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DETERMINANT OF HOUSEHOLD FOOD CONSUMPTION DIVERSITY IN LAMPUNG PROVINCE USING THE 2019 SUSENAS DATA

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Abstract: Diversifying food consumption was intended to reduce rice consumption while modifying food consumption patterns to become more diversified and healthier to gain excellent Human Resources (HR). The goal of this study was to discover (1) household expenditure patterns and welfare levels, (2) household food consumption diversity, and (3) factors influencing household food consumption diversity. This analysis drew on secondary data from the 2019 National Social Economic Survey (NSES). The size of household samples utilised in this study was 9,046. Quantitative descriptive analysis examined the household expenditure pattern and the welfare level. The Desirable Dietary Pattern (DDP) approach examined food consumption diversity. Multiple regression was employed to determine the factors influencing food consumption diversity. The results indicated that the level of household welfare in Lampung Province is categorised as a pre-prosperous household because the food share is 57.15%. The DDP score of the Lampung Province household was 75.44. This means that the diversity of household food consumption in Lampung Province was not ideal. Household income, the age of the head of the household, the mother's education, and the gender of the head of the household had a positive effect on household food consumption diversity. In contrast, the number of household members and the level of welfare harmed the diversity of household food consumption.

Keywords: Consumption, diversification, desirable dietary pattern.

Introduction

Lampung Province is one of the provinces with an abundance of food, producing rice, corn, cassava, and other forms of food. According to the Food Security Agency, the food availability index in Lampung Province in 2019 was 99.89 (Badan Ketahanan Pangan, 2020). This index's rating scale ranges from 0 to 100. So, that high score indicates that food availability in Lampung Province is excellent. However, this does not eliminate food issues in Lampung Province. Lampung Province's dietary problem is that its energy consumption in 2018 to 2019, namely 2,082 kcal and 2,051 kcal is still below the national average (2,112 kcal) and does not comply with the recommendation of Minister of Health Regulation No. 28 of 2019, namely 2,100 kcal (Badan Ketahanan Pangan, 2020). In addition, the regional medium-term development plan's target for the diversity of food consumption has not yet been met (Sayekti *et al.*, 2020a). This certainly will disrupt the stability of food security.

According to Badan Ketahanan Pangan (2020), the food consumption utilisation index in Lampung Province is still inadequate (52.67). This is evident from the index value, which is still lower than that of the Riau Islands Province (78.17) and the Bangka Belitung Islands (70.56). This value is also the lowest among the other food security indices, namely the food availability and affordability indexes. Low food utilisation rates can result in poor health. There has been an increase in cases of malnutrition in the region (Dito & Prayitno, 2019) as a result of the poor condition of health, which makes people susceptible to disease. Therefore, intervention is required to combat the low food utilisation.

Diversifying food consumption is one strategy for resolving this issue.

Food consumption diversity plays a crucial role in enhancing nutrition and producing healthy individuals. In addition, implementing food consumption diversity aims to decrease rice consumption and alter food consumption patterns to be more diverse and nutritious. This is because no single diet type contains all nutrients. According to Labadarios *et al.* (2011), the greater the number of food groups ingested, the greater the likelihood that the nutrients consumed will be met. Moreover, according to Taruvinga *et al*. (2013) and Parappurathu *et al*. (2015), the consumption of diverse and nutritionally balanced cuisine has a positive effect on the quality of life of Human Resources (HR) and improves the standard of living.

The Desirable Dietary Pattern (DDP) measures the variety of foods consumed. A diverse dietary pattern will affect the community's health and food security. According to Jones *et al.* (2014) and Kumar *et al*. (2016), the greater the variety of foods ingested, the greater the improvement in nutrient intake. In addition, the diversity of people's dietary habits will reduce their reliance on particular commodities.

The diversity of food consumption, which is a manifestation of food patterns is influenced by various factors. From various studies, various variables that influence food consumption and food consumption diversity can be identified. These variables are household income variables (Taruvinga *et al.*, 2013; Alexandri & Kevorchian, 2015; Rinaldi *et al.*, 2017; Firdaus & Cahyono, 2017; Argandi *et al*., 2019; Iftikhar *et al*., 2020; Sayekti *et al*., 2020a), number of household members (Workicho *et al*., 2016; Miranti & Syaukat, 2016; Miranti, 2017; Firdaus & Cahyono, 2017; Argandi *et al*., 2019; Sayekti *et al.*, 2020b), housewife's education (Taruvinga *et al*., 2013; Alexandri *et al.*, 2015; Workicho *et al*., 2016; Firdaus & Cahyono, 2017; Argandi *et al*., 2019; Iftikhar *et al.*, 2020; Singh *et al*., 2020), education of the household's head (Alexandri *et al.*, 2015; Miranti & Syaukat, 2016; Firdaus & Cahyono, 2017; Miranti, 2017; Iftikhar *et al.*, 2020), and age of the household's head (Firdaus & Cahyono, 2017; Iftikhar *et al.*, 2020).

In addition, food expenditure affects the diversity and or pattern of food consumption (Firdaus & Cahyono, 2017; Rinaldi *et al*., 2017). Other studies have also found that non-food expenditure significantly affects consumption patterns and/or food diversity (Liu *et al*., 2014; Mahmudiono *et al*., 2017). Food expenditure/ food share can be used to indicate household welfare (Sintha, 2019). According to Li (2009), diverse diets also increase consumer welfare because greater variety increases the likelihood of matching consumer preferences. The next variable that influences consumption and/or food consumption diversity is the sex of the head of the household (Codjoe *et al*., 2016; Misker *et al*., 2016; Workicho *et al*., 2016; Cordero-ahiman *et al*., 2021) and the type of residential area (Alexandri & Kevorchian, 2015; Miranti, 2017; Qineti *et al*., 2017).

