Food expenditure share analysis of household: Case study of food reserved garden area program in Bone Bolango regency of Gorontalo province

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Abstract. The share of food expenditure is one of food security indicator in communities. It also can be used as an indicator of the success of rural development. The aim of this research was to find the share of food expenditure of farm households before and after the program of Food Reserved Garden Area (KRPL/ FRGA) in Suwawa and Tilongkabila district at Bone Bolango Regency of Gorontalo Province. Analysis method used share of food expenditure method. The method measure the ratio of food expenditure and total expenditure of household for a month. Statistical test used a non-parametric method, especially The Wilcoxon Test (two paired samples test). The results found that KRPL program in Ulanta Village of Suwawa district did not significantly affect the share of food expenditure of farm household. While in the South Tunggulo village of Tilongkabila district, FRGA program significantly affected the share of food expenditure.

1. Introduction

The Republic of Indonesia Government Regulation No. 68 at 2002 year about Food Security [1], explained that food security was a fulfillment condition of food for household which reflected by availability of food, quantity and quality, secure, prevalent and affordable. Furthermore, the availability of food was food availability from domestic production and other sources. This is macro indicator, because probably food can be available but it can not be accessed by people. Meanwhile, food diversification is the effort to increase consumption of variety food with balanced nutrition principles. These things that could be basic rules of the formation of Food Reserved Garden Area (FRGA).

Good quality of nutrition is very important for food consumption. Therefore, there’s a policy for food consumption diversification. It’s called Desirable Dietary Pattern (DDP), which applied to FRGA. DDP is group of food which based on energy contribution regarding to total energy of main group of food. DDP is real form of food security, because commonly, DDP was known as a pattern consumption of variety food, balanced nutrition and secure [2].

In 2011 year, Agriculture Ministry of Republic of Indonesia released a program to maintain the food security. It’s called The Pattern of Food Reserved Garden Area. In 2012 year, the program is going to massification to the whole of Indonesia. The principles of FRGA are: 1). Utilization of home yard for food security and self-sufficiency. 2). Food diversification based on local resources, 3). Conservation of food genetic resources (plant, cattle and fish) and 4). Sustainability of village’s seed garden to get high income and society prosperity [3].
FRGA development and improvement have purposes for food diversification to get the food security and self-sufficiency which impact to increase the prosperity of society. In additional, food security reflected by several indicators, such as: 1) the damage level of plant, cattle and fish; 2) the decreasing of food production; 3) food availability in the household; 4) the share of food expenditure; 5) food price fluctuation which consumed by household; 6) a changes of social life, such as migration, sell assets; 7) eating habits, quantity and quality of foods; and 8) nutrition status [4].

The share of food expenditure can be use too for indicator of succeeded of villages’ development. High share of food expenditure shows that household income is still for basic needs (subsistence). Vice versa, high share of non-food expenditure indicates that there has been a shift of household’s needs from basic needs (subsistence) to the commercial needs. It means that the primary needs have been fulfilled or there has been a shift of food expenditure pattern. [5] argues that till 2006 year, the share of paddy-rice expenditure was very high. This condition was change after 2008 (economy crisis in Indonesia), where the share of ready meals expenditure (include instant noodles) was higher than paddy-rice (main carbohydrate source). It’ indicates that there has been a shift of dietary habit in the society. The people were more choice spends their money and time to buy ready food in the restaurant, cafe or other food stores. This habits can be indicates to the decreasing of rice consumption in the society.

Susenas Data in September 2014 shows that the share of food expenditure per capita in the rural area of Gorontalo province was 50.12%. It is higher than non-food expenditure per capita which just 49.88% was. In the urban area, the share of food expenditure was just 39.90%, but the non-food expenditure per capita was reach about 60.10% [6]. Those values indicate that the life behaviour priority of people in the rural area was fulfilment the raw food needs. In additional, the lacks of infrastructure facilities were the other factors that caused of low of prosperity in the rural area. It is very different with the condition of people in the urban area. They are more spending their income to buy the non-food goods. Even though, they bought a food for eat, so they will be spend their money for but a ready food in the restaurant or cafe than buy some raw materials of food and cook it. They but the food was not just for satisfied, but more than it, such as nutrition, healthy factors. The important is quality of food than quantity. So that, the FRGA or KRPL program did in Gorontalo Province, especially in Bone Bolango Regency. The program purposes to increase a Desirable Dietary Pattern (DDP), self-sufficiency of food and an alteration in the share of food expenditure, especially in the rural area.

