Dynamics of nutritional food consumption and expenditure patterns of Central Java population as welfare indicators to achieve sustainable development goals

W Rahayu, Darsono, S Marwanti and E Antriyandarti

Study Program of Agribusiness, Faculty of Agriculture, Universitas Sebelas Maret, Indonesia

Corresponding author: wiwitrahayu@staff.uns.ac.id

Abstract. This study aims to determine Central Java population welfare dynamics by looking at the pattern of expenditure and the nutritional and food consumption level. The data used is data on the expenditure and consumption of the Central Java population in 2016–2020. The data analysis method used is descriptive analytical. The study of expenditure patterns shows that during the period 2016–2020, the Central Java population welfare is increasing. Still, the population of rural areas is less prosperous than the population of urban areas. The welfare increase is also shown by decreasing the cereals group consumption. The analysis of the nutritional consumption level indicates that the energy and protein consumption level tend to increase during 2016–2020. The level of energy consumption is categorized as sufficient, and protein consumption level is categorized as good. In rural areas, energy consumption and energy consumption are higher than in urban areas; conversely, protein consumption and protein consumption in urban areas are higher than in rural areas.

1. Introduction

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity. The 17 SDGs are integrated—they recognize that action in one area will affect outcomes in others and that development must balance social, economic, and environmental sustainability. The goals of the SDGs include no poverty and zero hunger [1].

Indonesia has succeeded in achieving Indonesia’s MDGs target, which is 49 of the 67 MDGs indicators. However, several indicators must be continued in the implementation of the SDGs, namely reducing poverty rates based on the national poverty line, increasing minimum consumption below 1,400 kcal/capita/day, and disparity in target achievement between provinces is still wide [2]. The achievement of the MDGs in Central Java shows that of the 7 goals and 50 indicators, 28 indicators have not been achieved, one of which is poverty reduction [3].

The welfare of the population can be seen, among others, from the expenditure pattern for consumption. Low-income households allocate income to food rather than non-food needs [4–6]. The majority of households in developing countries spend a much higher share of their income on food than in developed countries. FAO estimates, this share reaches 60–80 percent in developing countries, compared to 10–20 percent in developed countries [7]. In 2019, rural areas in Nigeria spent more on...
food items than urban areas, spending 61.30% of its total consumption on food and 38.70% on non-food items [8].

The development of the food consumption level implicitly also reflects income or people's purchasing power for food [9]. A decrease in the level of energy consumption indicates a reduction in welfare in terms of energy consumption [4]. The level of welfare has a positive relationship significantly with the level of food security of poor fishermen's households, both for cases of poverty typology in urban and rural coastal areas [10].

It is important to know the dynamics of the population's welfare to see the achievement of the implementation of the SDGs, especially those related to reducing poverty. In 2019, the average total expenditure of the Central Java population was Rp. 1,000,875.00/capita/month (the lowest among 7 provinces in Java) with a share of food expenditure of 49.16% (the third highest number after Banten and East Java) [11]. This study aims to determine Central Java population welfare dynamics by looking at the pattern of expenditure and the nutritional and food consumption level.

2. Methods
The data used in this study is secondary data, namely the expenditure and consumption of the Central Java population in 2016–2020 sourced from the Book of Central Java Population Expenditure for Consumption that the Central Java Statistics Agency published. The data taken consists of data on food expenditure, non-food expenditure, and energy and protein consumption of the population of Central Java.

The data analysis method used is descriptive qualitative analysis, namely tabulations and percentages presented in tables and graphs. The analysis carried out is an analysis of expenditure patterns based on the proportion of food and non-food expenditures and an analysis of the energy and protein consumption level calculated by the formula:

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\text{Energy or Protein Consumption Level} = \frac{\text{actual consumption of energy or protein}}{\text{recommended dietary allowance of energy or protein}} \times 100\%
\]

Energy/Protein Consumption Levels (ECL/PCL) are classified namely (1) Good: ECL/PCL ≥100%, (2) Adequate : ECL/PCL : 80–99%, (3) Less : ECL/PCL: 70–80% , and (4) Deficit : ECL/PCL : <70 % [12].

