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Research Article

# Food Consumption Patterns of the Community in the Border Area Sangihe Islands Regency, North Sulawesi Province

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## Abstract

One of the main activities in realizing food security is the achievement of food diversification through improving people's food consumption patterns. The balance of the amount and type of food consumed is important to note because one type of food alone cannot provide optimal nutritional needs. The formation of healthy and quality human resources requires a variety of food consumption to achieve a balance of nutrients according to the standard of adequacy rate. The purpose of this study was to determine the energy/nutrient adequacy rate (AKE/G) and protein adequacy rate (AKP/G) along with the expected food pattern score (PPH) as a parameter of food security and to determine the proportion of energy contribution from each food group to total consumption. energy, especially for people in border areas. The research design used is a cross-sectional study from September to October 2017. The population is community households in border areas with a total of 90 households selected by non-probability sampling purposively. The research data is sourced from secondary and primary data covering socio-economic characteristics, and energy and protein food consumption. Data analysis was carried out quantitatively and qualitatively. The results show that: 1) the average calorie and protein consumption of people in border areas is still within the ideal limit of the adequacy of calorie and protein consumption, which is 2015 kcal and 53.82 grams of protein, and the average consumption of energy and protein is classified as low. normal level deficit category. Consumption of the grain food group contributed energy ranging from 57.80% oil and fat 12.60%, animal food 10.45%, vegetables and fruit (8.41%), and tubers 3.34%). The oily fruit/seed food group and other food groups contributed at least 1.3-1.4% energy.

**Keywords:** Border Area; Food Consumption Pattern; Energy; Protein

## Introduction

Food is an important and strategic commodity, considering that food is a basic human need that needs to be available at any time in sufficient quantities with decent quality, safe for consumption and affordable prices by the community. Food as a basic human need whose fulfillment is a human right of every Indonesian people as stated in Law No.7 of 1996.

The pattern of community food consumption in each region is different, depending on the potential of the region and the cultural structure of the community. The border area is a manifestation of state sovereignty. As a frontier, the border area holds several complex problems, both from security and socio-economic aspects. The border area is not only understood as a geographical concept of the area directly adjacent to other countries as described in Law

(UU) no. 43 of 2008, but it is also a strategic area that nationally concerns the livelihoods of many people.

The program for achieving food consumption diversification has not been optimal, presumably due to the lack of implementation in the field in marketing and promoting the importance of diversifying food consumption and relatively low consumer acceptance of products. This condition concerns the image, socioeconomic value, and nutritional quality of non-rice carbohydrate sources, which have been considered inferior. Food diversification is one of the quantitative indicators that can describe household food security [1]. One of the important pillars of food security is access/affordability to food. |2| defines food diversification as the number of different foods or food groups consumed in a certain period of time [2]. This concept shows that to achieve a balanced nutritional life, households must consume a variety of foods and should not rely on only one source.

[3] reported that the average quality of food consumption in Indonesia is still low and less diversified, still dominated by food sources of carbohydrates, especially from grains. Furthermore ([4] reported the results of his study on the Sustainable Food House Area Model (MKRPL) activities in 4 districts/cities in North Sulawesi province, namely Bitung, North Minahasa, South Minahasa, and Southeast Minahasa, which showed that in general, the people who consumed the highest energy sources came from the grain group is 2021 kcal/capita/day, this value is above the ideal energy adequacy rate (AKE) of 2000 kcal/capita/day [5].

Humans need more than 40 types of nutrients to live an active and healthy life and no type of food can meet all of these nutritional needs. Micronutrient deficiency places a huge burden on sufferers and society, namely in the form of health costs and negative impacts on human resources and reduces economic productivity. This is because micronutrient deficiencies impair physical growth and learning, limit productivity, and ultimately perpetuate poverty in a continuous cycle.

The balance of the amount and type of food consumed is important to note because one type of food alone cannot provide adequate nutritional needs. Therefore, the community is advised to consume a variety of foods to achieve a balance of nutrients according to the standard of adequacy required for the formation of healthy and quality human resources [6]. The assessment of the quality and quantity of the diversity of community food consumption becomes the basis for identifying the characteristics and patterns of community food consumption which is then followed by calculating the quality of food consumption using the concept of the Expected Food Pattern (PPH). Based on this description, the purpose of this study is to identify and determine (1) the socioeconomic characteristics of the household, (2) the energy/nutrition adequacy rate (AKE/G) and the protein adequacy rate (AKP/G) along with the expected food pattern score (PPH). as a parameter of food security (3) the proportion of energy contribution from each food group to the total energy consumption of border communities.

