levels [3]

Energy adequacy level (EAL)	Share of food expenditure	
	Low (< 60% total expenditure)	High (≥ 60% total expenditure)
Enough (> 80% of EAL)	Food Secure	Food Vulnerable
Lack (≤ 80% of EAL)	Food shortages	Food insecurity

3. Result and Discussion

3.1 Respondent Characteristic

The respondents of this study were wives aged between 30-60 years (city) and 27-63 years (village), with the majority being in the 41-50 year age range (Figure 1).

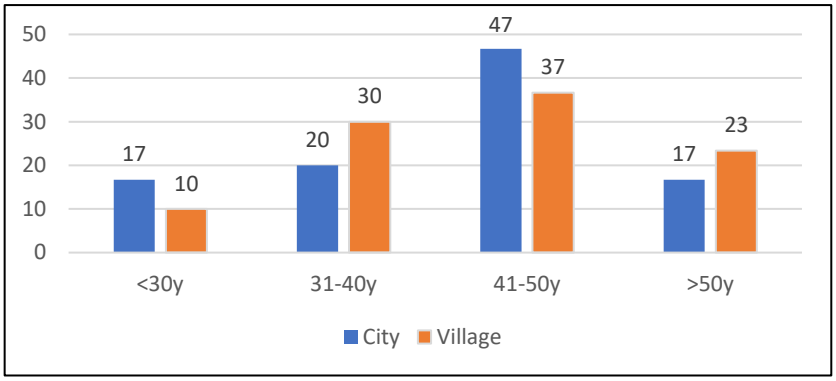

Figure 1. Wife's age distribution (%)

Most of the last education level of the husband and the wife were only up to Elementary School (SD) followed by Junior High School (SMP) in the village and Senior High School (SMA) in the city (Figure 2). This shows the lack of awareness of respondents and their husbands about the importance of education, due to various factors that influence moving up to a higher level, one of which is the low economic capacity of the HH.

Most HHs in both cities and villages, have 4-5 members. The majority of heads of HHs work as farmers and the majority of housewives do not work. The HH income per month in the city is in the range of IDR 1,500,000 - IDR 6,000,000 with an average of IDR 3,130,000.00; while in the village between IDR 1,620,000 - IDR 2,866,000 with an average of IDR 2,285,533.33. Based on the 2020 Central Statistics Agency's [5] prosperous family indicator, based on their consumption or expenditure, HHs are divided into high welfare levels (> IDR 5,000,000), medium welfare levels (IDR 1,000,000 - IDR 5,000,000), and low welfare (<IDR 1,000,000). Based on these criteria, all HHs in cities and villages are included in the medium welfare category. There is only one HH in the city that is classified as high welfare.

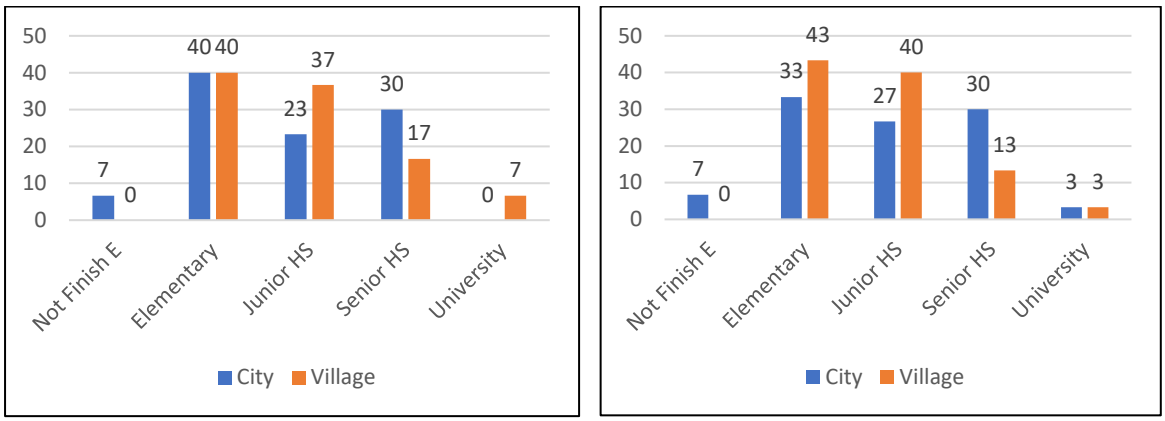

Figure 2. Distribution of husband's education (left) and wife's education (right) in %

3.2 Analysis of HH Food Security level

Food security level in this study is the result of calculating the percentage of food expenditure that was crossed-classification with energy sufficiency that was first introduced in 1991 [3]. The percentage of food expenditure is the comparison between food expenditure and total expenditure. Food expenditure consists of expenditure on rice, instant noodles, tubers, fish, chicken/beef, eggs, tofu, tempeh, vegetables, fruits, spices, beverage ingredients, processed food/drinks, cigarettes, wheat flour, cooking oil, and refilled water. The average HH's expenditure of food and non-food is presented in Table 2.

