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Analysing Food Consumption in Indonesia

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Abstract – This study analyzed the patterns of food consumption of communities in Indonesia. The data used was the National Socio-Economic Survey (SUSENAS) data in 2016. The method used to achieve the research objectives was descriptive statistical analysis. The results obtained showed that the average household income in Indonesia in 2016 amounted to IDR 3,469,497/household and dominated by family heads with an education level equivalent to the elementary school of 60.65%. Rice was the most consumed commodity with a participation rate of 97.27 %, and this was also evidenced that rice is an important source of food in the community. The share of expenditure allocated by households to buy rice was 17 %. Based on the results, the government should promote a food diversification program so it can reduce people's dependence on rice and strengthen the food security in Indonesia.

Keywords – Food, Consumption, Communities.

I. INTRODUCTION

As the main basic needs of humans, food must always be supplied in a certain amount. This is a human right that cannot be contested. The state as an institution that protects the fulfillment of the basic needs of the community is formally regulated through the 1945 Constitution of the Republic of Indonesia (UUD 1945). Implementation of the UUD 1945 is reaffirmed by issuing Law of the Republic of Indonesia, number 18 of 2012 concerning food. In this law, tasks assigned to the government to achieve food sovereignty and avoiding people from food insecurity and malnutrition that will affect the quality of human resources is detailed (Diana and Dewi 2015).

The problem of food needs fulfillment faced by Indonesia is also faced by countries in Asia, other Pacific countries and African countries (Oyinbo et al. 2013) and (Akinbode 2015) where improving food availability, improving access, and stability in meeting food needs is a policy from each country (Timmer 2014).

The food diversification program is a policy promoted by the government to overcome the above problems to reduce the enormous community demand for rice. It is expected that with the diversification of food, the government burden in providing adequate food needs of the community will be more easily fulfilled (Rachman, Handewi P S 2008). Each country is trying to meet its own food needs because the world food market is very fragile and the amount of world food availability is also limited (Mahbub 2012).

Household consumption patterns are a part of economic development indicators and factors that affect the welfare of a country's population. The consumption pattern is defined as a combination of commodities needed in the household that must be fulfilled within a certain time span. As rational-minded individuals, the order of selection of household needs is the basic needs compared to their tertiary needs (Amanaturrohim Hanifah 2016). This is in agreement with what stated by other previous studies that the demand model is useful as an evaluation material in tax policymaking (Banks et al. 2007)

The National Socio-Economic Survey (SUSENAS) data collected by the Central Bureau of Statistics is a survey conducted initially every three years, but to provide more detailed data then this data collection is performed annually. SUSENAS data in 2016 contains information about the

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number of commodities that are consumed in a week by the communities in Indonesia and how much they have spent to get these commodities. The number of commodities surveyed was 126 items. This data presented the consumption patterns of the Indonesian communities. Furthermore, this consumption pattern will provide information to the government on how to facilitate the people to get their needs. This data is an important source of information required by the government as a material for consideration in future decision making (Wijayati et al. 2019).

Research on the characteristics of households and their behavior in consuming food will influence the policies that will be taken by the government related to the community food supply. Based on the explanation above, this study analyzed the food characteristics and consumption of communities in Indonesia.

II. Literature Review

Standard demand theory analyzes the choice behavior of individuals who always want to maximize the utility or satisfaction of consuming goods and services with a limited budget. It is assumed that, consumers have complete information about available choices and evaluate these choices before choosing goods and services to be consumed (Okrent and Alston, 2011). Several studies have been conducted regarding consumption behavior and elasticity with varying results. Research conducted by Wahyuni *et al.* (2016) showed that partially the prices of the three food sources of protein (fish, meat, and chicken), household expenditure, the area of residence of the household, and the number of household members had an influence on the share of consumption expenditure of the three food sources of protein (fish, meat) , and chicken). The price elasticity of the price of the three food sources of animal protein sources included in the inelastic category,while the income elasticity for consumption of meat and chicken is included in the elastic category and income elasticity for fish commodities is included in the inelastic category.