According to research conducted in Germany by Thiele and Weiss (2003), the diversity of food consumption is influenced by household size, age, gender of the head of the household, employment status of the head of the household, and level of education. In addition, research conducted in Romania by Alexandri *et al.* (2015) discovered that household income, the level of education of the head of household, the number of household members, and the location of domicile significantly impacted the diversity of food consumption. According to research conducted by Zhang *et al*. (2017) in Southwest China, the diversity of household consumption is influenced by the gender, age, education, and income of the household's head. Moreover, research by Ochieng *et al.* (2017) in Tanzania indicates that the education of the household head, food and nutrition training, and the size of the agricultural land are significant determinants of the diversity of food consumption.

Based on the findings of these studies, it appears that the factors that influence the diversity of food consumption vary. It is likely that regional behaviour differs. According to Sayekti *et al.* (2020c) and Seda *et al.* (2021),

consumption patterns and food preferences are influenced by behaviour. Consequently, it is necessary to identify food consumption patterns in a region at the regional or provincial level that are more closely related. However, research on household consumption diversity and patterns has never been conducted in Lampung Province.

This study's objectives are to analyse the pattern of household expenditures, household welfare, and household food consumption diversity and determine factors contributing to household food consumption diversity in Lampung Province. It is anticipated that identifying determinants of food consumption diversification can be used as a basis for formulating policies that will increase the quality of HR.

Materials and Methods

Data, Sample, and Model Research

This research was a study that used secondary data in the form of cross-section data. Secondary data was raw data obtained from the Central Bureau of Statistics Republic of Lampung Province based on the 2019 National Social Economic Survey (NSES) results. Initially, the raw data for this study were 9,653 households. After the outlier test (Ghozali, 2016), there were 607 data outliers, so, the data analysed were 9,046 households.

This investigation utilised descriptive quantitative and verification data analysis. In this study, quantitative descriptive analysis employed a tabular summary of numbers to characterise household expenditure patterns, welfare level, and household food consumption diversity in Lampung Province.

Household expenditures were the costs that households incurred to satisfy their consumption needs. There were two categories of household expenditures: Food expenditures and non-food expenditures. The pattern of household food expenditures could characterise the behaviour of household groups as a whole. The type and quantity of food ingested could be determined from the description of this behaviour. Consequently, the percentage of household food expenditures/food share was used to determine the pattern of food consumption expenditures. Total food expenditures were divided by total household expenditures multiplied by 100%, yielding the food share.

Using the DDP score, food consumption diversity was measured. Law no. 18 of 2012 defines DDP as the composition of food according to nine food groups based on the contribution of energy that meets nutritional requirements in terms of quantity, quality, and diversity while considering social, economic, cultural, religious, and gastronomic considerations. Table 1 demonstrated that the DDP score was determined by multiplying the energy contribution of the nine food categories by their respective weights.

Verification analysis was used to identify the determinants of food consumption diversity using the multiple regression model using the Ordinary Least Square (OLS) method. In this analysis model, classical assumption tests were carried out, including multicollinearity tests, heteroscedasticity tests, and statistical criteria tests [Coefficient of Determination (R^2), F-statistics, and t-statistics].

Research variables included household income, number of household members, age of head of household, level of education of head of household and housewife, type of area, gender of head of household, and level of household welfare. Household income was the quantity of money received by the household in question after total monthly expenditures (IDR/month) were deducted. The area type was a dummy variable (1 for urban and 0 for rural), the same as the gender of the head of the household (1 = male; 0 = female).

The pattern of household expenditures may also serve as an indicator of household well-being. The more prosperous the household, according to Engel's Law, the smaller the proportion of spending on food consumption. Based on the percentage of food expenditure, the level of household welfare in this study was divided into three categories: Prosperous, pre-prosperous, and not yet prosperous. Pre-

prosperous households have food expenditure percentages in the range of 50% to 60% while not-yet-prosperous households have food expenditure percentages greater than 60%. Consequently, the classification of welfare level was utilised as a dummy variable for welfare level 1 (1 = pre-prosperous households; 0 = others) and welfare level 2 (1 = prosperous households; 0 = others). This investigation makes use of the following model:

$$DDP = \alpha + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + d_1 DA + d_2 DG\, d_3 D\,W1 + d_4 D\,W2$$

DDP : Desirable Dietary Pattern score of households.

X_1 : Household income (IDR/month).

X_2 : Number of household members (person).

X_3 : Education level of the household's head (year).

X_4 : Education level of housewife (year).

X_5 : Age of the household's head (year).

D_A : Dummy variable for area type (D_A = 1 for urban and D_A = 0 for rural).

D_G : Dummy variable for the gender of the household's head (D_G = 1 for female and D_G = 0 for male).

D_{W1} : Dummy variable for welfare level 1 (D_{W1} = 1 for pre-prosperous households and D_{W1} = 0 for others).

D_{W2} : Dummy variable for welfare level 2 (D_{W2} = 1 for prosperous households and D_{W2} = 0 for others).

Results and Discussion

Household Characteristics in Lampung Province

This study's sample of 9,046 households included 6,950 households from rural areas and 2,096 from urban areas. According to the 2019 NSES, most household heads in Lampung Province were men (89.51%). Moreover, according to Table 2, the plurality of household heads was between the ages of 35 and 46 (27.81%). The majority of Lampung Province's household heads were of productive age (89.91%). The productive age is between the ages of 15 and 65 when a person can still work (BPS, 2020). In rural areas, the average age of the head of household was 49 years old, whereas in urban areas, the average age of the head of household was 46 years old.