The largest food expenditure in HHs in both cities and villages is expenditure to buy rice. The average food expenditure for rice in WFG members in cities is 19.25 percent of total food expenditure, while in WFG members in villages it is 17.80 percent. The large expenditure to buy rice is because all HHs still rely on rice as their staple food, while carbohydrate sources other than rice such as tubers are only used as snacks so that rice consumption remains high. Other large HH food expenditures in urban in order are expenditures for animal food, cigarettes, vegetables and beverages. Meanwhile, in rural in order are cigarettes, vegetables, beverages and animal food. The average HH food expenditure for cigarettes in cities is 13.80 percent (third highest) of total food expenditure, while in villages is 12.94 percent (second highest). The high expenditure for cigarettes shows that HHs have not been able to allocate their expenditures for food better. Research conducted at corn farmers during Covid-19 in village of Blumbungan, District of Larangan, Pamekasan Regency also found almost the same result, that the largest food expenditure was for rice (34,28%), followed by animal food (18,07%) and cigarettes (16,57%) [6].

The average percentage of food expenditure for vegetable protein sources in urban is higher than in rural areas, but for vegetables it is lower. This shows that vegetable consumption in rural areas is higher than in urban areas, so that even though they have planted vegetables, they still have to buy vegetables, the percentage of which even exceeds that for animal food. On the other hand, those living in urban areas have higher percentage of expenditure on animal food compared to vegetables. Here, it implies that animal food consumption in urban areas is higher, while vegetable consumption is lower compared to those in rural areas. In addition to food expenditure, there are also non-food expenditures. Non-food expenditures consist of LPG gas, health/beauty hygiene, education, electricity and water, fuel, credit/quota, savings/arisan, taxes/insurance and cleaning materials.

Table 2. Average household food expenditure by location (Rp/month)

No	Types	City		Village	
		Rp/month	%	Rp/month	%
	A. Foods				
1	Rice	200,086.21	11.34	170,233.33	10.05
2	Tubers	9,862.07	0.56	45,900.00	2.71
3	Wheat Flour	12,724.14	0.72	14,600.00	0.86
4	Cooking Oil	70,241.38	3.98	66,000.00	3.90
5	Animal Foods	183,736.45	10.41	85,000.00	5.02
6	Tempeh	61,655.17	3.49	43,400.00	2.56
7	Tofu	59,206.90	3.35	19,866.67	1.17
8	Vegetables	91,724.14	5.20	118,466.67	6.99
9	Fruits	16,344.83	0.93	16,333.33	0.96
10	Spices	66,034.48	3.74	76,766.67	4.53
11	Beverages	86,598.52	4.91	89,400.00	5.28
12	fast foods/drinks	37,948.28	2.15	86,300.00	5.09
13	Cigarettes	143,482.76	8.13	123,666.67	7.30
	Total Foods	1,039,645.33	58.91	955,933.34	56.42
	B. Non-foods				
1	Health/cosmetics	22,844.83	1.29	48,700.00	2.87
2	Education	27,689.66	1.57	111,500.00	6.58
3	Electricity & water	92,620.69	5.25	64,700.00	3.82
4	Fuels	273,206.90	15.48	158,233.33	9.34
5	Quota	108,689.66	6.16	113,566.67	6.70
6	Saving	77,206.90	4.37	149,666.67	8.83
7	Tax/assurance	9,672.41	0.55	24,600.00	1.45
8	Cleanliness	113,275.86	6.42	67,433.33	3.98
	Total Non-food	725,206.91	41.09	738,400.00	43.58
	Total Expenditure	1,764,852.24	100	1,694,333	100.00