## Methods

The research design used is a cross-sectional study from September to October 2017. The population is community households in border areas, namely members of the Women Farmers Group (KWT) with a total of 90 households selected by non-probability sampling purposively [7] table 1.

| District | Number of households (people) | Density(Km$^2$) | Respondens |
|---|---|---|---|
| Tahuna | 18.073 | 717,39 | 30 |
| Tahuna Timur | 13.491 | 544,33 | 30 |
| Tabukan Selatan | 5.953 | 86,63 | 30 |
| Amount | | | 90 |

**Table 1:** Population and sample of community respondents in border areas.

Source: Central Bureau of Statistics, Sangihe Islands Regency, 2016.

The data used in this study include primary data and secondary data. Primary data collection was carried out by field observations and direct interviews using questionnaires covering 1) household socioeconomic characteristics, 2) household food consumption patterns, 3) food consumption including energy and protein consumption.

Data analysis was carried out quantitatively and qualitatively. The data on the socio-economic characteristics and the food con-

sumption characteristics of the respondents were processed descriptively. Data analysis of household food consumption patterns was carried out quantitatively, namely to calculate: (1) the amount of consumption and the level of consumption of nutrients; (2) the contribution of food groups to the total recommended nutrients (% Nutritional Adequacy Rate); and (3) the quality of food consumption according to the Expected Food Pattern (PPH) score. Assessment of household food consumption using the food recall method with the following stages: (a) Conversion of food ingredients in grams; (b) Summing up uniform foodstuffs so that the total consumption of foodstuffs is obtained in one day; (c) Grouping food ingredients into nine food groups of the Hope Food Pattern (PPH), namely grains, tubers, animal foods, vegetables and fruit, oils and fats, oily fruits and seeds, and others [9]; and (d) Calculate the average household consumption of nutrients per capita per day, based on the type of food, the type of food group, and the total. Based on the average total nutrient consumption, the level of nutrient consumption is then calculated using the formula formulation; Nutrient Consumption Rate = (Nutrient Consumption/Nutrient Adequacy Rate) x 100%.

## Results and Discussion

### Household socio-economic characteristics

The characteristics of the household include the education level of the head of the family, the occupation of the head of the household, the household, the number of family members, and household expenses. The socioeconomic characteristics of the family are presented in table 2.

The education level of the respondents indicated that the majority (46.8%) of the education level of the head of the family (KK) were high school (SMA), as was the education level of housewives (40.8%). The level of parental education is one of the factors that influence the child's upbringing including feeding. The high level of education is related to the economic situation, educational facilities and infrastructure in the area as well as the motivation and desire of respondents to take higher education levels. The high level of education will increase consumption expenditure and affect consumption patterns [10]. Mother's educational background also influences the mother's behavior in managing the household, especially in the choice of daily food which plays an important role in determining the nutritional status of toddlers and families [11]. Household food security and good nutritional status are indicators

| Characteristics | Category | Percentage |
|---|---|---|
| Education Level of Head of Household | Elementary School | 10.8 |
| | Junior High School | 26.2 |
| | High School | 46.8 |
| | College | 16.2 |
| Housewife Education Level | Elementary School | 15.2 |
| | Junior High School | 28,2 |
| | High School | 40,8 |
| | College | 15,8 |
| Number of Family Members (Persons) | 4 family members (small) | 95.8 |
| | 5 - 7 family members (medium) | 4,2 |
| Head of Household Job | Not working | 1,5 |
| | TNI/Polri/PNS/ Employees | 19,5 |
| | Self-employed/service/ trade | 62,2 |
| | Farmer/fisherman/ labor | 12,3 |
| | Others | 4,2 |
| Housewife Job | Not working | 10,1 |
| | TNI/Polri/PNS/Employees | 5,8 |
| | Self-employed/service/ trade | 77,8 |
| | Farmer/fisherman/ labor | 2,1 |
| | Others | 4,2 |
| Household expenditure (Rp/cap/month) | Food expenditure | 426.278 |
| | Non-food expenditure | 394.149 |

**Table 2:** Characteristics of community households in border areas.

Source: Primary data analysis, 2016.

of the high level of nutritional knowledge and education of family members [12].