Table 1: DDP composition as a reference instrument for planning and evaluation

No.	Food Group	Gramme	Recommended Energy Distribution Value (kcal/day)	Percentage Energy Adequacy Rate (EAR) Normative (%)	Weight	Max DDP Score
1	Grains	289	1,050	50	0.5	25.0
2	Tubers	105	126	6	0.5	2.5
3	Animal-derived food	157	252	12	2.0	24.0
4	Oil and fat	21	210	10	0.5	5.0
5	Oily fruit and seeds	11	63	3	0.5	1.0
6	Nuts	35	105	5	2.0	10.0
7	Sugar	37	105	5	0.5	2.5
8	Vegetable and fruit	262	126	6	5.0	30.0
9	Others	0	63	3	0.0	0.0
Total			**2,100**	**100**		**100.0**

Source: Badan Ketahanan Pangan (2021)

Most households in Lampung Province have 3 to 4 members (27.81%). In terms of area type, the majority of households in rural and urban areas are the same, namely four people. According to BPS (2020), households in Bandar Lampung City have the highest number of household members, namely 4.21, compared to other areas in Lampung Province. According to Wuryandari (2015), increasing the number of household members can increase food expenditure.

The majority of the education level of household heads in Lampung Province are elementary school graduates (31.65%). Households that have attained nine years of education are 44.80%. This was also determined in the study of Amin *et al.* (2019), which states that the average length of schooling in Lampung Province is still below nine years and below the average length of schooling in Indonesia. Judging from the type of region, the education level of the head of the household in rural areas is elementary school. In contrast, in urban areas, the education level of the head of household is senior high school (Table 2). In addition, the education level of household heads in urban areas is more in line with the nine years compulsory education program (60.59%) compared to household heads in rural areas, which is only around 40.04%. Based on this statement, there is a gap in household education between rural and urban areas. Note that the gap in education levels between regions of residence can be caused by several factors, namely school facilities and the quality of teaching staff (BPS, 2020).

In contrast to the education level of the head of the household, the education level of housewives in Lampung Province is that the majority did not graduate from elementary school or did not attend school (33.45%). Overall, housewives who have reached an average length of schooling of nine years are 39.94%. When viewed based on the type of region, there is no difference in the level of education of housewives in rural and urban. The majority of the education level of housewives in rural areas (34.35%) and urban areas (30.49%) did not graduate from elementary school or did not attend school.

In addition, housewives whose average length of schooling has reached nine years in urban and rural areas are 50.81% and 36.61%. Based on this description, it is necessary to increase the government's role in increasing the education or knowledge of housewives, considering that education is still low and the important role of education. Education is a basic need for society. According to Article 31, paragraph 1 of the 1945 Constitution, every citizen has the right to education. It is hoped that the higher the level of education, the more advanced people will have insight and thinking patterns. According to Aini *et al.* (2018) and Jacobus *et al.* (2019), the higher the education, the more people can live decent lives and can reduce the increase in household poverty rates.

Household income is the monthly household expenditure (household food and non-food expenditure). This study's results indicate that the average household income in Lampung Province is IDR3,067,112.82/month. Based on the type of area, the average household income in urban areas is greater than in rural areas. The average household income in urban areas is IDR3,848,623.19/month while in rural areas is IDR2,831,422.79/month.

This research also classifies monthly household income into four, namely household income < IDR1,500,000, household income of IDR1,500,000 to IDR2,500,000, household income of IDR2,500,000 to IDR3,500,000, and household income stairs > IDR3,500,000. Based on Table 3, households in Lampung Province are classified as income group 2 (IDR1,500,000 to IDR2,500,000) with an average income of IDR2,003,094.04/month. Judging from the type of area, it turns out that there are differences between households in urban and rural areas. In urban areas, the majority of household income is in group 4 (household income > IDR3,500,000) while in rural areas, it is class 2 (household income of IDR1,500,000 to IDR2,500,000).

Table 2: Distribution of household characteristics in Lampung Province (2019)

Variable	Area Type					
	Frequency Rural	Percentage (%)	Frequency Urban	Percentage (%)	Frequency Rural and Urban	Percentage (%)
Area type	6,950	76.83	2,096	23.17	9,046	100
Gender of the household's head						
Male	6,283	90.40	1,814	86.55	8,097	89.51
Female	667	9.60	282	13.45	949	10.49
Total	**6,950**	**100**	**2.096**	**100**	**9,046**	**100**
Number of the household's members (person)						
1-2	1,422	20.46	391	18.65	1,813	20.04
3-4	4,036	58.07	1,125	53.67	5,161	57.05
> 5	1,492	21.47	580	27.67	2,072	22.91
Total	**6,950**	**100**	**2,096**	**100**	**9,046**	**100**
Age of the household's head (year)						
16-25	**132**	1.90	43	2.05	175	1.93
26-35	1,089	15.67	308	14.69	1,397	15.44
36-45	1,955	28.13	561	26.77	2,516	27.81
46-55	1,784	25.67	561	26.77	2,345	25.92
56-66	1,290	18.56	410	19.56	1,700	18.79
> 66	700	10.07	213	10.16	913	10.09
Total	**6,950**	**100**	**2,096**	**100**	**9,046**	**100**
Education of the household's head (year)						
NS	1,771	25.48	359	17.13	2,130	23.55
Elementary school	2,396	34.47	467	22.28	2,863	31.65
Junior high school	1,411	20.30	360	17.18	1,771	19.58
Senior high school	1,186	17.06	683	32.59	1,869	20.66
Associate and Bachelor Degree	186	2.68	227	10.83	413	4.57
Total	**6,950**	**100**	**2,096**	**100**	**9,046**	**100**
Education of housewife (year)						
NS	2,387	34.35	637	30.39	3,024	33.43
Elementary school	2,015	28.99	394	18.80	2,409	26.63
Junior high school	1,454	20.92	356	16.98	1,810	20.01
Senior high school	869	12.50	505	24.09	1,374	15.19
Associate and Bachelor Degree	225	3.24	204	9.73	429	4.74
Total	**6,950**	**100**	**2,096**	**100**	**9,046**	**100**

Income of Household (IDR/Month)						
< 1.5 million	1,034	14.88	140	6.68	1,174	12.98
1.5-2.5 million	2,464	35.45	478	22.81	2,942	32.52
2.5-3.5 million	1,710	24.60	511	24.38	2,221	24.55
> 3.5 million	1,742	25.06	967	46.14	2,709	29.95
Total	**6,950**	**100**	**2.096**	**100**	**9,046**	**100**

Source: NSES Data (2019) (processed data)
NS = Not graduating from elementary school or not attending school.