The largest non-food expenditure in both urban and rural areas is fuel expenditure, which consists of petroleum for transportation and gas for cooking. The average fuel expenditure of urban HHs is 37.6 percent of total non-food expenditures, while in rural areas it is 21.4 percent. The large expenditure on fuel, especially petroleum, is due to the fact that most HHs have more than one motorized vehicle. These motorized vehicles are usually used to go to work, pick up and drop off school children, and other activities. Expenditure on fuel is greater than others because most HHs work as farmers who have more than one vehicle, so fuel expenditure is relatively high. These results are similar to research in South Lampung and Tanggamus Regencies that

expenditure on fuel was the second largest expenditure after education at the family of corn and coffee farmers [7][8]. Other large non-food expenditures in sequence are expenditures on clothing and hygiene, credit and quota, electricity and water, and savings and donations for those in the city, while those in the village are savings and donations, quota, education, and clothing and hygiene. The average HH expenditure on credit and quota in the city is 14.99 percent of the non-food expenditure total, while the average expenditure on credit and quota for HHs in the village is 15.3 percent. The large expenditure on credit and quota is influenced by the Covid-19 pandemic which requires online learning so that HHs need more quota/credit for their children to go to school online. After spending on credit and quota, the next large expenditure of non-food expenditure is electricity expenditure. The average electricity expenditure for HHs in the city is 12.7 percent of non-food expenditure total, while in the village it is 8.7 percent. Based on the food and non-food expenditure, the total expenditure of member HHs in the city and in the village can be seen in Table 2.

Households in the city, 58.9 percent of the total expenditure is spent on food, while the remaining 41.09 percent is for non-food. Whereas, HHs in the village, 56.42 percent of the total expenditure is spent on food, while the remaining 43.58 percent of the total expenditure is for non-food. The average percentage of food expenditure of HHs in the city is greater than that of in the village.

Tabel 3. Distribution of percentage food expenditure based on location

Percentage food expenditure	Category	City		Village	
		n (HH)	%	n (HH)	%
< 60%	Low	21	70,00	19	63,33
≥ 60%	High	9	30,00	11	36,67
Total		30	100,00	30	100,00

Overall, 66.67 percent of HHs fall into the low percentage of food expenditure criteria, while the remaining 33.33 percent fall into the high percentage of food expenditure criteria. The amount of food and non-food expenditure is influenced by the HH income itself. The low percentage of food expenditure indicates that HH income is relatively capable of meeting all needs. There are slightly more HHs in the city that fall into the low percentage food expenditure criteria compared to those in the village. This difference is because respondents in the city who are 50 years old and over with few family members are more numerous than those in the village. Older age and fewer members result in less food expenditure. Therefore, the low percentage of food expenditure of HH in the city is relatively greater than those in the village.

The energy sufficiency level is categorized into sufficient and insufficient. The energy sufficiency level is categorised to be enough if the value reaches more than 80 percent, while it is categorized to be insufficient if the value is 80 percent or less than 80 percent. Data in Table 4 shows that energy adequacy level of the HH in the village is all classified as sufficient, but in the city, there are 16.67 percent who are lacking. Overall, categorization of the HH energy adequacy level is showed in Table 4.

Table 4. Household energy adequacy levels based on location

Energy Adequacy Level (EAL)	Category	City		Village	
		n (HH)	%	n (HH)	%
> 80%	adequate	19	83,33	30	100,00
≤ 80%	Less	11	16,67	0	0,00
Total		30	100,00	30	100,00

Food security level of the HH during Covid-19 pandemic is presented in Table 5. Overall, the most HHs in cities and villages are categorized as food secure. The data in Table 5 shows that there are more HHs in villages that are categorized as food secure compared to those in cities. In the food insecure category, there are HHs in cities, namely 6.67 percent, while in villages there are none that are food insecure. These results show that urban HHs are more affected by the pandemic of Covid-19, as indicated by greater number of HHs that are food insecure. In overall, the HH food security level in villages is better than that of in cities. Based on these conditions, it can be said that HHs in cities feel the negative impact of the Covid-19 pandemic on HH food security level more than those in villages. One of the reasons is that as a farmer, the head of a HH in rural areas continues to work on his farm as usual and still gets agricultural products to support his family's food security. As for those in urban areas, almost all of their food must be purchased, but transportation access to markets or stalls is limited during the Covid-19 pandemic.