3. Result and discussion

3.1. Dynamics of Central Java population expenditure pattern
Population consumption expenditure is broadly classified into two groups, namely food expenditure and non-food expenditure. The pattern of population expenditure shows the composition of the proportion of food and non-food expenditures to total expenditure. The dynamics of the expenditure patterns of the Central Java population in 2016–2020 are presented in Table 1.

Table 1 shows that during the period 2016–2020 there was an increase in the average expenditure of the population of Central Java, namely IDR 756,720.00/capita/month in 2016 to IDR 1,018,487.00/capita/month in 2020. The average population expenditure in urban areas is higher than the population in rural areas. The pattern of population expenditure seen from the proportion of food and non-food expenditure shows that during the period 2016–2020 there is a tendency to decrease the proportion of food expenditure and increase the proportion of non-food expenditure. This condition indicates an increase in the welfare of the population of Central Java. However, the population welfare in rural areas is lower than in urban areas. The proportion of food expenditure of the people in rural areas (an average of 53.31%) is higher than the proportion of food expenditure of the population in urban areas (an average of 46.43%). An increase in the proportion of expenditure on food can be an indicator of declining population welfare and increasing poverty levels [13].
Table 1. Dynamics of Central Java population expenditure patterns in 2016–2020

| Year | Location       | Food Expenditure | Nonfood Expenditure | Total Expenditure |
|------|----------------|------------------|---------------------|-------------------|
|      |                | IDR/capita/month | %                   | IDR/capita/month  | %                   | IDR/capita/month | %                   |
| 2016 | Urban          | 409,810          | 45.84               | 484,097           | 54.16               | 893,907          |
|      | Rural          | 337,788          | 53.17               | 297,504           | 46.83               | 635,292          |
|      | Urban+Rural    | 371,605          | 49.73               | 385,115           | 50.27               | 756,720          |
| 2017 | Urban          | 443,810          | 47.34               | 493,715           | 52.66               | 937,525          |
|      | Rural          | 399,849          | 55.53               | 320,185           | 44.47               | 720,034          |
|      | Urban+Rural    | 421,515          | 50.96               | 405,708           | 49.04               | 827,223          |
| 2018 | Urban          | 491,151          | 46.33               | 568,887           | 53.67               | 1,060,039        |
|      | Rural          | 429,085          | 52.91               | 381,835           | 47.09               | 810,920          |
|      | Urban+Rural    | 460,891          | 49.11               | 477,690           | 50.89               | 938,581          |
| 2019 | Urban          | 500,721          | 46.31               | 580,606           | 53.69               | 1,801,327        |
|      | Rural          | 436,513          | 52.91               | 388,574           | 47.09               | 825,060          |
|      | Urban+Rural    | 469,421          | 49.08               | 486,982           | 50.92               | 956,403          |
| 2020 | Urban          | 534,297          | 46.34               | 618,738           | 53.66               | 1,153,035        |
|      | Rural          | 456,030          | 52.01               | 420,784           | 47.99               | 876,814          |
|      | Urban+Rural    | 496,173          | 48.72               | 522,314           | 51.28               | 1,018,487        |

Food expenditure is allocated to various food groups. The dynamics of the proportion of food expenditure by food group are presented in Figure 1.

![Figure 1. Dynamic of food expenditure proportion by food group, 2016–2020](image)

Figure 1 shows that by food group, the largest proportion of food expenditure is allocated to the prepared foods and drinks group (an average of 34.97%), followed by the tobacco and betel group (an average of 11.98%), and cereals are ranked third (an average of 11.71%). During 2016–2020 the proportion of food expenditure for cereals tends to decrease, while proportion of food expenditure for the prepared foods and drinks group tends to increase. Bennett’s law states that at low-income levels,
the demand for food is prioritized for energy-dense foods derived from carbohydrates, namely cereals [14]. Therefore, a decrease in the proportion of food expenditure on cereals indicates an increase in the welfare of the population of Central Java.