Berdasarkan jumlah anggota keluarga, mayoritas responden berada pada kategori keluarga kecil dengan jumlah anggota keluarga maksimal 4 orang. Peningkatan jumlah anggota rumah tangga tanpa diimbangi dengan peningkatan sumberdaya dan sumber mata pencaharian penunjang ekonomi akan menyebabkan alokasi pemenuhan pangan per anggota rumah tangga menjadi rendah [19]. Lebihlanjut dinyatakan bahwa ukuran jumlah anggota keluarga menentukan tingkat ketahanan pangan [13].

Mayoritas pekerjaan kepala keluarga adalah wiraswasta yaitu 62.2% namun masih terdapat 1.5% kepala keluarga yang tidak berkerja, sedangkan untuk ibu rumah tangga terdapat 77.8% berprofesi sebagai wiraswasta namun sebagian besar (10.1%) tidak bekerja. Ada kecenderungan bahwa jenis pekerjaan yang dilakukan mempengaruhi besar pendapatan yang diterima individu. Sebagian besar rumah tangga contoh (95.8%) termasuk keluarga kecil, hanya 4.2% keluarga sedang. Jumlah anggota keluarga mempengaruhi kebiasan makan dan gizi rumah tangga [14].

The average household expenditure per capita per month is Rp.810,427, where the average expenditure for food is Rp.426,278 of the total expenditure and the average expenditure for non-food is Rp.394,149. Based on the proportion of household food expenditure, most households have a proportion of food expenditure <60% so that they are included in the "food insecure" category of households. Household food expenditure is positively related to the availability of food as a source of energy for household consumption [15]. Families with small incomes will spend most or all of their income for food consumption needs [16]. The vulnerability of a household to access to food is reflected in the proportion of spending to buy food. [17,18] stated that households with low incomes will only consume certain food products, especially rice commodities. In addition, the food price factor affects household demand for certain types of food, which will then affect the effective demand/household food consumption. A household is said to have good food affordability if its per capita income is above the poverty line and the proportion of food expenditure is less than 60% of real expenditure [19]. One that affects household food diversification is household income [20-22]. The higher the household income, the more diversified the food consumed by the household is.

## Food consumption pattern

Food consumption patterns in the people of North Sulawesi, especially in the border areas of the Sangihe Islands Regency, shift dynamically, influenced by many factors such as social, cultural, economic conditions, preferences and availability. Every commodity in each food group is strived to always be present in every daily food menu, so that the energy adequacy of each individual can be fulfilled. Energy sufficiency in each individual is seen in the PPH value which is expected to continue to increase in magnitude. Nutritional norms indicate that there is a minimum standard of the amount of food an individual needs to live a healthy and active life. One measure of the quantity of food consumption is the amount of energy consumption or protein consumption.

Consumption of calories and protein by households in border areas based on food groups is presented in table 3. The total value of calorie consumption is 2015 kcal/capita/day and protein consumption is 53.82 grams/cap/day. The total energy adequacy rate above 2000 kcal/capita/day has reached the average national ideal energy adequacy rate of 2,000 kcal [5], or is already above the regional needs standard of North Sulawesi Province (BPS, 2016), so that when viewed from the classification food consumption level is classified as normal category (90-<120% AKE/G). This result is much more realistic than the 2 regions in Java, namely Central Java and DKI Jakarta, which are below the 2000 kcal figure [23]. Household size is a determinant in energy consumption. The larger the household size, the less food is available that can be distributed to household members [24]. The Protein Adequacy Rate (AKP) is quite ideal compared to the regional needs of North Sulawesi Province, which is 50 grams [8]. When compared with the Protein Sufficiency Rate of 52.0 grams/capita/day, the level of protein consumption is still above the national average of 50.1 grams/capita / day [23,25,26].