Furthermore, Alexandri *et al.* (2015) estimated the parameters of the food demand system using the Almost Ideal Demand System (AIDS) model to see consumption behavior in Romanian society after population's food security policy was applied. System parameters differ between cities and villages. The results show that the expenditure elasticity in villages is higher than in cities. Then, Budiwinarto (2011) in his research found that the proportion of food was 80.76% with the largest proportion of food being sea fish commodities. In addition, Adekunmi *et al.* (2017) in his study found that rural residents, whose average income is classified as poor families, have a small proportion in spending on consumption of animal protein food sources, with protein sources obtained from meat and fish. In addition, by looking at the social economic characteristics, namely that marital status, education status, and income are factors that influence animal protein consumption patterns. The research to be conducted is different from previous studies because it will specifically analyze the characteristics and food consumption of people in Indonesia.

III. Research Methods

The data used in this study was secondary data which is the first quarter 2016 of SUSENAS data in March 2016 collected by the Central Bureau of Statistics. This data contains the consumption of 126 food commodities carried out by 300 thousand households as a sample unit.

To facilitate the analysis, 126 commodities were grouped into 13 food groups. There was no price data in this survey, so the commodity price approach was carried out by calculating the unit value using the following equation:

$$uv_j = \frac{e_j}{q_i} \qquad (1)$$

Where $\mathbf{uv_j}$ is the unit value of the j^{th} commodity, $\mathbf{e_j}$ is the value of money spent by the household to buy the commodity, and $\mathbf{q_j}$ is the amount of commodity consumed by the household. After obtaining the commodity price approach, commodity price per food group was approached by calculating a weighted average. The formula is:

$$uv\_group_j = \sum_{j=1}^{Ji} \left[uv_j \frac{e_j}{\sum_{j=1}^{Ji} e_j} \right] \qquad (2)$$

After obtaining the number and price of food groups then the data was analyzed using descriptive statistics including the average consumption, minimum and maximum values, and standard errors of each data.

IV. Results And Discussion

The National Social Economic Survey (SUSENAS) data was collected from all over Indonesia covering 511 city districts from Sabang to Marauke. The number and composition of households recorded is adjusted to the level of population density in the district or city. The smallest number of households collected in one regency / city is 166 households while the most is 1.166 households.In the analysis in this study also included variables related to the

demographics of the respondent's household such as the number of household members, the age of the head of the household and the length of education of the head of the household. Related to the length of education of the head of the household is used as one of the variables because it is suspected that the longer the education of the head of the household will get more knowledge related to the content of food eaten and the good or bad of a food commodity for consumption. For more details on how the old picture of head of household education can be seen in Table 1.

Table 1. Frequency distribution of education level of family heads in 2016

Duration of education (Years)	Number of households (Family)	Percentage (%)
6	176,746	60.65
9	3,475	1.19
12	17,836	6.12
13	50,007	17.16
15	1,961	0.67
16	10,394	3.57
18	87	0.03

Table 1 shows that the recent education of family heads are still dominated by elementary school education, with a total of 176,746 family heads or 60.65 %. Based on this fact, it is shown that the level of education in Indonesia is still relatively low. Education is closely related to poverty. The education of the family heads will affect the type of work which will ultimately affect household income. The most recent education after elementary school is the equivalent to high school (12-13 years), which is 23.28 % and the equivalent to junior high school (9 years) is 1.19 %. The education of the family head equivalent to a Bachelor (16 years) is 3.57 % and equivalent to a Master (18 years) is only 0.03 % of the household.

Commodity treatment

For the purposes of this research, it is focused on household food consumption where the grouping of food consumed is based on the similarity of food sources (carbohydrates, proteins, fats etc.) and is related to the focus that will be the main discussion in this research. Table 2 illustrates the grouping of 126 foods into 10 major food groups.