Household income and income per capita in Lampung Province are already above the poverty line (Table 3). According to BPS (2020), the household and per capita poverty lines in Lampung Province in 2019 were IDR1,966,052/month and IDR418,309.00/month. Based on Table 3, there are 2,540 poor households (27.10%). This study's results also show that there are more poor households in rural areas than in urban areas (Table 3).

Household Expenditure Patterns

Household expenditure is spending on goods and services by households to meet the necessities of life. Household expenditure in Lampung Province consists of food and non-food expenditure. The results of this study show that the average total household expenditure per month in Lampung Province in 2019 was IDR3,067,112.82/month and the total per capita expenditure was IDR911,356.50/month (Table 4). The results of this study also show that the average household food and non-food expenditure per month in Lampung Province in 2019 was IDR1,672,553.66 and IDR1,394,559.17/month, respectively.

It can also be seen that the average household expenditure in rural areas is lower than that in urban areas (Table 4). This is presumably because income in urban areas is greater than in rural areas. According to Abdillah *et al.* (2019), the average per capita income significantly influences food and non-food expenditure in each type of region. Likewise, according

Table 3: Summary of household income in Lampung Province according to the 2019 Poverty Line category (IDR/month)

Category	Average (IDR/Month)	Standard Deviation	Percentage (%)
Urban			
Poor	1,478,887.23	348,657.83	15.08
Not poor	4,269,317.89	1,991,598.06	84.92
Total	**3,848,623.19**	**2,093,769.14**	**100**
Rural			
Poor	1,457,985.04	364,959.55	32
Not poor	3,477,746.44	1,396,268.27	68
Total	**2,831,422.79**	**1,502,011.00**	**100**
Urban and Rural			
Poor	1,460,585.47	362,970.19	27.10
Not poor	3,694,315.33	1,620,307.78	72.90
Total	**3,067,112.82**	**1,712,556.57**	**100**

Source: NSES Data (2019) (processed data).

to research by Wuryandari (2015), socio-demographic, socio-economic, and residential conditions significantly affect the proportion of household expenditure on food, total household expenditure on education, and health.

The average household food share in Lampung Province is 57.15%. In addition, based on the type of region, households in urban areas in Lampung Province have a smaller percentage of food shares compared to rural areas (Table 5). According to Engel's Law, the lower the percentage of food expenditure (food share), the better the household economy will be. In addition, BPS (2020) states that if the percentage of household food expenditure is below 60%, Lampung Province households are not food-vulnerable.

Food expenditure consists of 14 groups, namely grains, tubers, marine animals (fish, squid, shrimp, shellfish), meat, eggs and milk, vegetables, nuts, fruits, oil and coconut, ingredients for beverages, spices, other foodstuffs, ready-to-drink foods, and cigarettes and tobacco. Based on Table 5, the highest average household food expenditures per month are expenditures for the processed food and beverage group (IDR421,860.14), cigarettes and tobacco expenditure (IDR257,462.64), and grain expenditure (IDR239,376.07). Based on the type of area, the average expenditure for processed food households in urban areas is IDR 197,954.50 more than households in rural areas. The same is also seen in the average expenditure on cigarettes and tobacco in urban households, which is greater than in rural areas. There is a difference in the average spending on grain commodities in urban areas, which is lower than that of households in rural areas (Table 5).

The highest average household food budget share in Lampung Province in Table 5 is processed food and beverage commodities at 13.44%, followed by grain commodities (9.26%), and cigarette and tobacco commodities (8.25%). The budget share of food groups in households can illustrate how these households allocate their budget for consuming more specific foods in food commodity groups. Note that the percentage of food expenditure for the processed food group in Lampung Province is still low compared to the average in Indonesia (17.29%). However, the percentage of grain expenditure in Lampung Province is greater than the average in Indonesia (5.57%). The government needs to pay attention to the high consumption of grains in Lampung Province.

The same thing is also presented in Table 5, which shows that the percentage of cigarette/tobacco expenditure in Lampung Province is 2.20%, which is greater than Indonesia's average expenditure percentage. According to Purwaningsih *et al.* (2015), the high percentage of expenditure in the cigarette and tobacco group needs to be watched out for considering the health risks of smoking. Not only is it detrimental to health but smoking habits also have an impact on reducing household expenses in meeting food and education needs (Ginting & Maulana, 2020). In addition, according to BPS Provinsi Lampung (2019), cigarette/tobacco commodity expenditure is the second largest contributor to the poverty line (9.45%). According to Wandita (2020), the factors that

Table 4: Household expenditure in Lampung Province (2019)

Area Type	The Household Expenditure (IDR Million/Month)			Expenditure Per Capita (IDR Million/Month)		
	Food	Non-food	Total	Food	Non-food	Total
Rural	1.58	1.24	2.83	0.47	0.38	0.85
Urban	1.95	1.89	3.84	0.55	0.55	1.10
Province	1.67	1.39	3.06	0.49	0.42	0.91

Source: NSES Data (2019) (processed data)

influence cigarette consumption in households in Lampung Province are the price of cigarettes, household income category, and the education level of the head of the household.