The results of the study (Table 3) also show that the highest contribution of calories and protein is in the food groups of grains, oils and fats, animal foods and vegetables and fruit. This shows that the consumption of people in border areas is still dominant in the cereals and animal protein group, so it is still necessary to diversify food consumption, especially for non-rice food consumption and vegetable protein.

| No | Food Group | Sangihe Islands Regency | | | |
|---|---|---|---|---|---|
| | | Energy | | Protein | |
| | | kcal | % | gram | % |
| 1 | Grains | 1165,2 | 57,80 | 26,39 | 49,03 |
| 2 | Tubers | 67,4 | 3,34 | 0,43 | 0,80 |
| 3 | Animal Food | 210,7 | 10,45 | 20,43 | 37,96 |
| 4 | Oils and Fats | 254,1 | 12,60 | 0,15 | 0,28 |
| 5 | Oily Fruits/ Seeds | 27,9 | 1,38 | 3,0 | 5,57 |
| 6 | Nuts | 51,9 | 2,57 | 0,48 | 0,89 |
| 7 | Sugar | 41,7 | 2,07 | 0,02 | 0,01 |
| 8 | Vegetables and Fruits | 169,5 | 8,41 | 2,92 | 5,43 |
| 9 | Others | 27,5 | 1,36 | | |
| | Total | 2015 | 100,00 | 53,82 | 100,00 |

**Table 3:** Energy and protein consumption by food group in border areas Sangihe Islands Regency, 2017.

Primary data analysis, 2016.

| No | Food Group | Sangihe Islands Regency |
|---|---|---|
| 1 | Grains | 25,0 |
| 2 | Tubers | 1,7 |
| 3 | Animal Food | 20,4 |
| 4 | Oils and Fats | 4,0 |
| 5 | Oily Fruits/Seeds | 0,6 |
| 6 | Nuts | 5,0 |
| 7 | Sugar | 1,0 |
| 8 | Vegetables and Fruits | 30,0 |
| 9 | Others | |
| | Total | 87,7 |

**Table 4:** Scores of expected food patterns (PPH) per group of foodstuffs in border areas Sangihe Islands district.

Primary data analysis, 2016.

The indicator to measure the level of diversity and balance of food consumption, which is also an indicator of the quality of food consumption is the Expected Food Pattern (PPH) score. According to [27]. the PPH approach can be assessed for the quality of the population's food based on the food score (dietary score). The quality level of food consumption patterns in border areas is indicated to be not diverse, nutritious and balanced. This is indicated by the PPH score ranging from 0.6 to 87.7 or less than the ideal PPH score of 100 (Table 4).

The total score of the Hope Food Pattern (PPH) in the Regency is around 87.7, still not reaching the target of obtaining the North Sulawesi provincial government plan above 90 grams [8]. The low value of the Hope Food Pattern (PPH) is related to the collection of several sub-districts in the border area that are included in the category of food insecurity and high risk nutrition. The food consumption patterns of the people of the border areas are not yet diverse in terms of both quality and quantity, so it is necessary to develop food diversification to achieve nutritional adequacy standards. The quality of consumption is relatively low, if it does not meet nutritional needs in the long term, it will have an impact on decreasing nutritional status and increasing morbidity rates. Efforts to increase the value of the Hope Food Pattern (PPH) are to ensure food availability. Furthermore, the scenario of achieving the ideal Expected Food Pattern (PPH) score will be realized more quickly by accelerating food diversification. The higher the food quality score, the more diverse the food situation and the better the composition and nutritional quality [30].

## Conclusion

People's food consumption in the border areas is above the Ideal Energy Adequacy Rate of 2,000 kcal/capita/day and is included in the normal category (90-<120% AKE/G). The total value of food consumption is above the energy adequacy rate, which is 2,015 kcal per capita per day. While protein consumption is 53.82 grams/capita/day. When compared with the Protein Adequacy Rate of 52.0 grams/capita/day, the level of protein consumption has reached 110.5% of the RDA. Food consumption patterns are still not diverse, nutritious and balanced. This is indicated by the PPH score of 87.7 or less than the ideal PPH score of 100. Consumption of the grain food group contributes 57.80% of energy, oil and fat 12.60%, animal food 10.45%, vegetables and fruit (8.41%) and tubers 3.34%. The oily fruit/seed food group and other food groups contributed at least 1.3-1.4% energy.

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