Based on Table 2, it can be seen the food group into 10 the main group. Rice is not combined with other commodities based on the consideration that as staple food for 97 percent of Indonesian people, rice has a large portion of total household expenditure. in addition to the rice commodity, many governments make policies commodity, many governments make policies related to prices and the amount and distribution in the community so that the characteristics of rice in household consumption patterns have particularities which will be discussed in further discussion. In group 2 it contains food commodities containing carbohydrates other than rice. Consideration why this commodity is classified in one group because it is a source of carbohydrates in the community of this commodity is thought to be a choice of carbohydrate sources besides rice, in addition there are still a few places in Indonesia that consume products from this group as a staple food source.

Table 2. Food Groupings Based on 2016 Susenas data

Group	Types of Food Groups	Food Commodities
1	Rice	Rice
2	Other carbohydrates	Glutinous rice, wet corn with skin, corn shelled, wheat flour, yams, cassava, sago, taro, potatoes, cassava
3	Fish	Mackerel tuna / tuna / skipjack, bloating, anchovies, tilapia, milkfish, catfish / catfish / cork / eels, other freshwater / brackish fish, other fresh / seawater fish, shrimp / squid / cuttlefish / clam / crab (fresh), freshwater / brackish fish preserved / marinated, canned fish
4	Meat	Beef, pork, flavored chicken meat, free-range chicken, preserved meat (sausages, nuggets, smoked meat, corned beef), tetelan
5	Eggs, milk, beans	Broken chicken eggs, free-range chicken eggs, duck eggs / mania eggs, quail eggs, milk powder, factory liquid milk, sweetened condensed milk, baby milk powder, skinless peanuts, tofu, tempeh

6	Vegetable	Spinach, kale, mustard greens, beans, long beans, tomatoes, cassava leaves, eggplant, bean sprouts, vegetable soup, sour vegetables, young jackfruit, onion, garlic, red chili, cayenne pepper
7	Fruit	Oranges, mangoes, apples, rambutan, duku, durian, soursop, banana, papaya, watermelon
8	Fat	Cooking oil, coconut oil, coconut
9	Beverage ingredients, seasonings, other consumption	Granulated sugar, brown sugar, tea powder, tea bags, ground coffee, instant coffee, salt, candlenut, coriander, pepper, tamarind, shrimp paste / paste, soy sauce, flavoring / vetsin, instant cooking spices, other seasonings (nutmeg, ginger, turmeric), instant noodles, raw crackers, packaged baby porridge
10	Food and cigarettes	Bread, pastries / biscuits, cookies, fried foods, gado gado, mixed rice, fried rice, white rice, rice cake, soto / gule / rawon / chopped, meatball noodles, children's snacks, processed fish dishes, processed meat dishes , bottled water, gallon bottled water, ice, soft drinks, ready-made drinks (coffee, milk coffee, tea, milk, chocolate), liquor, unfiltered clove cigarettes, filter clove cigarettes, white cigarettes

The group 3 includes all commodities sourced from fish both freshwater fish, fresh seawater fish and those already in the process of preservation. While group 4 covers all food commodities sourced from chickens, cows, buffaloes and pigs. The reasons for selecting groups 3 and 4 are based on protein sources. Besides fish and meat, other protein sources that are also recorded in the Susenas data are eggs, milk and legumes, so all commodities sourced from these commodities are grouped in group 5. This is in line with a research conducted by Ilham that consumption of protein sources of food fluctuates based on holidays and other celebrations (Ilham et al. 2019). Besides that, another reason of the low meat consumption is because the meat prices per unit are higher than other commodities (Nugroho and Wardhani 2016).

Group 6 and group 7 are groups of food commodities that are included as contributors to vitamins and minerals for the body which are usually donated by fruits and vegetables. Whereas group 8 is a food group consisting of cooking oil either sourced from oil palm or coconut including in this group are coconut milk and whole coconut.