Households in urban areas have a larger budget share of processed food and beverage expenditure per month (1.81%) compared to rural areas (Table 5). This is in line with the research of Miranti *et al.* (2016) in West Java and Mayasari *et al*. (2018), in East Java, presenting that households in urban areas consume more prepared food and beverages compared to households in rural areas. The high budget share of the prepared food group in urban areas is suspected to be due to a change in the lifestyle/ habits of the community and the busyness of the urban community. Currently, people prefer to gather to eat out and spend a lot of activities or activities outside the home. In addition, many activities outside the home require them to consume prepared food and drinks because they are more practical. An increase in spending on food allocation for processed food commodities can positively impact the processed food and beverage industry.

It can be seen in Table 5 that the next highest expenditure is the expenditure of the grains group. The high average share of the grain group's budget indicates that grain consumption is one of the main priorities in spending on household needs in Lampung Province. In addition, the percentage of grain expenditure in rural areas is higher than in urban areas. This is in line with research by Purwaningsih (2015) and Miranti *et al.* (2016), demonstrating that the proportion of expenditure on grain in rural areas is higher than in urban areas.

The results of this research also determined that the percentage of cigarette/tobacco spending in urban areas is 1.03%, lower than that in rural areas. This was also reported by Miranti *et al.* (2016), which states that the percentage of cigarette/tobacco expenditure in villages is 1.41% greater than in cities.

Non-food expenditure comprises six groups: Housing and household facilities, various goods and services, clothing, footwear and headgear, durable goods, taxes and insurance, and parties and ceremonial needs. Based on the results in Table 5, the largest household non-food expenditure is housing and household facilities expenditure, IDR736,416.38/month and non-food expenditure per capita in Lampung Province is IDR227,479.86/month. In addition, non-food expenditure, namely the housing group and household facilities in urban areas is greater than in rural areas. Expenditures for housing and household facilities consist of housing costs, home maintenance and repairs, electricity, municipal waterworks, and fuel costs, including telephone, credit, Internet, and so on.

Household Welfare Level

One of the main indicators in describing the level of household welfare is household food consumption expenditure (Puspita & Agustina, 2020). Households with a small proportion of food expenditure (food share) compared to non-food expenditure, it can be assumed that these households are prosperous (Wuryandari, 2015). This is based on Engel's Law, which states that the lower the proportion of food expenditure, the more prosperous the household will be (Kumar *et al.*, 2016). The level of household welfare in this study is classified into prosperous, pre-prosperous, and not yet prosperous households.

Based on this study's results, the household welfare level in Lampung Province is categorised as pre-prosperous because the average percentage of food expenditure is 57.15%. The results also indicated that 2,263 households (44.12%) in Lampung Province were classified as not prosperous households, 2,792 households (30.86%) were pre-prosperous, and 2,263 households (25.02%) were prosperous households. In this study, welfare level was used as a dummy variable for welfare level 1 (1 = pre-prosperous households; 0 = others) and welfare level dummy 2 (1 = prosperous households; 0 = others).

Based on Figure 1, the highest percentage of food consumption expenditure allocation (budget food share) in prosperous, pre-prosperous, and not yet prosperous households

Table 5: Household food and non-food expenditure in Lampung Province (2019)

The Household Expenditure	IDR/Month			Budget Share (%)		
	Rural	Urban	Rural + Urban	Rural	Urban	Rural + Urban
Cereals	245,073.27	220,485.07	239,376.07	10.00	6.81	9.26
Tubers	11,475.48	12,051.44	11,608.94	0.43	0.35	0.41
Fish/shrimp/common squid/shells	122,570.14	175,906.59	134,928.44	4.34	4.57	4.40
Meat	53,390.90	69,686.21	57,166.60	1.70	1.58	1.67
Egg and milk	86,853.44	123,869.47	95,430.22	3.10	3.26	3.14
Vegetables	152,911.72	164,279.59	155,545.71	6.08	5,02	5.83
Legumes	43,106.37	53,169.15	45,437.96	1.73	1.60	1.70
Fruits	59,891.71	90,395.31	66,959.54	2.00	2.33	2.08
Oil and Coconut	53,725.99	56,743.71	54,425.21	2.18	1.76	2.08
Beverages stuffs	61,635.19	59,050.50	61,036.31	2.49	1.82	2.33
Spices	40,089.58	41,545.55	40,426.93	1.56	1.26	1.49
Miscellaneous type of food commodity	29,234.31	36,375.51	30,888.96	1.09	1.03	1.07
Prepared food and beverages	375,993.17	573,947.67	421,860.14	13.02	14.83	13.44
Cigarettes	251,527.03	277,144.17	257,462.64	8.49	7.46	8.25
Total Food Expenditure	**1,587,478.30**	**1,954,649.92**	**1,672,553.66**	**58.20**	**53.68**	**57.15**
Housing and household facilities	649,127.92	1,025,850.92	736,416.38	23.20	26.39	23.94
Goods and services	270,731.98	465,717.10	315,910.93	8.92	10.79	9.35
Clothing, footwear, and headgear	100,942.88	128,327.51	107,290.61	3.34	3.15	3.29
Durable goods	114,523.61	116,768.36	115,039.63	2.82	2.21	2.68
Taxes and insurance	76,131.51	126,686.08	87,835.82	2,58	2.99	2.67
Parties and ceremonies	236,816.46	313,396.58	250,905.99	0.96	0.80	0.92
Total Non-food Expenditure	**1,243,944.50**	**1,893,973.27**	**1,394,559.17**	**41.80**	**46.32**	**42.85**
Total Expenditure	**2,831,422.79**	**3,848,623.19**	**3,067,112.83**	**100.00**	**100.00**	**100.00**

Source: NSES Data (2019) (processed data)

is the processed food and beverage group while the lowest is the tubers group. This study's results also established that the pattern of food consumption in prosperous households is better than that of pre-prosperous and less-prosperous households. As seen in Figure 1, after fulfilling the consumption of the grain group, wealthy households allocate food needs to the protein group (fish, shrimp, squid, shellfish) and fibre (vegetables) group, in contrast to poor and less prosperous households, which allocate expenditure in the cigarette and tobacco group.