The aim of this research is want to know about the share of food expenditure of farm household, before and after FRGA program in Suwawa and Tilongkabila district of Bone Bolango Regency.

2. Materials and methods

2.1. Place and time
The research conducted at Ulanta Village of Suwawa District and South Tunggulo Village of Tilongkabila District in Bone Bolango Regency. The both of villages are the location of FRGA program in Bone Bolango Regency during 2013 – 2014.

2.2. Source of data
This research took a data from beginning of the program at 2013 till the end at 2014 (before and after). The research was more focused on the survey activity. The data took with a questionnaire and direct interview. Kinds of data are:
1. Farm household characteristics
2. Kinds and total of household expenditure for food consumption (before and after FRGA)
3. Kinds and total of household expenditure for non-food (before and after FRGA).

2.3. Analysis method
The share of food expenditure (SFE) is an expenditure ratio for food and non-food (total) for a month. The share of food expenditure was obtained by the data at the farm household level and then divided by the number of farm household’s members. The formula as follow as, where:
\[ SFE \% = \frac{EF}{ET} \times 100 \]  

1. \( SFE \) = The share of food expenditure (\%)  
2. \( EF \) = an expenditure for food (Rp/month)  
3. \( ET \) = Expenditure total of farm household (Rp/month)

The hypothesis:

1. \( H_0 \) = there’s no difference to the share of food expenditure between before and after FRGA program. 
2. \( H_1 \) = there’s significant difference between before and after FRGA program to the share of food expenditure.

Non parametric method of statistic used to test that hypothesis. Non-parametric method using The Wilcoxon test (2 related sample test). This method was used because the data were not normally distributed based on Kolmogorov-Smirnov normality test. The test showed that the significance value is less than 0.05 (0.000) which means that the sample was not normally distributed. Although the data type was ratio data [7].

All of the respondents were the whole of member of group that followed the FRGA program between 2013 – 2014 in the Ulanta and South Tunggulo villages. All statistical analysis were performed using IBM SPSS Statistics ver.20.0.

There are two criteria in the Wilcoxon test for decision making:

1. Compare the value of \( z \) calculate and \( z \) table:
   - If \( z \) calculate < \( z \) table, \( H_0 \) accepted
   - If \( z \) calculate > \( z \) table, \( H_0 \) rejected or \( H_1 \) accepted

2. Probability values:
   - If probability value > 0.05, \( H_0 \) accepted
   - If probability value < 0.05, \( H_0 \) rejected atau \( H_1 \) accepted.

To calculate the \( z \) value using the following formula, [7]:

\[
Z = \frac{T - \frac{1}{4N(N+1)}}{\sqrt{\frac{1}{24}N(N+1)(2N+1)}}
\]

where:

\( T \) = a smallest difference  
\( N \) = the total sample

3. Result and discussion

Descriptively, the percentage of share of food expenditure each respondents shows at table 1. Table 1 shows that after FRGA program, SFE increased in average 1% after FRGA program at Ulanta Village and an average 4% in South Tunggulo Village. This result argues that commonly, more of household income spent for food (groceries) or primary needs than secondary or tertiary needs (luxury goods). Wilcoxon test performed to test the relationship of SFE between before and after FRGA program (table 2).

Negative ranks in the Table 2 shows that there are 6 (six) negatives data difference in Ulanta Village. Meanwhile, there are 4 (four) negatives data difference in South Tunggulo Village. Negative ranks are data differences between “after” and “before” which had negative value or value of “after” was smaller than “before” value. This result explain that frequency of food purchases or SFE value before FRGA program was greater than after FRGA program.