Group 9 is all ingredients and spices and other food ingredients. Although the Susenas data has been prepared with a detailed questionnaire and with a variety of foods that may be consumed by the household, there are also some foods that are not covered in the questionnaire, so to anticipate this, all undefined foods in other groups are included in this group.

The last group is all food which is food that is ready to be eaten and bought so to be consumed in the household and included in this group are cigarettes. although cigarettes are not included in the food group but considering the number of households that consume these commodities, it is assumed that the percentage of users will affect the ability of households to consume other food.

As explained in the methodology that in the 2016 Susenas Data there are no data on commodity prices but what is available is the amount of expenditure spent by households to purchase a number of food commodities. Based on this, the unit value obtained is used as the price approach. Based on this, Table 3 provides an overview of the average price of food and the average amount consumed by households in 2016.

Based on Table 3, it can be seen that those who have the highest average price are the meat food group, which is Rp. 39 145.91 / unit while those who have the lowest average price are other carbohydrate groups with a value of Rp. 10871.04 / unit. The average price of rice is Rp. 9277.73 / unit.

Table 3 Types of food and average prices in 2016

Food type	Average price (IDR/kg):
Rice	9,277.73
Other Carbohydrates	10,871.04
Fish	26,674.80
Meat	39,145.91
Eggs, milk and beans	20,661.1
Vegetables	12,805.07
Fruit	9,923.95
Fat	11,944.25
Ingredients drinks, herbs and other consumption	1,216.19
Cigarettes and food	1,905.28

The average price that applies to each type of food will affect the ability of the community to consume it and how much the share of expenditure used for this. The Traore and Deacue study (2017) states that the percentage of public expenditure in Burkina Faso where the percentage of expenditure used to buy staple food (cereals) is 52.3 percent of their total budget on food, therefore the prevailing average price may affect on public consumption.

Furthermore, the description of Per capita consumption based on rural and urban (per capita / week) of people in Indonesia can be seen in Table 4.

Table 4. Per capita consumption based on rural and urban areas (per capita/week)

Food Type	Rural	Urban
Rice	1.89	1.55
Other carbohydrates	0.50	0.27
Fish	0.42	0.41
Meat	0.09	0.15
Egg	1.58	2.42
Milk	0.04	0.09
Beans	0.20	0.29
Fat	0.28	0.26
Vegetable	0.76	0.76
Fruit	0.43	0.54
Other consumption	69.10	58.89
Cigarette	17.19	15.40
Prepared food	8.37	12.12

Demographic variables affect one's consumption patterns such as differences in consumption between rural and urban populations. Some types of food, such as rice, other carbohydrates, fish, other consumption and cigarettes, have higher per capita consumption in rural areas compared to urban areas. Meanwhile, consumption of meat, beans, eggs, milk, fruit and prepared food, is higher in urban areas compared to rural areas. The consumption of other carbohydrate per capita in rural areas is twice as high as in urban areas. Other carbohydrates are tubers, corn, and sago. This is because people still tends to consume local food in rural areas such as corn in East Java and East Nusa Tenggara, sago in Maluku, and tubers in Papua. Meanwhile, consumption of prepared food in urban areas was 41 % higher than in rural areas. The results of the analysis showed that per capita consumption of prepared food in urban areas was 12.12 units/capita/week, whereas in rural areas it was only 8.37 units/capita/week. This indicates that there are differences in consumption behavior between rural and urban populations. People in urban areas tend to have a lifestyle in consuming fast food. In addition, urban areas have easy access and have more restaurants than in rural areas.