This follows Bennett's law, which states that the more prosperous household income increases, the more consumption patterns will change. It was initially only dominated by staple

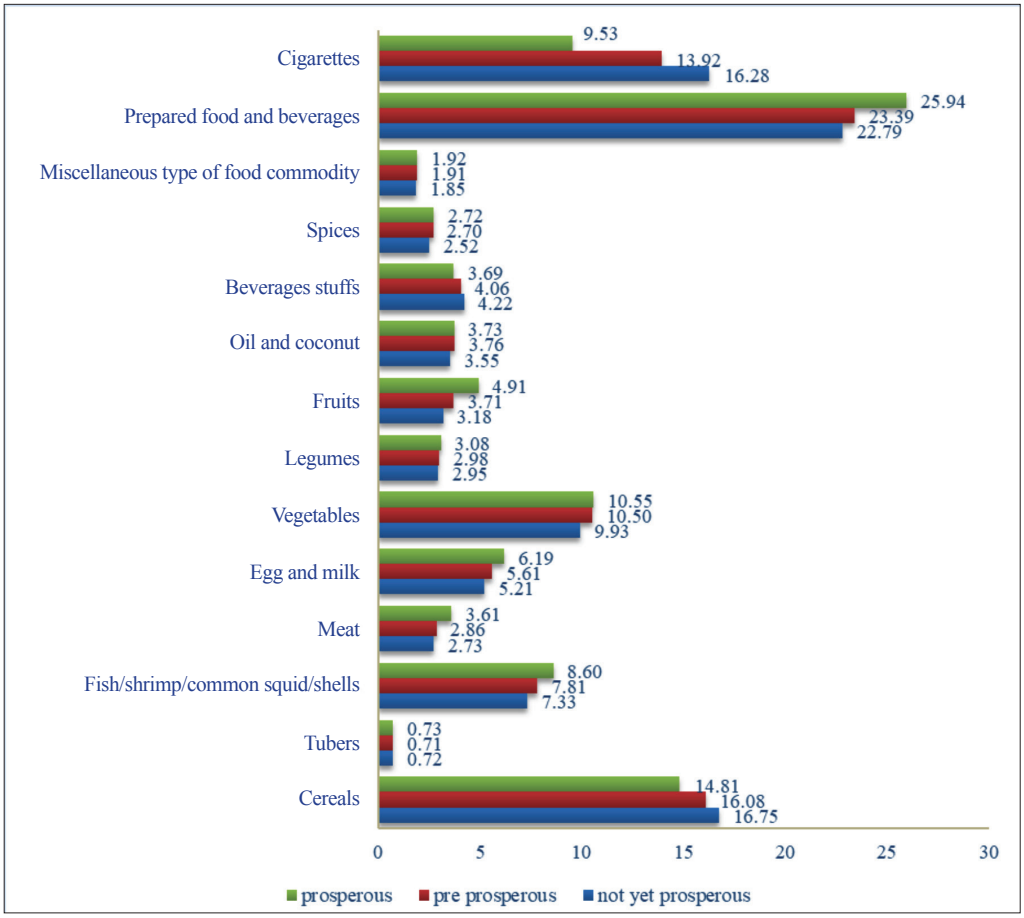

Figure 1: Budget food share according to welfare level

foods such as grains to become more varied, such as consuming foods rich in fibre and vitamins (fruits and vegetables) and protein, namely milk and meat (Gevisioner, 2015). Other than that, Hamid *et al.* (2013) stated that households at certain income levels would prioritise food at lower prices such as energy food. If the level of income increases, consumption preferences will change from previously cheap food to high-priced food such as protein food.

Desirable Dietary Pattern Score (Food Consumption Diversity)

The DDP score in this study was obtained from the research results of Sayekti *et al.* (2022). The results of this study show that the DDP score in Lampung Province is 75.44 (Figure 2). This score is still quite far from the ideal DDP score of 100. The DDP score in Lampung Province is lower when compared to research by Dewanti *et al.* (2020) in Central Java and Musta'in and Saputro (2021) in the Special Region of Yogyakarta. Based on this research, the PPH score in Central Java Province was 89.07, and in Yogyakarta Province, the DDP score was 89.92.

Table 6 presents the food groups with the largest to the smallest energy: Grains, oils and fats, animal-derived foods, vegetables, fruit, sugar, tubers, nuts, and others. It can be seen that the food consumption for the grain, oil, fat, and sugar group exceeds the recommendations while the consumption of tubers, animal-derived foods, vegetables, fruit, nuts and oily fruit and seeds is still not in accordance with