Positive ranks are values of “after” will be greater than “before” values. Table 2 shows that there are 9 (nine) datas in Ulanta village which showed that SFE value in after FRGA program was greater than before FRGA program. Meanwhile, there are 11 (eleven) datas in South Tunggulo village which showed...
that SFE value after FRGA was greater than before FRGA program. In addition, “Ties” is there’s no same value or there’s same value of SFE in the whole of respondent data.

**Tabel 1. Recapitulation data of the share of food expenditure in Ulanta and South Tunggulo Villages, before and after FRGA Program.**

| Respondents | Village | District | Share of Food Expenditure (SFE) (%) Before KRPL | Share of Food Expenditure (SFE) (%) After KRPL |
|-------------|---------|----------|-----------------------------------------------|-----------------------------------------------|
| 1           | Ulanta  | Suwawa   | 22%                                           | 11%                                           |
| 2           | Ulanta  | Suwawa   | 12%                                           | 15%                                           |
| 3           | Ulanta  | Suwawa   | 28%                                           | 22%                                           |
| 4           | Ulanta  | Suwawa   | 8%                                            | 15%                                           |
| 5           | Ulanta  | Suwawa   | 9%                                            | 11%                                           |
| 6           | Ulanta  | Suwawa   | 12%                                           | 13%                                           |
| 7           | Ulanta  | Suwawa   | 16%                                           | 5%                                            |
| 8           | Ulanta  | Suwawa   | 8%                                            | 5%                                            |
| 9           | Ulanta  | Suwawa   | 16%                                           | 9%                                            |
| 10          | Ulanta  | Suwawa   | 21%                                           | 13%                                           |
| 11          | Ulanta  | Suwawa   | 5%                                            | 12%                                           |
| 12          | Ulanta  | Suwawa   | 4%                                            | 11%                                           |
| 13          | Ulanta  | Suwawa   | 2%                                            | 17%                                           |
| 14          | Ulanta  | Suwawa   | 10%                                           | 14%                                           |
| 15          | Ulanta  | Suwawa   | 8%                                            | 21%                                           |
| 16          | South Tunggulo | Tilongkabila | 99%                                           | 90%                                           |
| 17          | South Tunggulo | Tilongkabila | 5%                                            | 16%                                           |
| 18          | South Tunggulo | Tilongkabila | 9%                                            | 16%                                           |
| 19          | South Tunggulo | Tilongkabila | 6%                                            | 16%                                           |
| 20          | South Tunggulo | Tilongkabila | 9%                                            | 14%                                           |
| 21          | South Tunggulo | Tilongkabila | 8%                                            | 11%                                           |
| 22          | South Tunggulo | Tilongkabila | 12%                                           | 11%                                           |
| 23          | South Tunggulo | Tilongkabila | 12%                                           | 11%                                           |
| 24          | South Tunggulo | Tilongkabila | 8%                                            | 16%                                           |
| 25          | South Tunggulo | Tilongkabila | 10%                                           | 9%                                            |
| 26          | South Tunggulo | Tilongkabila | 11%                                           | 17%                                           |
| 27          | South Tunggulo | Tilongkabila | 9%                                            | 11%                                           |
| 28          | South Tunggulo | Tilongkabila | 8%                                            | 12%                                           |
| 29          | South Tunggulo | Tilongkabila | 9%                                            | 14%                                           |
| 30          | South Tunggulo | Tilongkabila | 8%                                            | 15%                                           |

Source: primary data (2013 and 2014)
Table 2. The result of Wilcoxon test of SFE, before and after FRGA program in Ulanta Village and South Tunggulo Village (2014).

| Ranks                        | N   | Mean Rank | Sum of Ranks |
|------------------------------|-----|-----------|--------------|
| Desa Ulanta (PPP after – PPPbefore) |     |           |              |
| Negative Ranks               | 6a  | 9.00      | 54.00        |
| Positive Ranks               | 9b  | 7.33      | 66.00        |
| Ties                         | 0c  |           |              |
| Total                        | 15  |           |              |
| Desa Tunggulo selatan (PPP after – PPPbefore) |     |           |              |
| Negative Ranks               | 4a  | 4.75      | 19.00        |
| Positive Ranks               | 11b | 9.18      | 101.00       |
| Ties                         | 0c  |           |              |
| Total                        | 15  |           |              |

a. P3after < P3before  
b. P3after > P3before  
c. P3after = P3before

Source: output IBM SPSS ver.20.0 (2015)