Table 5. Per capita consumption based on Java and outside Java regions (per capita/week) in 2016

Food Type	Outside Java	Java
Rice	1.83	1.58
Other carbohydrates	0.46	0.28
Fish	0.50	0.24
Meat	0.11	0.14
Egg	1.77	2.37
Milk	0.06	0.08
Beans	0.17	0.40
Fat	0.28	0.25
Vegetable	0.75	0.82
Fruit	0.48	0.48
Other consumption	68.12	58.62
Cigarette	17.23	14.99
Prepared food	8.73	13.11

Community consumption behavior also differs between households in Java and outside Java. Food consumption such as meat, eggs, milk, beans, vegetables, and food is higher in Java Island than in outside Java. Meat and egg consumption in Java is higher because the highest producers of chicken farms, both broilers and laying hens are found in Java. Meanwhile, other types of food such as rice, other carbohydrates, fish, and cigarette consumption are higher in outside Java than in the regions of Java. Fish consumption is high in outside Java because the largest sea waters are found outside Java. The consumption of rice and other types of carbohydrates is found higher in outside of Java than in Java. This is because outside Java are generally still rural and agricultural, so that households still dominate the consumption of rice and other local food as a source of calories. The results showed that consumption of prepared food in Java reached 13.11 kg/capita/week.

As the main carbohydrate source, the amount of rice is still a big assignment for the government to fulfill Even at certain times due to increased demand, the amount is less so imports must be carried out because of high consumption both in Java and outside Java. (Pontoh et al. 2016).

According to a research conducted by Nur et al. (2013), the factors that influence rice consumption are the population, income level, the price of rice, the price of substitute products (flour) and the amount of rice production. This is consistent with what Siregar explained that rice is a source of carbohydrates that functions to produce energy for the human body (Siregar 2014).

Table 6. Food consumption by region in Indonesia in 2016

Food Type	Sumatra	Java	Bali and East Nusa Tenggara	Kalimantan	Sulawesi	Maluku and Papua
Rice	1.83	1.58	0.12	1.66	2.03	1.42
Other carbohydrates	0.26	0.28	0.46	0.23	0.36	1.64
Fish	0.44	0.24	0.32	0.46	0.66	0.63
Meat	0.12	0.14	0.12	0.17	0.06	0.08
Egg, Milk, Beans	0.81	0.95	0.47	0.82	0.55	0.35
Vegetable	0.78	0.82	0.82	0.59	0.73	0.79
Fruit	0.47	0.48	0.37	0.51	0.57	0.43
Fat	0.33	0.25	0.20	0.25	0.27	0.28
Ingredients drinks, herbs and Other consumption	70.30	58.62	62.69	70.77	72.50	54.85
Cigarette	19.75	14.99	10.69	18.71	18.20	11.08
Prepared food	9.72	13.11	7.74	10.16	7.87	5.79

Overall, household per capita consumption in Indonesia is divided into 6 main regions, i.e., Sumatra, Java, Bali and East Nusa Tenggara, Kalimantan, Sulawesi, and Maluku and Papua. The highest rice consumption was found in Sulawesi region and then Papua of 2.03 kg/capita/week and 1.83 kg/capita/week per capita consumption, respectively. The highest consumption of other carbohydrates and fish was found in Maluku and Papua with a per capita consumption of 1.42 kg/capita/week. Maluku region is identical with its special food, namely sago, while Papua is tuber food. Per

capita fish consumption is the highest in this area because this area is surrounded by sea waters as the main producer of capture fisheries. The highest consumption of fat was found in Sumatra, with fat consumption per capita reaching 0.33 L/capita/week. This is because foods and snacks in Sumatra are rich in oily and fatty foods, especially in North Sumatra and West Sumatra. Per capita consumption of eggs, vegetables and fruit was higher in Java compared to other regions. Per capita consumption of prepared food in Java region was found higher compared to other regions. The second highest per capita consumption of prepared food was Kalimantan of 10.16 unit values/capita.

V. Conclusion

The results obtained indicate that rice is the most consumed commodity in Indonesia. This is also evidenced that rice is an important staple food source in the community. Based on this study, it is suggested that the government should promote a food diversification program so that it can reduce people's dependence on rice and strengthen the food security in Indonesia.

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