Table 5. Household food security level based on location

Category	City		Village	
	n (HH)	%	n (HH)	%
Food Insecure	2	6,67	0	0,00
Food Vulnerable	3	10,00	11	36,67
Food shortages	9	30,00	0	0,00
Food Secure	16	53,33	19	63,33
Total	30	100,00	30	100,00

In a study also conducted in the recipient area of the sustainable food yard program in Sleman Regency, DIY showed difference result. There was found that the majority of HHs were in the category of food shortages (75%) of the total sample, followed by food security (20.45%) and the rest were food insecure (4.55%). The majority of HHs in the category of food shortages, namely a low percentage of food expenditure and a low energy consumption level, meaning that HHs are able to use income for a smaller proportion of food expenditure, but HH food consumption has not implemented food selection according to the type and amount needed by the body so that the level of energy consumption is still lacking. This can be caused by a lack of knowledge about food

and nutrition, especially the selection of food consumed according to the type and amount so that the food consumed is not yet able to meet the need for sufficient energy so that energy sufficiency is lacking [9].

3.3 Influencing Factors of HH Food Security Level

Influencing factors of HH food security level in this research are analysed by statistical tests using logit regression with factors of number of HH (X1), education level of husband (X2), education level of wife (X3), price of cooking oil (X4), price of eggs (X5), price of tempeh (X6), HH income (X7), age of the mother (X8) and location of the HH (Dummy) of Mekar Agung members in the city and Mekar Jaya in the village. The results of the logit regression for influencing factors of HH food security level is shown in Table 6.

Table 6. Influencing factors of household food security level

Variables	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	2.244	1.155		1.943	0.058
HH members (X1)**	0.163	0.064	0.340	2.549	0.014
Husband Education (X2)	0.016	0.035	0.103	0.472	0.639
Wife Education (X3)	-0.041	0.035	-0.238	-1.169	0.248
Cooking Oil Price (X4)	-3.991E-5	0.000	-0.097	-0.802	0.427
Egg's Price (X5)	-4.549E-5	0.000	-0.199	-1.070	0.290
Tempeh's Price (X6)*	-5.304E-5	0.000	-0.612	-1.897	0.064
Household Income (X7)	9.270E-8	0.000	0.169	1.087	0.282
Wife's Age (X8)*	-0.016	0.008	-0.304	-2.107	0.040
Location (Dummy)*	0.594	0.314	0.616	1.890	0.065

Overall, the logit regression analysis shows that there are four variables that have a significant effect on the HH food security level, namely the number of HH members and wife's age which are significant at $P < 0.05$; whereas, the price of tempeh, and the location which are significant at $P < 0.10$. The number of HH members (X1) and the location have significant positive effects on HH food security level; while the price of tempeh and the wife's age have negative effects. That the number of HH members (X1) has a positive effect on the level of HH food security can be interpreted that the more HH members, the greater the opportunity for the HH to achieve secure of food security. This is similar to the research that states the more family members, the greater the percentage of food expenditure because the needs of food will be more diverse. This is because of each HH member has different tastes [10]. However, other researches [11][12] stated that the number of HH members had negative effect on the food security level of farmer HHs. The variable of the age of wife (X8) has negative effect on the HH food security level, it means that the older wife, the lower food security level. This is not the same with the finding result study

that the age of wife has positive effect on HH food security level [13]. The variable of the price of tempeh (X6) also has negative effect on the HH food security level, it means that the higher price of tempeh, the smaller opportunity for HHs to achieve secure food security. Tempeh is vegetable protein source that is preferred by HHs compared to tofu. The HH expenditure on tempeh is higher than tofu. The increase price of tempeh will lower HH food security level. Meanwhile, location has positive effect on the HH food security level. Those who live in villages are more food secure. The variables of the level of husband education (X2) and wife education (X3) do not effect on the level of HH food security level because the level of confidence is below 90 percent. The level of husband education mostly only up to elementary school (SD). Usually, HH decision-maker on food expenditure and determining the menu are entirely regulated by housewife. The knowledge of husband and wife in managing income to achieve food security does not only come from formal education.

The variables of oil price (X4) and chicken egg price (X5) do not affect HH food security level. This means that changes in the price of oil and eggs do not cause HHs to change their spending on these two commodities. This is because most of the food menus consumed by HHs at the research location use a lot of cooking oil and the most easily obtained animal side dishes at affordable prices are chicken eggs. Other researches also find that food security level of the HH was not affected by housewife education level [9, 14], age of wife [15] and oil price [14].

4. Conclusion

The majority of household of WFG members (>50%) are categorized as food secure. There are households that are less food secure (30%), vulnerable (10%) and food insecure (7%) in the city, while in the village there are households at the food vulnerable level (37%). Factors that significantly affected food security level of household are the number of household members, age of wife, price of tempeh and location of WFG (City/Village).

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