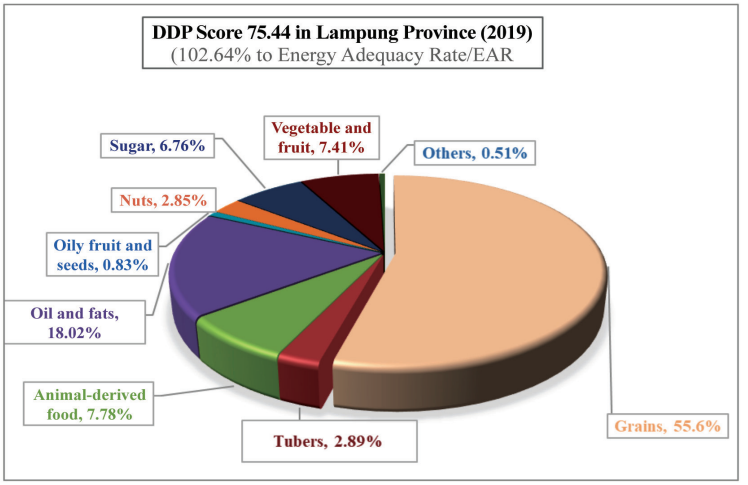

Figure 2: DDP score in Lampung Province in 2019
Source: Sayekti *et al*. (2022)

the recommendations. In addition, Table 6 also shows that all food groups in Lampung Province are still below the ideal rate.

Determinants of Household's Desirable Dietary Pattern (Food Consumption Diversity)

The DDP score determinant analysis results are described in detail as follows. First, a test

Table 6: DDP score calculation in Lampung Province (2019)

No.	Food Group	Average Consumption							
		Energy	Ideal Energy*	EAR (%)	Ideal % EAR*	Weight	EAR (%) x Weight	Ideal Standard DDP	DDP Score
1	Grains	1,195.45	1,050	55.60	50	0.50	27.80	25.00	23.29
2	Tubers	62.17	126	2.89	6	0.50	1.45	2.50	0.95
3	Animal-derived food	167.17	252	7.78	12	2.00	15.55	24.00	13.73
4	Oil and fats	387.40	210	18.02	10	0.50	9.01	5.00	4.82
5	Oily fruit and seed	17.82	63	0.83	3	0.50	0.41	1.00	0.34
6	Nuts	61.28	105	2.85	5	2.00	5.70	10.00	5.07
7	Sugar	145.26	105	6.76	5	0.50	3.38	2.50	2.23
8	Vegetables and fruits	159.28	126	7.41	6	5.00	37.04	30.00	25.02
9	Others	11.00	63	0.51	3	0.00	0.00	0.00	0.00
	Total	**2,206.84**	**2,100**	**102.64**	**100**	**-**	**100.34**	**100.00**	**75.45**

Source: Sayekti *et al.* (2022)

for violating the classical assumption of multicollinearity was carried out, as seen in Table 7.

Table 7 indicates no multicollinearity problem in the model because the VIF obtained for all variables is less than 10. Second, a heteroscedasticity test was conducted, as seen in Table 8.

From Table 8, it can be seen that Prob. Chi-Square obtained is less than 0.05. Hence, in this model, there is a problem of heteroscedasticity. It is necessary to improve the model. The results are presented in Table 9.

Table 9 results from the best DDP score determinant analysis because it is free from multicollinearity and heteroscedasticity problems. From the table, it can be seen that the adjusted R^2 obtained is 0.3861. This means that 38.61% of the DDP score variation can be explained by household income, number of household members, age of head of household, education of the household's head, education of housewife, area, gender of the household head, and level of welfare. Other variables that were not analysed contributed 61.39% to the DDP score variation. Using secondary data with a broad scope in this study causes limited data availability. Therefore, another study is needed that uses models with more complete variables.

From the F-statistic obtained, it can be concluded that household income, number of household members, age of the household head, education of the household head, education of housewife, area, gender of the household head, and level of welfare have a significant effect on the DDP score with a confidence level of 99%. However, the results of the partial test show that household income, number of household members, age of the household head, education of the housewife, gender of the household head, and level of welfare significantly affect the DDP score. In contrast, the education of the household head and area has no significant effect on the DDP score.

Table 7: Multicollinearity test results

Variable	Coefficient Variance	Uncentered VIF	Centred VIF
C	0.492390	39.55919	NA
X1	6.84E-15	6.776805	1.610505
X2	0.008832	10.65610	1.308365
X3	9.75E-05	19.76160	1.366462
X4	0.001231	6.800197	1.814917
X5	0.001262	6.043866	2.023284
D_A	0.077394	1.440718	1.106897
D_G	0.169422	1.427967	1.278161
D_{W1}	0.071102	1.763112	1.218937
D_{W2}	0.103905	2.088341	1.565909

Source: NSES Data (2019) (processed data)

Table 8: Heteroscedasticity test results

F-statistic	13.61070	Prob. F(9,9036)	0.0000
Obs*R-squared	120.9917	Prob. Chi-Square(9)	0.0000
Scaled explained SS	118.2562	Prob. Chi-Square(9)	0.0000

Source: NSES Data (2019) (processed data)

Table 9: The results of the regression analysis determine the DDP score

Variables	Coefficient		Std. Error	t-statistic	Prob.
C	80.38420	***	0.716093	112.2538	0.0000
X_1 (Household income)	4.89E-06	***	1.07E-07	45.63023	0.0000
X_2 (Number of household members)	-5.649353	***	0.100073	-56.45228	0.0000
X_3 (Age of the head's household)	0.051761	***	0.010007	5.172563	0.0000
X_4 (Education of the head's household)	0.035311	ns	0.037609	0.938880	0.3478
X_5 (Education of the housewife)	0.102437	***	0.035396	2.894022	0.0038
D_A	0.321476	ns	0.274756	1.170040	0.2420
D_G	2.395239	***	0.417431	5.738054	0.0000
D_{W1}	-2.988287	***	0.263996	-11.31944	0.0000
D_{W2}	-8.955807	***	0.319880	-27.99743	0.0000
R-squared	0.386712				
Adjusted R-squared	0.386101				
S. E. of regresion	10.61107				
F-statistic	633.0763				
Prob(F-statistic)	0.000000				

Source: NSES Data (2019) (processed data)
*** = significant α = 0.01; ** = significant α = 0.05; * = significant α = 0.1; and ns = not significant.