3.2. Dynamics of energy and protein consumption level of Central Java population
Energy and protein are nutrients that humans need to live healthy and productive activities. Energy and protein consumption is the amount of energy and protein obtained from the food consumed. The energy and protein consumption level show how much energy and protein consumed can meet the recommended dietary allowance of energy or protein. The recommended dietary allowance of average energy and protein for the Indonesian population is 2,100 kcal/person/day and 57 grams/capita/day [15].

The dynamics of consumption and the Central Java population's energy and protein consumption level are presented in Table 2.

Table 2. The dynamics of consumption and the energy and protein consumption level of the Central Java population, 2016–2020

| Year | Location         | Energy Consumption | Protein Consumption |
|------|------------------|--------------------|---------------------|
|      |                  | kcal/person/day    | Energy Level (%)    | grams/person/day | Protein Level (%) |
| 2016 | Urban            | 1,952.48           | 90.81               | 56.00           | 98.25             |
|      | Rural            | 1,974.22           | 91.82               | 53.02           | 93.02             |
|      | Urban+Rural      | 1,964.01           | 91.35               | 54.42           | 95.47             |
| 2017 | Urban            | 2,048.35           | 95.27               | 60.83           | 106.72            |
|      | Rural            | 2,112.26           | 98.24               | 59.11           | 103.70            |
|      | Urban+Rural      | 2,080.76           | 96.78               | 59.96           | 105.19            |
| 2018 | Urban            | 2,098.83           | 99.94               | 62.36           | 109.40            |
|      | Rural            | 2,114.91           | 100.71              | 58.78           | 103.12            |
|      | Urban+Rural      | 2,106.67           | 100.32              | 60.61           | 106.33            |
| 2019 | Urban            | 2,029.43           | 96.64               | 61.19           | 107.35            |
|      | Rural            | 2,062.67           | 98.22               | 58.33           | 102.33            |
|      | Urban+Rural      | 2,045.63           | 97.41               | 59.80           | 104.91            |
| 2020 | Urban            | 2,049.89           | 97.61               | 61.78           | 108.39            |
|      | Rural            | 2,059.23           | 98.06               | 58.52           | 102.67            |
|      | Urban+Rural      | 2,054.43           | 97.83               | 60.19           | 105.60            |

Table 2 shows that during 2016–2020, the Central Java population's consumption and energy and protein consumption level tends to increase. The average consumption of energy and protein in 2016 was 1,964 kcal/person/day, increasing to 2,054.43 kcal/person/day in 2020. Meanwhile, the average protein consumption increased from 54.42 grams/person/day to 60.19 grams/person/day in 2020. The energy consumption level increased from 90.81% in 2016 to 97.83% in 2020. The protein consumption level increased from 98.25% m2 in 2016 to 105.60% in 2020. The increase in consumption and the consumption level of energy and protein indicates an improvement in the Central Java population. The average energy consumption level is categorized as sufficient (<100%), except in 2018, it is categorized as good (>100%). Meanwhile, the level of protein consumption is categorized as good, except in 2016, it is categorized as sufficient. Based on the location of residence, it is known that the average energy consumption and energy consumption level of the population in rural areas is higher than that of the population in urban areas.

4. Conclusion
According to the nutritional food consumption and the expenditure patterns of the population, the welfare of the Central Java population is increasing. During the period 2016–2020, there is a tendency to decrease the proportion of food expenditure and increase non-food expenditure. Still, the population
of rural areas is less prosperous than the population of urban areas. The welfare increase is also shown by decreasing the proportion of food expenditure on cereals and increasing prepared foods and drinks. The analysis of the nutritional consumption level shows that energy and protein consumption levels tend to increase from 2016–2020. The average energy consumption level is considered sufficient, and the average protein consumption level is considered good. The energy consumption and energy consumption level in rural areas are higher than in urban areas; conversely, the protein consumption and protein consumption in urban areas is higher than in rural areas.

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