Table 3. The result of statistic test of Wilcoxon, before and after FRGA program in Ulanta and South Tunggulo Villages.

| Test Statistics        | Ulanta Villages (PPPafter – PPPbefore) | South Tunggulo Villages (PPPafter – PPPbefore) |
|------------------------|----------------------------------------|-----------------------------------------------|
| Z                      | (-)0.341b                               | (-)2.329b                                    |
| Asymp. Sig. (2-tailed) | 0.733                                  | 0.020                                        |

a. Wilcoxon Signed Ranks Test  
b. Based on negative ranks.

Z table : 0.6368 (α = 0.05)  
Z table : 0.9906 (α = 0.05)

Source: output IBM SPSS ver.20.0 (2015)

Table 3 shows that in Ulanta village, Z calculate value (sign ignored) was smaller than Z table value. So that, the final result is accept H0. There are same value of SFE between before and after FRGA program in Ulanta village. The meaning is there’s no influence of FRGA program to the share of food expenditure in Ulanta Village, Suwawa District. There’s same result if we use probability criteria.

Meanwhile, according to table 3, Z calculate value was greater than Z table value in South Tunggulo village. So that, the final result is reject H0 or H1 accepted. There’s same result if we use probability criteria. The meaning is there’s significant difference of SFE between before and after FRGA program in South Tunggulo Village. Therefore, it’s important to continue the FRGA program in that village, especially for improve the Desirable Dietary Pattern (DDP) through food diversification.

As a food security indicator of the region, [4] said that if share of food expenditure (SFE) is higher, so the food security is more reduce. As a prosperity indicator, if SFE value is smaller, so the prosperity level is higher. This is because the income of each household has just small part for buy food (groceries) and largely to spend for secondary and tertiary needs (luxury goods).
According to that statement, it can be argued that the prosperity and food security level of household in South Tunggulo is better than the household in Ulanta village.

Ilham and Sinaga [4] found that there’s a relationship between share of food expenditure and food security. This can be indicated by higher income, share of food expenditure decrease, but energy and protein consumption increase. The increasing of consumption of energy and protein indicated that Desirable Dietary Pattern was improve. People was more choice the quality of food for healthy reason than quantity of food for satisfied reason.

The differences of income and education were the one of decided factor for food expenditure pattern. Kirpatrik and Tarasuk [8] argued that the household with low education level spend considerably less income to buy food in restaurants or food stores. They tend to spend their money to buy a cheaper material food in the traditional market and then cook it by themselves. Pusposa [9] found that income variable was significantly influence to the consumption pattern. Kirpatrik and Tarasuk [8] also found that food expenditure pattern depend on education level. Household with high level of education have a high income either. So that, it is very influence to the purchasing power and food expenditure pattern of household. The household which have a high income usually able to access the restaurant or food stores which sell the premium quality food, easily.

Moreover, Rachman and Ariani [10] said that food consumption pattern in Indonesia (rural and urban area) dominated by share of carbohydrates source. In the other hand, Indonesian people consume more carbohydrates (satisfied factor) than the other nutrition source. Whereas, the urban income is higher than the rural income. So that, purchasing power factor of each household is depending factor of food consumption pattern of society. Commonly, people who live in the urban area are more concerned to the nutrition ingredients of food (quality factor) than the quantity of food (satisfied factor) [10].

4. Conclusion

- The implementation of FRGA program in Ulanta Village does not significantly influence to the share of food expenditure of each respondent household.
- FRGA program in South Tunuggulo Village is significantly influence to the share of food expenditure of household.
- Several researches showed that education and income level are factors which significantly influence to the food expenditure pattern and food consumption pattern of each household.
- Preferably, Food Reserved Garden Area (FRGA) program should be continued. Because, It can be influence the share of food expenditure (SFE) and Diserable Dietary Pattern (DDP), directly or inderictly.

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