Household income significantly affects the DDP score with a 99% confidence level. The regression coefficient of 4.89E-6 indicates that if household income increases by IDR 1,000,000.00 per month, the DDP score will increase by 4.89. This is in line with research by Taruvinga *et al.* (2013), Aneftasari *et al.* (2016), Rinaldi *et al.* (2017), Alfiati (2018), and research by Hutagaol and Sinaga (2022), which states that an increase in income will further increase the variety of food consumed so that it can influence food consumption patterns. In addition, according to Gevisioner *et al.* (2015) and Handayani *et al.* (2019), an increase in income provides a great opportunity to choose and buy various type of food products with better quality and quantity under balanced nutrition provisions.

The number of household members has a significant effect on the DDP score with a 99% confidence level. The regression coefficient obtained is -5.6494, which means that if the number of members in the household increases by one person, the DDP score will decrease by 5.65. The results of this research follow research by Ismiasih *et al.* (2013), Qineti *et al.* (2017), and Alfiati (2018), which shows that the number of household members has a negative effect on the diversity of food consumption.

In addition, according to Dewanti *et al.* (2020), households with more than four members tend to have less chance of achieving a high diversity of food consumption. An increase in the number of household members can contribute to an increased expenditure burden borne by the head of the household, which is getting bigger. Thus, an increasing number of household members without an increase in income can make these households prioritise allocating their income to meet the quantity of food rather than diversifying the food they consume. In addition, households with a larger

number of household members tend to consume only one type of staple food, which is cheap (Hutagaol & Sinaga, 2022).

The age of the head's household has a significant effect on the DDP score with a 99% confidence level. With a regression coefficient of 0.0518, if the age of the household head increases by one year, the DDP score will increase by 0.05. This following the research of Firdaus and Cahyano (2017) in Yogyakarta Province and East Nusa Tenggara Province and research by Dewanti *et al.* (2020) in Central Java Province, which concluded that the age of the head of the family had a significant effect on the diversification of household food consumption. As the age of the household's head increases, experience also increases, including experience in choosing good food for consumption.

The education of the housewife has a significant effect on the DDP score with a 99% confidence level. The regression coefficient of 0.1024 indicates that if a housewife's education increases by one year, the expected food pattern score will increase by 0.10. This follows the research of Rahma *et al.* (2020) and Alfiati (2018), which show that the level of a housewife's education significantly affects the diversity of food consumption. Furthermore, according to Amugsi *et al.* (2016), housewives with a higher level of education than those with basic education are more likely to achieve a more varied diet than housewives who are not educated. Similarly, Hamid *et al.* (2013) stated that the more educated the housewife is the more knowledge and insight the housewife has about nutrition so that when the mother cooks food every day, it is not only based on habits and the concept of being full. The housewife will consider or choose a quality type of food and also pay attention to the nutritional elements contained in the food.

The gender of the head's household significantly affects the DDP score with a 99% confidence level. The regression coefficient obtained is 2.3952. This means that the DDP score of households with female heads of households is 2.39 higher than the DDP scores of households with male heads of households. The results of this research align with the research of Taruvinga *et al.* (2013) and Dewanti *et al.* (2020), who concluded that female heads of household tend to have a higher diversity of food compared to households with male heads of household.

The welfare level significantly affects the DDP score with a 99% confidence level. The regression coefficients obtained are -2.9883 and -8.9558. This indicates the highest DDP score for less prosperous households (80.38). The PPH score for pre-prosperous households is 77.39. The DDP score for prosperous households is the lowest at 71.42. Hence, the results of this study are not in line with the research by Mayasari *et al.* (2018), which states that households with better welfare will tend to pay attention to the quality and quantity of food consumed by their households compared to households with a low level of welfare. With this difference in results, it is suspected that prosperous households will try to allocate their income for secondary and even tertiary needs, which can increase the percentage of non-food expenditures such as education, health, and other expenses.

The education of the head's household has no significant effect on the DDP score because the confidence level is less than 90%. Nearly 90% of household heads are male. The head of this household is in charge of earning a living, so, the task of organising and providing food for household members is in the hands of the mother. In addition, according to Dewanti *et al.* (2020), education can cause a person to have a wider choice in determining the food he consumes. This results in a person's education level not always aligned with consumption patterns. Therefore, the higher the education level of the head of the household does not determine the higher the DDP score achieved.

The area has no significant effect on the DDP score because the level of confidence obtained is also less than 90%. This demonstrates that DDP scores in rural areas are the same as in urban areas.

Conclusions

The findings of this study suggest that the level of diversity in food consumption among households in Lampung Province was suboptimal, as reflected by the region's DDP score of 75.44. The aforementioned score exhibits considerable deviation from the optimal DDP score of 100. The present study indicates that certain factors positively contribute to household food consumption diversity, including the income level of the household, the age of the household head, the educational attainment of the housewife, and the gender of the household head. Conversely, the number of household members and welfare level negatively impact the diversity of household food consumption.

The findings of this study demonstrate that household characteristics are a key factor in determining food consumption diversification. As such, there is a pressing need to engage in socialisation, promotion, and counselling interventions to foster the consumption of diverse, nutritious, balanced, and safe food to enhance overall food quality. Moreover, a deficient background in education can lead to a deficiency in comprehension and understanding regarding the consumption of high-quality food, thus, necessitating the enhancement of formal and informal educational efforts. This is attributable to the fact that superior education can potentially augment both the financial resources and overall well-being of households.

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Conflict of Interest Statement

The authors declare that they have no conflict of interest.

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